



ANNUAL REPORT

# **BTI** Institute

Borders • Trade • Immigration

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A Department of Homeland Security Center of Excellence

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# EXECUTIVE SUMMARY

This Annual Report is focused on our progress and accomplishments over performance period 2 and as such, builds upon the initiation of the BTI Institute in the previous year. During this performance period, we have emphasized transparent processes to streamline reporting and reduce administrative burden to our Performers, establishing clear metrics for assessing current programs and launching highly focused new Research & Development programs to meet the needs of DHS components. A key area for our center is the development of effective transition strategies to efficiently make technologies and applications quickly available to address today's challenges. A number of Standard Operating Procedures have been created to improve workflow and transparency; these have been made available to other Centers of Excellence. The BTI Institute looks forward to exciting new projects and continued achievement in ongoing projects in the coming year.

## A. INTRODUCTION

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The DHS Center of Excellence (COE) named Borders, Trade, and Immigration (BTI) Institute was previously referred to as the Center for Borders, Trade, and Immigration Research (CBTIR). The name change occurred in August 2016 as part of a process for developing a branding strategy for this COE. This change was approved by both the DHS Office of University Programs (OUP), which administers the COE program, and the University of Houston (UH), which leads the BTI Institute.

### A.1. MISSION

The BTI Institute's mission is to conduct research, develop innovative solutions, and provide educational materials to enhance the nation's ability to secure our borders, facilitate legitimate trade and travel, and ensure the integrity of our immigration system.

Through a multi-disciplinary team of national and international experts, the BTI Institute delivers transformational technology-driven solutions, data-informed policies, workforce development opportunities for today's Homeland Security Enterprise, and trans-disciplinary education for the next generation of homeland security experts.

### A.2. VISION

The BTI Institute's vision is to strengthen homeland security, social, and economic development as a global leader in research and education for transnational flows.

### A.3. RESEARCH AND EDUCATION THEMES

In Spring 2017, the BTI Institute conducted a review of goals and objectives to better clarify their alignment with the research questions in the Notice of Funding Availability (NOFA), and to identify critical areas for future Requests for Proposals (RFPs). These RFPs are issued to rebalance the research portfolio of the BTI Institute across the high priority areas identified in the NOFA through soliciting new projects and partners. The results of our analyses were used to help capture and organize BTI Institute projects under major research and education themes.

### **A.3.a. Research Themes**

#### THEME 1. Enhance the U.S. Border Management Operations

- Promote International Partnerships for Prevention, Deterrence and Facilitation
- Improve strategic capabilities and technologies to prevent, deter, and counter the illegal activities of Transnational Criminal Organizations (TCOs)
- Improve the safety, efficiency and operational effectiveness of U.S. Border Operations

#### THEME 2. Enhance the Ability to Secure and Facilitate Transnational Flows of People

- Promote Prevention and Deterrence of Unauthorized Transnational Flows of People
- Facilitate Legitimate Travel

#### THEME 3. Enhance the Ability to Secure and Facilitate Transnational Flows of Goods

- Promote Deterrence of Unauthorized Transnational Flows of Goods
- Facilitate Legitimate Trade

#### THEME 4: Enhance the Ability to Promote the Integrity of the Immigration System within the U.S. Border

- Improve the understanding of the characteristics of the immigrant population in the U.S
- Improve the understanding of economic and societal impact of the immigrant population in the U.S.
- Enhance the use of best practices in the administration of immigration
- Promote Immigrant Integration into communities

#### THEME 5: Enhance the Ability to Secure and Facilitate Transnational Flows of Data and Financial Capital

- Promote Prevention and Deterrence of Unauthorized Transnational Flows of Data and Financial Capital
- Facilitate Transnational Flows of Data and Financial Capital

### **A.3.b. Education Themes**

THEME 1: Create and offer training, seminars and workshops critical to the Homeland Security Enterprise (HSE)

THEME 2: Establish a pathway for post-secondary students to pursue a career path with HSE

## A.4. PARTNERS

Table 1 lists the BTI Institute’s principal partners (10 U.S. universities and 1 industry partner) for the period covered in this report and Figure 1 shows their geographic distribution (Arizona, California, Minnesota, New Jersey, North Carolina, Texas, and West Virginia).

**Table 1.** BTI Institute principal partners. Minority Serving Institutions are denoted with an asterisk (\*).

Principal Partners	Areas of Expertise / Core Capabilities
Middlebury Institute of International Studies at Monterey	Export Control and Nonproliferation
Rutgers, the State University of NJ– Newark* and New Brunswick	Systems: Modeling, Analysis, and Optimization
Texas A&M International University*	Criminal Justice, Human trafficking
Texas A&M Transportation Institute	Intelligent transportation systems; International land border crossings
University of Arizona*	Border Management Policy
University of Houston*	Biometrics; Video Analytics; Multi-Spectral Surveillance; Big data Analytics; Supply Chain Security; Port security; Technology Transfer
University of Minnesota*	Navigation & Localization; Sensor fusion
University of North Carolina, Charlotte	Vulnerabilities of Biometric Systems
University of Texas at El Paso *	Federal Law Enforcement Training
Voir Dire international, LLC	Geographic Information Systems; All-Source Data Collection
West Virginia University	Biometrics; Multi-spectral and Hyper-Spectral Imaging



**Figure 1.** Geographic distribution of the BTI Institute’s Principal Partners.

## **B. PERSONNEL**

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Personnel titles reflect the BTI Institute's Year 3 Work Plan.

### **Director/PI**

Ioannis A. Kakadiaris, Ph.D., is a Hugh Roy and Lillie Cranz Cullen University Professor of Computer Science, Electrical & Computer Engineering, and Biomedical Engineering at the University of Houston, Houston, TX. He also holds an adjunct position at the School of Health Information Sciences at the University of Texas, Health Sciences Center. He joined UH in August 1997 after a postdoctoral fellowship at the University of Pennsylvania.

Dr. Kakadiaris earned his B.Sc. in physics at the University of Athens in Greece, his M.Sc. in computer science from Northeastern University, and his Ph. D. at the University of Pennsylvania. He is the founder and director of the Computational Biomedicine Lab ([www.cbl.uh.edu](http://www.cbl.uh.edu)). His research interests include cardiovascular informatics, biomedical image analysis, biometrics, computer vision, and pattern recognition. Dr. Kakadiaris is the recipient of a number of awards, including the NSF Early Career Development Award, Schlumberger Technical Foundation Award, UH Computer Science Research Excellence Award, UH Enron Teaching Excellence Award, and the James Muller Vulnerable Plaque Young Investigator Prize. His research has been featured on Discovery Channel, National Public Radio, KPRC NBC News, KTRH ABC News, and KHOU CBS News.

### **Associate Director, Program Management**

Ioannis Konstantinidis, Ph.D. became Executive Director in January 2016. Prior to his appointment to this position, he was the founding principal of KC Consulting, a consulting firm specializing in research development, knowledge mobilization, and data analytics. He has held successive research faculty appointments at the University of Houston and University of Maryland, College Park (UMD), where he also served as Associate Director of the Norbert Wiener Center for Harmonic Analysis and Applications at UMD. He earned a Ph.D. in Mathematics from UMD and most recently served as Secretary of the National Organization of Research Development Professionals.

### **Executive Director, Strategic Partnerships**

Kevin Clement is an accomplished Homeland Security and Emergency Management professional with in-depth program management and interagency coordination experience. A retired Army Infantry officer with over 23 years of active service, he has had consistent success in leading and directing homeland security, emergency management, and public safety activities with specific expertise in critical infrastructure security and resiliency, continuity of operations planning, public safety, anti-terrorism, and border security operations. A respected planner, he is the author of the Texas Border Security Operations Plan (Operation Border Star 2010), the Texas Critical Infrastructure Security and Resilience Plan (2014), and the Texas Cross-Border Mass Migration Plan. Most recently, he led the Texas State Agency Continuity of Operations (COOP) initiative and the development of a statewide Preventive Radiological and Nuclear Detection (PRND) Strategy and CONOPS. Kevin served as Texas's representative to the State, Local, Tribal and Territorial Government Coordinating Council (SLTTGCC) and co-chair of its Regional Initiatives Working Group. He received a Bachelor of Science degree from the United States Military Academy, and Master of Arts degrees from the U.S. Naval War College (National Security and Strategic Studies) and Salve Regina University (International Relations).



### **Program Director, Workforce and Education Initiatives**

Tiffany Roosa brings over 15 years of experience delivering education program offerings across a broad spectrum of institutions including a tribal college, and public and private universities. Tiffany is currently pursuing a Ph.D. in Measurement, Quantitative Methods, and Learning Sciences at the University of Houston. Her area of research focuses on quantitative analysis of factors relating to student success. Previously she earned a Master of Business Administration from City University in 2001 and a Bachelor of Arts in Sociology from Western Washington University in 1995.

### **Program Director, Business Operations and Administration**

Rachel Brownlie worked in non-profit and the public sector, and has substantial experience with executive organizational management, operations and systems development; grants management, administration, evaluation and monitoring; and community organizing. Ms. Brownlie received her Bachelor's Degree in Sociology from the University of Evansville, and has completed all coursework for her Master's in Urban Planning and Public Administration from the University of Texas-Arlington.

### **Program Coordinator, Special Projects**

Barbara Dwyer worked in education for over 25 years in a multitude of capacities including teaching elementary school; coordinating a research study for the University of Houston's Graduate College of Social Work; founding and serving as the program coordinator for Cougars in Recovery, the collegiate recovery community at the University of Houston which supports students in recovery from substance use disorders. Barbara's experience includes planning and developing methods for program implementation, coordinating program activities and processes, preparing reports, developing and maintaining databases, implementing policies and procedures, and arranging special events. Barbara was educated in New Jersey, earning her Bachelor's Degree in Elementary and Special Education from Kean College of New Jersey, and her Master's Degree in Learning Disabilities from Montclair State College.

### **Media and Communications Advisor**

Dr. Lan Ni is an Associate Professor in the Valenti School of Communication, specializing in public relations and strategic communication. Her major areas of research include stakeholder engagement and strategic relationship management, intercultural and global public relations with a focus on immigrants and minority groups, as well as identification and segmentation of publics.

Dr. Ni has received multiple research grants and published in major journals in communication and public relations such as the Journal of Public Relations Research, Public Relations Review, Journalism and Mass Communication Quarterly, Journal of Communication Management, Journal of Public Affairs, International Journal of Strategic Communication, and Public Relations Journal. Her work has also been presented at major conferences such as the International Communication Association, the Association for Education in Journalism and Mass Communication, the National Communication Association, the Public Relations Society of America, and the International Public Relations Research Conference. She currently serves on the editorial board of the Journal of Public Relations Research, the Western Journal of Communication, and Communication Booknotes Quarterly, as well as the Research Advisory Committee of the International Association of Business Communicators (IABC) Research Foundation.

## **B.1. UH LIAISONS**

### **Administrative Liaison**

Mary Ann Ottinger, PhD., is the Associate Vice Chancellor for Research for the UH System and Associate Vice President for Research for UH. Her responsibilities include leading the Office of Research Development, enhancing extramural funding by working with our outstanding faculty and staff to build interdisciplinary and multidisciplinary research programs. She also assists the Vice Chancellor/Vice President for Research and Technology Transfer in managing centers and institutes. Dr. Ottinger facilitates the collaboration and cooperation of partner offices and institutions within the University of Houston system to provide those interdisciplinary skill sets, unique capabilities, and experiences necessary to ensure the success of the BTI Institute in achieving its research objectives.

Dr. Ottinger has a Ph.D. in Zoology, with specialization in behavioral neuroendocrinology and environmental toxicology. She was a tenured professor at the University of Maryland, College Park (UMD) where she now holds the title of Emeritus Professor. Dr. Ottinger has a distinguished academic record with international recognition for her research in neuroendocrine systems, development and aging supported by NIH, NSF, EPA, USDA-NRI and DOI, incorporating an interdisciplinary and comparative approach to studies of neural systems, development and aging. She has spent the last nine years in administration, both at UMD and the Agricultural Research Service of the U.S. Department of Agriculture. From 2008 to 2011, she served as the Associate Vice President for Research Compliance at UMD. She also has served as a Program Officer at the National Science Foundation and as Interim Associate Dean of the Graduate School at UMD. Dr. Ottinger has received community and research excellence awards from Sigma Xi and Gamma Sigma Delta. She has also been elected as a Fellow of the American Association for the Advancement of Science and is Chair of the University Advisory Committee for Cancer Prevention & Research Institute of Texas and the Oversight Committee of the Gulf Coast Consortium.

### **Financial Liaison**

Beverly Rymer is the Executive Director of the Office of Contracts and Grants. In her role, she provides oversight in pre-award, post-award and financial matters for sponsored projects.

Prior to joining the Division of Research in 2010, Ms. Rymer worked as the Business Administrator for the College of Natural Sciences and Mathematics. Ms. Rymer earned a bachelor's degree in Psychology and Economics from the University of Massachusetts. In 2013, she earned a Master in Business Administration from the University of Houston-Victoria.

## **C. COMMITTEES**

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### **C.1. RESEARCH COMMITTEE**

The BTI Institute's Research Committee comprised the BTI Institute's Director and the following individuals: Maria Burns (UH), Ioannis Pavlidis (UH), Shishir Shah (UH), and Luis R. Torres (UH). The Committee monitored research progress for BTI Institute partner projects, intervening where necessary during the course of the budget year to steer R&D on a productive path. The Committee was also tasked with providing feedback on the formulation of Performer workplans in advance of the OUP Program Manager review when new projects were approved, to facilitate the onboarding process. The Research Committee reviewed workplans and provided feedback to the

performers on stakeholder engagement, logic model development (tasks, milestones, outputs) and performance metrics. A detailed description of the Research Committee's efforts is provided in Section E. Project Management Activities.

## **C.2. BTI INSTITUTE FELLOWS**

### **C.2.a. Purpose**

The BTI Fellows were created to expand the capabilities and expertise of the BTI Institute's faculty and staff. These Fellows provide expertise in a wide variety of topics working from locations throughout the United States – helping to achieve research objectives addressing homeland security issues pertaining to our northern and southern borders, coastal regions, territories, and critical infrastructure.

Each of the BTI Fellows is a highly experienced and eminently qualified subject matter expert in at least one topic area related to the BTI Institute's mission. Collectively they bring expertise in areas such as border security, cyber security intelligence analysis, counterterrorism, violent gangs and transnational criminal organizations, project management, organizational leadership, exercise development and evaluation, and continuity of operations.

The BTI Fellows are engaged, as needed, to work on BTI initiatives. Typically, the Fellows serve in part-time positions where individuals are asked to perform a wide spectrum of functions and projects, such as

- Consulting in their subject areas of expertise
- “Red Team” activities for proposed plans and initiatives
- Critical review of concepts and proposals
- Development of grant applications and research proposals
- Conduct of training (Continuity of Operations)
- Exercise planning, facilitation, and evaluation in accordance with the Homeland Security Exercise and Evaluation Program (HSEEP)

A key task in which BTI Fellows enhance Institute capabilities is representation at meetings and conferences. With an eye to geographical location, BTI Fellows can extend the Institute's outreach by establishing close working and advisory relationships with the leaders of Federal partner agencies in their regions. This provides a cost-effective alternative and decreases travel demands on BTI Institute staff.

This greatly assists in promoting the BTI Institute's northern border presence through BTI Fellows located in New York, New England, and the Seattle/Vancouver area. The Institute's southern border presence is also assisted by BTI Fellows located in Florida, Texas, and New Mexico.

### **C.2.b. Activities**

The BTI Institute conducted its first BTI Fellows Orientation on May 9-10, 2017. The twelve BTI Fellows received briefings and engaged in discussions with the BTI Institute's Director and Executive Director, Strategic Partnerships, on the BTI Institute and its current initiatives.

During the period covered in this report, BTI Fellows initiated preparations for:

- Participation in planning and analysis on the joint BTI Institute/South East Texas Regional Planning Commission initiative to create a Unified Regional Response to a Coordinated Complex Terrorist Attack

- Heading the Border Security UAS Working Group
- Formation of the Tunnel Detection Working Group by providing contacts within the Department of Defense and the Army's Asymmetric Warfare Unit

The Executive Director, Strategic Partnerships, coordinates the BTI Fellows program. The Institute hosts a teleconference with BTI Fellows on the last Thursday of each month to update them on current projects, new initiatives and opportunities, and to respond to suggestions and answer questions as they arise.

### **C.3. EXTERNAL ADVISORY BOARD**

The External Advisory Board serves to assist the BTI Institute in planning, research, technology, and market development. As such its members work to: provide strategic advice to the Director, actively assist the BTI Institute in achieving its goals, provide links between the BTI Institute and its strategic and operational environment, act as a sounding board to BTI Institute leadership regarding development of the Institute, and enhance the visibility of the Institute nation-wide. Honorable Alan Bersin will serve as the EAB Chair.

Alan Bersin served as Assistant Secretary for Policy & International Affairs and Chief Diplomatic Officer in the U.S. Department of Homeland Security (DHS). In those capacities, Bersin led and oversaw DHS's international engagement, served as the principal advisor to the Secretary in all matters pertaining to international affairs, and was responsible for leading the Department's strategic planning and policy formulation functions. Between 2012 and 2015, Bersin served as Vice President of INTERPOL for the Americas Region and as a member of the INTERPOL Executive Committee. He served through 2016 as Chair of the Advisory Committee for the International Policing Division Steering Committee of the International Association of Chiefs of Police (IACP).

The following distinguished individuals have agreed to serve as members of the EAB:

- David Aguilar, Former Commissioner of US Customs and Border Patrol
- Edward Alden, Bernard L. Schwartz senior fellow at the Council on Foreign Relations (CFR)
- Maria Luisa Boyce, Director, Global Public Affairs
- Dane Egli, US Coast Guard, (retired), Los Alamos Laboratory
- Joe Frank Martinez, Sheriff of Val Verde County Texas and Chair of the Southern Border Sheriffs' Coalition
- Gustavo Mohar Betancourt, Former Under Secretary of Secretaria de Gobernacion (Now in private consulting practice)
- Luc Portelance, Former President of the Canada Border Services Agency (CBSA) (Now in private consulting practice)
- Jonathan S. Spaner, McKinsey & Company, Public Sector Practice, Washington, DC
- Julie Myers Wood, Chief Executive Officer, Guidepost Solutions

The External Advisory Board conducted its first plenary session and organizational meeting on June 27-28, 2017 in Houston.

## **D. WORKING GROUPS**

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### **D.1. COUNCIL OF TERRITORIES**

The BTI Institute acknowledges that each of the U.S. territories experiences its own homeland security challenges and concerns. In 2017, the BTI Institute initiated contact with each of the territories of American Samoa, Guam, Northern Marianas, Puerto Rico and the U.S. Virgin Islands to discern their issues and needs regarding border security, immigration and international trade. The BTI Institute maintains contact with each of the territories (individually due to the variances in time zones) and incorporates their input in its planned activities and functions.

### **D.2. BORDER SECURITY UNMANNED AERIAL SYSTEMS WORKING GROUP**

#### **D.2.a. Purpose**

The BTI Institute created the Border Security Unmanned Aerial Systems (UAS) Working Group in Spring 2017 to align with the Department of Homeland Security Secretary's concerns with the illegal use of Unmanned Aerial Systems in the border regions.

The purpose of the Border Security UAS Working Group is to collectively identify and address homeland security and public safety concerns associated with the employment of unmanned aerial systems by terrorist elements, cartels, and other Transnational Criminal Organizations in our border and coastal regions.

Led by the BTI Institute, this Working Group serves to foster collaboration between university researchers, homeland security officials, and public safety officers in the conduct of research and development of innovative solutions to address homeland security needs.

The Border Security UAS Working Group's objectives are to:

- Identify research needs and opportunities for UAS – and adapt for border security and public safety activities
- Explore tactical and technical developments in counter-drone technology to deny UAS support to terrorist elements and Transnational Criminal Organizations
- Develop UAS tactics and applications for integration in future operational and strategic planning efforts
- Promote the U.S.-Mexico border region as a test bed for UAS technology in border security and law enforcement operations
- Educate the homeland security and public safety communities on laws and regulations regarding lawful operation of UAS
- Educate leaders on UAS capabilities and those laws, regulations, and policies impacting the use of UAS systems in Homeland Security and public safety operations

Membership includes representatives from the U.S. Customs and Border Protection, US Coast Guard, the Federal Aviation Administration, US Marshals Service, Texas Department of Public Safety, Texas Military Forces, and officials from El Paso, Austin and the Port of Corpus Christi. Also represented are directors and researchers from the following Department of Homeland Security Centers of Excellence: the Borders, Trade and Immigration Institute; the Center for Risk and Economic Analysis of Terrorism Events (CREATE), the National Consortium for the Study of Terrorism and Responses to Terrorism (START), the Critical Infrastructure

Resilience Institute (CIRI), and the Coastal Resilience Center (CRC). Also participating are the Lone Star UAS Center of Excellence (Texas A&M) and the Combating Terrorism Center (United States Military Academy).

#### **D.2.b. Activities**

The Working Group's first meeting was held on May 17, 2017 at the BTI Institute in Houston. Members received a briefing on reported drone use in the U.S.-Mexico border region by Lieutenant Danny Cardella, Texas Military Forces, currently assigned to Operation Secure Texas. BTI Institute Fellow, Joel Aud, provided a presentation on the potential use of tethered drones in surveillance and disaster response. The meeting culminated in a briefing and demonstration by Fire Service officer Coitt Kessler of the Austin Fire Department's RED Team on its advances in the use of UAS and robots in public safety operations.

Roy Sikes, BTI Fellow, was named as Chairperson of the Border Security Unmanned Aerial Systems Working Group to plan, coordinate, and conduct its future meetings over the course of the next fiscal year.

The Border Security Unmanned Aerial Systems (UAS) Working Group will continue to meet every two months with plans to participate in on-site demonstrations of UAS capabilities at the Lonestar UAS Center of Excellence (Texas A&M University - Corpus Christi) in October 2017.

### **D.3. TUNNEL DETECTION WORKING GROUP**

#### **D.3.a. Purpose**

The BTI Institute formed the Tunnel Detection Working Group in Summer 2017 to align with the Department of Homeland Security Secretary's concerns with the attempts of Transnational Criminal Organizations to smuggle drugs and contraband through tunnels under the U.S.–Mexico border.

The purpose of the BTI Institute's Tunnel Detection Working Group is to identify tunnel detection issues, propose research strategies, explore existing related technologies and promote the application of emerging technology to develop reliable tunnel detection solutions in order to prevent their use by terrorist elements and criminal organizations seeking to gain illegal access to our nation.

Led by the BTI Institute, the Tunnel Detection Working Group serves to foster collaboration between university researchers, homeland security officials, and U.S. Border Patrol agents in the conduct of research and development of innovative solutions to address tunnel detection and remediation.

Membership in the Tunnel Detection Working Group includes representatives from the BTI Institute, the Southwest Border Sheriffs' Coalition, U.S. Border Patrol Headquarters Strategic Planning and Analysis Directorate (SPAD), Analysis Division and Operational Requirements Management Division, US Border Patrol Operational Programs Division and Program Management Office Directorate, and the Customs and Border Protection Laboratories and Scientific Services Directorate.

The Tunnel Detection Working Group's objectives are to:

- Identify research needs and opportunities for tunnel detection for border security and public safety activities

- Explore technical developments in mining and gas/oil exploration technology for adaptation/use in tunnel detection operations
- Promote the development of technology to detect tunnels currently in existence and the construction of new tunnels
- Develop tactics and applications on the use of robotics in exploration of tunnels once detected
- Promote the U.S.-Mexico border region as a test bed for tunnel detection technology in border security and law enforcement operations
- Explore tunnel detection technology and tactics used by other nations

### **D.3.b. Activities**

The BTI Institute planned an organizational meeting to be followed by a visit to the San Diego Sector in which members will be briefed on the tunnel threat in the sector, program basics, ongoing efforts, and research gaps. A line tour of tunnels discovered in the San Diego Sector is planned along with orientations on current technology used in detection efforts. These activities will occur in the next performance period.

Future meetings are scheduled to be held on a quarterly basis.

## **E. PROJECT MANAGEMENT ACTIVITIES**

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### **E.1. NEW PROJECTS**

The BTI Institute assigned a member of the Research Committee to each project as soon as the project was selected by DHS as a candidate for workplan development. Each Research Committee member was tasked with providing constructive feedback to the project team during the process of drafting the project workplan in advance of submitting to OUP for approval. The BTI Institute also provided written guidelines, instructions, and templates to the performers to facilitate the onboarding of the teams and promote uniformity in management across projects. As part of the BTI Institute's continuing formative evaluation process, these written documents were revised and updated (compared to the documentation used for projects in the previous performance period) to incorporate feedback received and experience gained. BTI Institute leadership and Research Committee members continuously review communications and documents generated by the BTI Institute and its researchers to ensure that the information provided is easily understood (in plain English) and that the products provided are intuitive and user friendly.

The BTI Institute's Director and Research Committee members subsequently worked with the performers through several revision iterations so that their workplans incorporated and addressed the information and comments provided by the external reviewers on both scientific merit and mission relevancy. Research Committee members (including the BTI Institute's Director) interacted with Project Principal Investigators (PPIs) throughout the workplan development phase and prior to the start of the project to ensure that the comments received were addressed and that project resources required were available. They provided constructive feedback to the performers on how to resolve these challenges as needed, and projects were recommended to start only if these challenges were resolved to the satisfaction of the Research Committee.

In total, four projects led by RFP-16-01 applicants developed workplans that received approval by OUP during the period covered in this report.

- Central America's Immigrant and Refugee Crisis: Limiting Unauthorized Migration through the Alliance for Prosperity and Reintegration Efforts (Migration Policy Institute)
- Modeling International Migrant Flows: Theory, Evidence and Forecasts (University of Virginia)
- Secure and Transparent Cargo Supply Chain: Enabling Chain-of-Custody with Economical and Privacy Respecting Biometrics, and Blockchain Technology (University of Houston and Texas A&M University)
- The Impact of Central American Child and Family Migration on U.S. Communities (American University and University of Houston)

Two project applicants submitted workplans to OUP and are awaiting OUP approval. Two additional projects had been invited by OUP to develop workplans, but subsequently during the workplan development phase, DHS declined approval for their projects.

## **E.2. CONTINUING PROJECTS**

### **E.2.a Research Progress Monitoring**

Each continuing project provided written updates on progress to its assigned Research Committee member. The Research Committee member and project PPI held monthly calls to evaluate progress, understand any challenges encountered, and provide guidance on any project aspects to be considered for improvements. The BTI Institute also provided written guidelines, instructions, and templates to the performers for the report format. These reports are meant to document items such as progress in the tasks, milestone completion, challenges encountered, and requests for assistance and include items such as the names of authorized project personnel and output (such as publications or degrees awarded).

As part of the BTI Institute's continuing formative evaluation process, these written documents have been revised and updated (compared to the documentation used for projects in the previous performance period) to incorporate feedback received and experience gained. BTI Institute leadership and Research Committee members continuously review communications and documents generated by the BTI Institute and its researchers to ensure that the information provided is easily understood (in plain English), and that the products provided are intuitive and user friendly.

The research committee held regular meetings during the course of the period covered by this report. These meetings allowed for discussion of project progress (in particular any deviations from the approved work plan), understanding of any challenges encountered, and deliberations on feedback and suggestions for the Performers as needed.

The BTI Institute also provided guidelines, instructions, and templates to the Performers for their annual report (covering the previous performance period), and the Research Committee worked with the Performers to organize and manage their submissions. In addition, the BTI Institute developed a form to track individual project status (see Appendix 6) throughout the performance period.



### **E.2.b. Performer's Meeting and Retreat**

The first Annual BTI Institute Performers Meeting was held on March 28, 2017 on the University of Houston campus. This was an academic meeting with all BTI Institute research partners and the DHS OUP PM in attendance (remotely). Additional attendees included interested stakeholders from DHS components. Each BTI Institute project had a presentation (no more than 30 minutes, followed by Q&A). This was an opportunity for BTI Institute partners to engage and interact with each other, the program manager, and HSE stakeholders (some of them remotely, due to travel restrictions). A Performers' Retreat was held the day prior (March 27<sup>th</sup>) to allow project PPIs to meet with each other and with BTI Institute staff and discuss project management processes.

### **E.2.c. Performers' Showcase**

A performer' showcase was held in conjunction with the BTI Institute's ribbon cutting ceremony on March 27, 2017 (section K.1). At this event, current partners focused on technology and policy research related to border issues, trade, and immigration, demonstrated their projects to event attendees. All projects had a poster available for viewing. Two projects had live demos available (one on face recognition and one on modeling of traffic flows through ports of entry). Another project had a video demonstration of its results (on automatically measuring wait times at ports of entry). Print materials (Announcements, After Action Reports, and Research Briefs) were also made available for upcoming and previous events in the Homeland Security Symposia Series. Additional projects focusing on education and workforce development were presented.

## **E.3. BTI INSTITUTE PERFORMANCE REVIEW**

To evaluate the BTI Institute's performance, twelve Performers were asked to complete a survey (the full report is available upon request). Performers rated the BTI Institute on a five-point Likert scale with the following response options: strongly agree (5), agree (4), neither agree nor disagree (3), disagree (2), and strongly disagree (1). The following results represent the mean response to the management and project management questions. Responses were converted to means by averaging all Performer responses by question.

The BTI Institute also developed an enhanced assessment framework which is reflected in Appendix 5 - Performance Metrics Information Document.

### **E.3.a. Management Performance Review**

Performer's perception of the BTI Institute management agreed the guidelines provided by the BTI Institute were helpful (4.00); the BTI Institute played a key role in the success of the project (3.75); BTI Institute's Director provided a supportive environment for projects (4.00); and the Associate Director of Program Management for the BTI Institute rendered administrative help when needed (4.33). Averaging all BTI Institute management related scores, the BTI Institute received an average rating of agreed (4.02), indicating performers find the BTI Institute's management to be helpful and supportive. Overall the BTI Institute's management scored lower than the supportiveness of the Associate Director, Program Management and relatively equal to the supportiveness provided by the Director highlighting the importance of relationships.

**Table 2.** Response Means and Standard Deviations by Management Question (N=12)

Questions	Mean	Standard Deviation	Range
Q.1.1: The guidelines provided by BTI Institute were useful.	4.00	0.85	2-5
Q.1.2: BTI Institute played a key role in the success of my project.	3.75	1.22	1-5
Q.1.3: The BTI Institute Director provided a supportive environment for my project.	4.00	1.13	2-5
Q.1.4: The Associate Director, Program Management for the BTI Institute rendered administrative help when I needed it.	4.33	0.65	3-5
<b>Sum Q1 Group</b>	<b>4.02</b>		

A theme of communication is pervasive throughout the qualitative portion of the survey. One respondent identified that the BTI Institute “impressively sought input from its performers on the administrative dimension of the overall award implementation” and another identified that the BTI Institute had “good intentions.” Other communication comments took a different tone citing a need for “communication and leadership training”, a request for the BTI Institute “to invest more time in really getting to know the performers and especially their home institutions.” In line with this request, Dr. Ottinger has been in contact with VPRs at the BTI Institute’s Partner Institutions. Communication was a key issue for Performers both as a method of sharing information and developing rapport and understanding.

Although not directly aligned to the management of the BTI Institute, respondents provided additional feedback on the requirements, processes, and deadlines experienced while working with the BTI Institute as performers. Respondents identified a “disconnect between expectations of the sponsor and performers,” “difficult to retool with changing customer champions and needs,” “too many sudden deadlines,” concerns about a need for short term gains over creativity, and a request for “backup personnel to answer questions when key guidance person is unavailable.” With these concerns identified, one performer identified that the BTI Institute “helped keep some of the demands of this particular dimension of project work from overshadowing the substance of the research itself and its value for the stakeholders. BTI deserves credit...” and another performer wrote “As performers we understand the pressures from DHS PM for practical and ‘useful’ research.”

### **E.3.b. Project Management Performance Review**

Performers’ perception of the Research Committee (formerly referred to as Thrust Leads) comprises the program management portion of the survey. In this section, Performers were asked to rate the Thrust Lead assigned to their project. Performers agreed Thrust Leads responded when needed (4.25); and provided constructive feedback for their project (3.92). Responses to the next questions, Thrust Lead established good rapport (4.17); and treated the Performer fairly (4.17) received equal levels of agreement. Performers’ responses to the question about the Thrust Lead role as an evaluator and helper in the success of the project as moderate (3.58). Averaging all BTI Institute project management related scores, the BTI Institute received

an average rating of agreed (4.02) indicating performers overall find the BTI Institute’s management helpful.

**Table 3.** Response Means and Standard Deviations by Project Management Question (N=12)

Questions	Mean	Standard Deviation	Range
Q.2.1: The Thrust Lead assigned to my project has rendered help when I needed it.	4.25	0.75	3-5
Q.2.2: The Thrust Lead assigned to my project provided constructive feedback for my project.	3.92	1.00	2-5
Q.2.3: The Thrust Lead assigned to my project established good rapport with me.	4.17	0.83	3-5
Q.2.4: The Thrust Lead assigned to my project treated me fairly.	4.17	0.83	3-5
Q.2.5: The Thrust Lead played a key role as an evaluator and helper for the success of my project	3.58	1.16	1-5
<b>Sum Q2 Group</b>	<b>4.02</b>		

In the qualitative portion of this survey, Performers encouraged the BTI Institute to keep up the good work. Performers also identified concern that “BTI seems to have academic leads with limited leadership experience” and recommended additional communication and leadership training. Other performers encouraged increased communication and collaboration with “regular face-to-face meetings.” These responses represent an interest in continuing to work with the BTI Institute and build stronger, more personalized relationships with performers and their institutions.

## **F. TRAINING AND WORKFORCE DEVELOPMENT**

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### **F.1. TRAINING AND WORKFORCE INITIATIVES**

The BTI Institute’s Education and Workforce Development (EWD) Initiatives program develops and carries out the BTI EWD work plan. The BTI Institute’s strategic EWD plan is designed with two primary goals: (i) training, seminars and workshops critical to HSE, and (ii) establishing a pathway for post-secondary students to pursue a career path with HSE. To address critical needs of current HSE employees, the BTI Institute is able to meet workforce training needs and support skill development with high quality, timely workforce development offerings. To facilitate interest in HSE careers with post-secondary students, the BTI Institute builds connections through trainings and internships.

The specific objectives of the BTI Institute include facilitating course development, course offerings, and internship programs. A key strategy used in this performance period was to offer face-to-face workforce development courses that can be transitioned to online offerings. The purpose was to strengthen the HSE relationship, support HSE employees, and develop a long-term relationship between HSE departments and agencies, and the BTI Institute.

Another major component of the BTI Institute's EWD initiatives includes recruiting and training current and future workforce participants in areas related to the BTI Institute's mission. Through EWD, the BTI Institute uses a mixture of workforce development, and internship programs to educate audiences, especially those from diverse backgrounds, to engage in content areas and professional development related to HSE. Through these programs, the BTI Institute expands knowledge in the areas of HSE culture and operations, knowledge of borders, trade and immigration as well as joint border management related content, and leadership. This outreach is designed to motivate participants to pursue education, research, and career opportunities in HSE fields.

### **F.1.a. Summer Research Teams Program (S RTP) for Minority Serving Institutions**

#### *F.1.a.i. 2015-2016 Academic Year*

Researcher: Dr. Yok Fong Paat, University of Texas at El Paso

Faculty Mentor: Dr. Luis Torres, University of Houston

The BTI Institute hosted the MSI recipients of the DHS Summer Research Team Program for ten weeks from June 2016 through August 2016. The DHS Summer Research team explored the dynamics of disease transmission across borders as critical factors to understand public health aspects of homeland security. These dynamics were not easy to measure. As part of the summer 2016 research, the team recruited 45 frequent international travelers through purposive sampling to participate in confidential interviews and surveys. To accommodate the language of preference for these international travelers who were recruited through Houston-based community agencies and institutions, the research team offered individual interviews and surveys in English, Spanish and Chinese.

The project examined the dynamics of disease transmissions and travelers' pathways to sexually-risky behaviors during international contact. Data collected over summer 2016 are expected to result in manuscripts that serve as preliminary studies for a larger grant proposal submission. The data could also refine research instruments used to assess ecological and life course factors that critically impact risky sexual behaviors and disease transmission during international travel.



**Figure 2.** Yok Fong Paat, Ph.D (center) and BTI Thrust Lead Luis R. Torres, Ph.D (right)

*F.1.a.ii. 2016-2017 Academic Year*

Researcher: Dr. Samuel Olatunbosun, Norfolk State University

Faculty Mentor: Dr. Weidong Shi, University of Houston

Beginning in Fall 2016, the BTI Institute began promoting the DHS Summer Research Team Program to qualified MSI faculty and students, receiving and reviewing applications in Spring 2017, and preparing to host MSI recipients of the DHS Summer Research Team Program for 10 weeks from June 6- August 11, 2017. The selected Summer Research Team for the summer of 2017 included Dr. Samuel Olatunbosun and two students, Nathaniel Edwards and Cytyra Martineau. Their project aimed to study the problem of cyber security awareness in the sub-Saharan African zone, under the mentorship of Weidong "Larry" Shi, Ph.D. This program represents an effective mix of researchers bringing complementary skills to address sub-Saharan African cyber-attacks and cyber-crimes. Existing cyber-attack academic research, reports, and investigations typically focus on the continents of Europe and Asia, neglecting the sub-Saharan region. As the use of Information Communication Technologies (ICT) spreads, more attacks are expected to originate from the sub-Saharan African region, and currently, these attacks are not being tracked. This research is expected to result in a data repository used to provide answers to several cyber threat questions that may originate from the African continent in the future. Data collected in this study could also be used by other researchers to understand threats of cyber security in sub-Saharan Africa.



**Figure 3.** (Left to right): Nathaniel Edwards, SRT student participant, NSU; Nouhou Abdoulaye, Student Researcher, UH; Cytyra Martineau, SRT student participant, NSU; Dr. Samuel Olatunbosun, SRT Researcher, NSU; Dr. Weidong "Larry" Shi, UH faculty.

### **F.1.b. BTI Institute Student Fellows**

The BTI Institute launched the Student Research Fellows program promoting the program during Fall 2016, receiving applications in Spring 2017 and preparing to host the research program for ten weeks beginning June 2017. The Student Research Fellow, Bobby Hsu, was directly mentored by a leading faculty researcher, Dr. Paula deWitte, in the area of cyber security, risk management and critical infrastructure. Through the summer the student worked under direct

faculty mentoring to develop course materials, syllabi, slides, and reference materials for workshops targeting small businesses. In June 2017, *Cyber Security 101: Everything You Wanted to Know about Cybersecurity, but Were Afraid to Ask* was developed for small businesses. Two additional courses will be developed in July and August 2017. These courses include *Risk Assessment and Management for Small Businesses*, and *Critical Infrastructure*. To incorporate high quality, cutting-edge research into the course content, each course is developed under the oversight of faculty member and is subject to a Red Team review.

These courses are consistent with the BTI Institute's mission to provide educational materials that better ensure our national security, including legitimate trade and developing a cyber security-ready workforce. This benefits the nation by improving our overall security posture, the individual students by building cyber security skills, and the BTI Institute by developing useful services and products consistent with its mission.

This research has led to an increased interest in cyber security and risk management for Mr. Hsu who applied to a Master of Science program in Information Systems Security at the University of Houston in June 2017. The program he is recognized by the National Security Department of Homeland Security and is designated a Center of Academic Excellence. Mr. Hsu has expressed an interest in continuing research and course development as well as potentially exploring employment opportunities in HSE related fields.

## **F.2. CONTINUITY OF OPERATIONS (COOP) TRAIN-THE-TRAINER-COURSES**

In 2017, the BTI Institute, working in coordination with the FEMA Region VI Continuity Program Manager, conducted COOP Program Management Train-the-Trainer and COOP Planning Train-The-Trainer Courses in border and coastal regions to expand capabilities and enhance preparedness of the requesting jurisdictions.

There are significant areas within U.S. border regions that have requested COOP training, but for which trainers were not available. The BTI Institute responded to the requests of the South East Texas Regional Planning Commission (Beaumont, Texas), the Rio Grande Council of Governments (El Paso, Texas), and the South Texas Development Council (Zapata, Texas) to provide the FEMA L-550 COOP Planner Train-the-Trainer Course and L-548 Continuity Program Manager Train-the-Trainer Course.

The BTI Institute dispatched a two-person Mobile Training Team (MTT) to conduct training in requesting border and coastal regions in order to:

- Provide Continuity of Operation training to qualified trainers from counties and municipalities in the border regions
- Provide the knowledge and planning tools needed to develop operational Continuity of Operations plans for regional, county and local municipalities in the border and coastal regions
- Establish a core group of Continuity of Operations trainers within each requesting border and coastal region
- Preclude the loss of DHS and FEMA funding by jurisdictions that currently do not have operational Continuity of Operations plans
- Contribute to increased readiness and enhance the protection, response and mitigation missions of border and coastal communities
- Educate trainers for counties, cities, and tribes in the specified regions

All training sessions were scheduled in coordination with the FEMA Region VI Continuity Manager and the Texas Division of Emergency Management (TDEM) Training Section.

Training scheduled for June 23-27 in Beaumont was curtailed as the impending landfall of Tropical Storm Cindy resulted in callbacks of emergency management personnel attending the course. Only the L-548 Continuity Program Manager Course was conducted on June 23-24th. The L-550 Course will be rescheduled in November-December, 2017.

The BTI Institute is scheduled to conduct COOP training in El Paso, Texas on July 24-28, 2017 and for the South Texas Development Council in Zapata, Texas, from September 25-29, 2017.

## G. TRANSITION STRATEGY

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As per OUP, "Transition is defined as the process and eventual transfer of ownership and operation/maintenance of a product or system: Transfer of responsibility for a product or system from a research and development organization to a receiving activity, with subsequent integration of the product or system into the receiving activity's operations. For purposes of this definition, the term "operations" can include any phase of an acquisition program, capability development, or equivalent."

The BTI Institute recognized the need for codifying a transition strategy and initiated a process that culminated in the inclusion of guidelines (detailed in the rest of Section G, and Appendices 1-4) in its approved work plan for period 3. The BTI Institute transition model is sensitive to the unique needs of key stakeholders and the environment within which the BTI Institute operates. Specifically, the BTI Institute is motivated by the ideas and concepts of the Mission Model Canvas pioneered by Alexander Osterwalder and Steve Blank<sup>1</sup>. This model provides a mission oriented framework that measures success through benefits achieved, cost management, deployment, and stakeholder support. This is a step away from a revenue based business model. The mission oriented model aligns with the BTI Institute mission, purpose, and strategy.

The transition strategy employed by the BTI Institute consists of a customer-centric process driven by the Project Principal Investigator and assisted by the BTI Institute team, leveraging the resources of the University of Houston, and directly engaging with end-users in the DHS community to deliver pragmatic solutions for the near-term, the mid-term, and the long-term needs of the DHS. In general, there are five phases to transition:

**Phase 1 – Pre-Award:** During the pre-award phase and development of the work plan, the transition team assists the PPI to develop a notional transition plan – as an integral part of the project workplan to address core components of the project and align with a mission outcome.

**Phase 2 – Performance period:** During the performance period, the customer is identified and included in the briefings related to the project. Customer suggestions are incorporated into the plan to maximize optimal transition outcomes. A viable transition plan for the Customer(s) is developed and approved in consultation with the DHS Project Champion within the first year.

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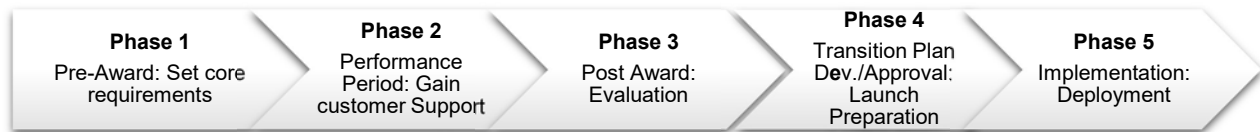
<sup>1</sup> <https://steveblank.com/2016/02/23/the-mission-model-canvas-an-adapted-business-model-canvas-for-mission-driven-organizations>



**Phase 3 – Post Award:** Upon completion of the project, an evaluation of the deliverables is performed to decide if transition is desired by the Customer.

**Phase 4 - Transition Plan Development/Approval:** A detailed transition plan for the Customer(s) is developed and approved in consultation with the DHS Project Champion.

**Phase 5 - Implementation:** Transition is undertaken by an entity decided by the customer.



The BTI Institute’s leadership, working in conjunction with the PPI and Champion, will conduct an assessment of the needed mix of interdisciplinary skill sets, unique capabilities, expertise, credentials and partners needed to achieve the research objectives. They will reach out to partner institutions to provide representatives and subject matter experts to the team to address any perceived gaps.

The Transition Team continuously reviews communications and documents generated by the BTI Institute’s researchers to ensure that the information provided is easily understood (in plain English) and that the products generated are user-friendly.

## **G.1. TRANSITION TEAM**

BTI Institute employs a customer-centric structure to the transition strategy thereby ensuring the continued advancement, timely adoption, and effective migration from research to use by the DHS community. At a minimum, each project will include representatives from the Project’s Principal Investigator (PPI) Organization, the BTI Institute, and DHS, as follows:

- PPI’s Organization
  - The principal investigator
  - Representative from the Technology Transfer Office of the PPI’s organization
  - Representative from the Communications Office of the PPI’s organization
- BTI Institute
  - BTI Institute’s Transition POC
  - The BTI Institute’s Executive Director for Strategic Partnerships
  - Member of the BTI Institute’s Research Committee assigned oversight of the project
  - The BTI Institute’s Emerging Technologies Architect (TBN)
  - Representative from the Technology Transfer Office of the University of Houston
- DHS
  - Project Champion
  - Project Advocates
  - Customer’s Transition POC (beginning in Phase 4)

The Transition Team is not limited to the agencies, organizations, and positions listed above. The BTI Institute may add partners and personnel to the Transition Team as necessary to ensure a successful transition of research to its customers. The transition team, partners, and personnel contribute to development of the value proposition through the refinement of products and services and how these effectively produce benefits and address problems.

## G.2. PHASE 1 – PRE-AWARD

During the pre-award phase, the BTI Institute forms a Transition Team to assist the PPI in an analysis of deliverables and the development of the work plan, of which the notional transition plan is an integral part. This phase sets the foundation for identifying key beneficiaries, determining effective financial stewardship, program implementation, and strengthening stakeholder relationships through program transition.

### Phase 1 Process

#### Use-cases/need

The transition team will assist the PPI in identification of specific use cases/needs for the project outputs (deliverables/products). Through this customer-centric needs assessment, more information about the use-cases and needs are assessed. Further, additional research is conducted to identify concerns that may be masked, hidden, or compensated for by policy, doctrine, or practices. To facilitate the identification of the use-cases/needs, provide accurate metric-verifiable codification, and share across the transition team, the codified details of the use-cases/needs are seminal to the generation of the transition plan. In addition, using existing use-cases (through CGAP or Acquisition Documents like a CONOPS, or planning CONOPS) will be explored.

It should be recognized that, in this phase of transition plan development, the initial use-cases/needs may be eclipsed or integrated into an identified/discovered broader scope and scale of applicability. In turn, that may drive or shape the near-term, mid-term, and long-term transition plans and actual project development. Although all cases and needs are important, the dogmatic pursuit of a single use-case/need solution, within the context of a greater potential application, will only be advocated as a near-term foundational/proof of concept prolegomena to a broader application of the solution.

#### Deliverables Analysis

The types of deliverables (tools, technology, software, knowledge product) are listed in Table 1.

**Table 4.** Types of Deliverables

Deliverable Type	Description
<b>A:</b> Algorithm	A computational science algorithm to perform a specified task
<b>B:</b> Brief	A brief report about a research problem including analysis and recommendations
<b>Co:</b> CONOPS	A document outlining a Concept of Operations
<b>C:</b> Course	The materials associated with an education or training offering
<b>D:</b> Dataset	A dataset to be used for the development, validation, and testing of an algorithm
<b>H:</b> Hardware Prototype	A hardware prototype designed to perform a specified action.

<b>P:</b> Publication (Conference or Journal)	A peer-reviewed publication in a scientific journal
<b>Pr:</b> Protocol	A protocol of operations
<b>R:</b> Report	A report about a research problem including a detailed analysis
<b>So:</b> Software	Executable and source code
<b>Su:</b> Survey	A validated Instrument to conduct a survey for particular questions
<b>V:</b> Video	A video explaining to a lay person the problem being addressed, the solution and the impact of the solution.

Key questions are addressed by the PPI during the pre-award, while the work plan development is in process, and during the continuation of work plan development processes which define the product and/or service:

- What is the nature of the deliverables?
- To what degree is the technology of the deliverables end-user/customer specific?
- Is the academic, industrial, or commercial environment of the technical context of the solution so volatile that a solution may be eclipsed or overtaken by evolutions in the specific or a parallel arena of development?
- What are the functional and/or operational requirements for the proposed deliverables, as identified?
  - Are the functional/operational requirements unique to a specific end-user/customer or a spectrum of users?
  - Are there capability gaps, critical vulnerabilities that the end user may have articulated, but not yet refined into requirements
  - How does the work relate to initial requirements (these are pre-refined Operational Requirements that are basic agent statements with an initial level of analysis at a planning workshop; Not yet to be considered as Operational Requirements)?
- Are there any technical, procedural, policy, or doctrinal dependencies that exist and would need to be modified, or would be required for the end-user to adopt/acquire to use the developed solution?
- Are there alternative technologies/processes/methods/protocols/knowledge products that could address the requirements for solving the problem?
  - What methodology was employed to survey alternatives?
  - If they exist, what are their limitations/advantages?
  - What is the comparative rate of development in the alternative technology, and is there potential for the proposed solution to be eclipsed or overtaken by the alternative technology?
- What are the means and methods used by the PPI to engage with the PPI's organization's technology transfer office and communications office to leverage the capabilities and assets they represent, including:
  - Frequency and level of communication
  - Leveraging of existing contacts from the identified/discovered potential end-user(s)/customer(s) within the DHS community and allied communities
  - Partner COE, academic, industrial, and commercial contacts

## **Phase 1 Outcomes**

The PPI updates the workplan with detailed descriptions answering the questions from the deliverables analysis and the notional transition plan. It should be emphasized that the notional transition plan is a dynamic document subject to modification as dictated by changes in physical, geographic, and regulatory environments of the end-user(s)/customer(s) and new manifestations of use-cases/needs. The Project Principal Investigator, assisted by the BTI Transition Team, may amend/update the written notional transition plan over time. The workplan is approved by the Project Champion and OUP and contract is signed.

## **G.3. PHASE 2 – PERFORMANCE PERIOD**

During this phase, the transition team assists the PPI to identify a customer for the project.

### **Phase 2 Process**

All team members offer leads to the PPI and facilitate introductions. The DHS components function/operate across a broad spectrum of physical, geographic, and regulatory environments. Use-cases/needs identified for a specific user have a high probability of being applicable to components in the original form or with minimal modification. To ensure the greatest return on investment from DHS funds, resources, staffing, and time, the broadest possible user community must be identified, and should be included.

**Customer Discovery:** Toward a comprehensive and accurate understanding of the potential customers for a project and the proposed deliverable, the user community including the DHS S&T program advocates, DHS agency advocates, DHC agency contact(s) for project acquisition, allied agency/community advocates/subject matter experts (external to the DHS, University of Houston, or BTI Institute's communities), project champion(s), and potential end-user(s)/customer(s) should be surveyed with, at a minimum, the following questions:

- Who is/are the potential and most likely end-user(s)/customer(s) of proposed deliverables?
  - How, potentially, will the end-user(s)/customer(s) change in scale and scope across the near-term, mid-term, and long-term research, development, testing, and deployment of the project?
  - Are the deliverables scalable?
- What are the functional and/or operational requirements for the proposed deliverables as identified?
  - Are the functional/operational requirements specific to a specific end-user/customer or a spectrum of users?
  - If there are significant conflicts between the optimal deliverable across a spectrum of potential end-users/customers, how will they be resolved?
  - How is the optimal solution as prescribed by cost/time/resources defined?
- Are there any technical, procedural, policy, or doctrinal dependencies that exist and would need to be modified, or would be required for the end-user to adopt/acquire to use the developed solution?
- Are there alternative technologies/processes/methods/protocols/knowledge products that could address the requirements for solving the problem?
  - What methodology was employed to survey alternatives?
  - If they exist, what are their limitations/advantages?

- What is the comparative rate of development in the alternative technology, and is there a potential for the proposed solution to be eclipsed or overtaken by the alternative technology?

### **Phase 2 Outcomes**

The PPI writes a memorandum of record for each potential customer documenting the interaction and its outcomes, and identifies one or multiple customers for the specific project. Each potential customer offers a written commitment to participate in the development of an evaluation plan of the deliverables.

## **G.4. PHASE 3 – POST AWARD**

During this phase, the BTI Institute develops and implements an evaluation plan for the deliverables based on the customer use cases. The DHS Project Champion helps identify the: 1) Requirements Manager; 2) Program Manager; 3) Operational Sponsor.

### **Phase 3 Process**

The BTI Institute's team interviews the customer(s) to write the requirements for the specific need. The BTI Institute invites the Champion to designate a Customer Transition POC. The BTI Institute performs an evaluation of the deliverables against the requirements and provides a report to the customer. Focus is placed on ensuring gaps, requirements and use cases are used to ensure and explain the product can be evaluated against the initial problem.

### **Phase 3 Outcomes**

The BTI Institute provides a written evaluation of deliverables to the Customer. The Customer(s) designate(s) a Transition POC(s) to assist in the development of the specific Transition Plan. The Customer's Transition POC will have the responsibility/authority to approve the specific Transition Plan.

## **G.5. PHASE 4 - PLAN DEVELOPMENT/APPROVAL**

During this phase, the PPI develops a specific Transition Plan.

### **Phase 4 Process**

The transition plan will include:

- A clear and concise explanation for the concrete real-world use of the research and subsequent deliverables
- The deliverables as defined by the analysis, including: the specific granularity of the deliverables as developed for a committed end-user(s)/customer(s) within the DHS community, the applicability across a larger scale and scope, and any limitations or technical, procedural, policy, or doctrinal dependencies.
- A clear and concise explanation for the transitional pathway to deploy the deliverables to end-user(s)/customer(s) within the DHS community, including the issues of:
  - The rights of intellectual property
  - Manufacturing considerations
  - As appropriate, identified sources for software, hardware, fabrication, and/or manufacturing
  - The operational and maintenance considerations, including: cost, end-user(s)/customer(s) required knowledge base

- Test, training, and evaluation (with metrics for testing) for end-user(s)/customer(s)
- The means and methods of engagement with and deployment to end-user(s)/customer(s)
- Documentation of best practices and methods, and provisions of accessibility to end-user(s)/customer(s)
- The specific initial end-user(s)/customer(s) recipients (by agency, role, and name where possible) of the deliverables and the protocol for sharing by the initial recipients to other users within the DHS and allied communities
- The means of deployment for deliverables to specific initial end-user(s)/customer(s) recipients
- Potential plans for publication of metrics, narratives, source code, presentations, websites, workshops, teleconferences, emails, and face-to-face meetings and “how-to” instructions to the DHS.

#### **Phase 4 Outcomes**

Specific Transition Plan has been developed and approved by the Customer POC.

## **G.6. PHASE 5 – IMPLEMENTATION**

During this phase, the Phase-5 assigned entity performs the transition.

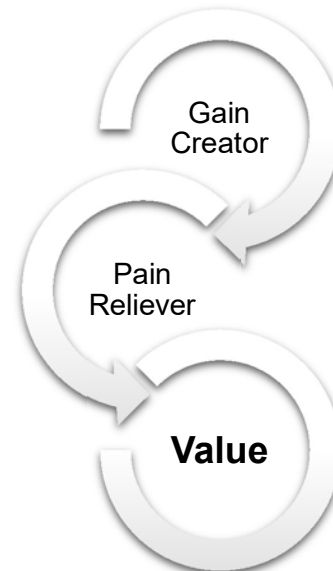
#### **Assessment of the Transition Process**

Beyond the satisfactory meeting and/or delivery of the stated task, milestones, deliverables, and performance metrics, the assessment of the transition process will be a measure of:

- The effective deployment of the deliverables to end-user(s)/customer(s)
- The level of engagement by end-user(s)/customer(s) in the use of the deliverables
- The closing of a knowledge, and/or operational capability gap/deficiency of significant importance to the Homeland Security Enterprise, and/or a change in the technology, software, database, CONOPS, visualizations, process, method, or protocol of end-user(s)/customer(s) with no major outstanding/remaining business issues
- The establishment of a “transition agreement” and protocol with the end-user(s)/customer(s) for the sustainment and maintenance of the deliverable deployment

- As appropriate, the effective and wide-spread circulation of metrics, narratives, source code, presentations, web sites, workshops, teleconferences, emails, and face-to-face meetings and “how-to” instructions to the DHS stakeholders

Throughout the five phases of the transition process, the goal is to identify and maximize the value offered to all stakeholders. In this process facilitated by the BTI Institute, internal and external customers engage through projects and needs discovery to align the problem under consideration with the “gain creators” and “pain relievers”. The BTI Institute seeks mission oriented solutions; it is this focus that drives the relationships, process, criteria, and outcomes. The transition strategy is key to the value creation process. Phases 1-5 fit within a theoretical mission-oriented structure identified by Osterwalder & Blank<sup>1</sup>.



**Figure 4:** Value chain components for a mission based transition plan (Osterwalder & Blank, 2017)

## H. RESEARCH DEVELOPMENT

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### H.1. RFP

The BTI Institute issued two separate Requests for Proposals, which were still in the evaluation phase at the end of the period covered in this annual report. Questions were sourced from the original NOFA, with direction from the OUP PM as to which ones should be excluded. Additional questions requested by DHS were also included.

**RFP-17-01:** Proposals in response to the first RFP (RFP-17-01), which focused on the themes of Border Security and Immigration, were due on Friday, May 5, 2017. The anticipated project award will be up to \$325,000, and applicants were asked to propose projects with a duration of up to 24 months.

The BTI Institute received a total of 7 submissions from 4 universities, 1 non-profit organization, and 1 company. In total, submissions were received from organizations based in 3 different states (MD, TX, and VA).

**RFP-17-02:** The second RFP (RFP-17-02) called for projects to address research questions related to all aspects of the BTI Institute’s mission. Proposals were initially due on Saturday, July 1, 2017, and the deadline was extended to July 7, 2017. Total funding under this RFP is to be

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<sup>1</sup> <https://steveblank.com/2016/02/23/the-mission-model-canvas-an-adapted-business-model-canvas-for-mission-driven-organizations>

determined, with funding for each award to be up to \$350,000 for a performance period of up to 24 months.

The BTI Institute received a total of 44 submissions from 16 universities, 5 non-profit organizations, and 3 companies. In total, submissions were received from organizations based in 8 different states (IL, KS, MD, MN, NY, TX, VA, and WV).

**RFP Process:** The RFP calls were posted on the BTI Institute's website and announced via the BTI Institute's email lists and social media platforms. For RFP-17-02, the BTI Institute coordinated with DHS S&T to promote the announcement via its wider distribution channels. The BTI Institute employed the services of an independent, auditable submission system that is separate from all University of Houston's systems to handle its RFP submissions. The BTI Institute's Associate Director, Program Management was the only BTI Institute team member with access to that system.

The BTI Institute also employed the services of an independent researcher database to identify Subject Matter Experts (SMEs) for all submissions not presenting a conflict of interest by using automated search algorithms. At least two SME reviewers were assigned to each proposal to conduct the scientific merit review. Following the conclusion of the SME External Review, all materials will be forwarded to the DHS OUP PM to conduct the relevancy review. The BTI Institute will not receive any information about the reviewers employed by OUP.

As part of a continuous formative evaluation process, all aspects of a new RFP issued by the BTI Institute were evaluated and modified based on input from the previous RFP process. This resulted in revised processes, instructions, templates, and forms used.

**Conflicts of Interest:** All proposals presenting institutional conflicts of interest with the University of Houston were routed to a different COE (subject to the approval of the DHS OUP PM). The external COE was tasked with handling the organization of the Subject Matter Expert (SME) External Reviews using the same guidelines incorporated by the BTI Institute for all other submissions. In particular, all personnel and reviewers who handled proposals completed the same/common review forms, scoring forms, and Conflict of Interests and Confidentiality Statements. The BTI Institute will not receive any information about the experts employed by the external COE.

## **H.2. PROCESS TO IDENTIFY AND COMPETE NEW PROJECTS OF INTEREST**

The BTI Institute developed and utilizes a specific methodology to identify, coordinate, conduct and compete research projects in subjects of interest to the Department of Homeland Security related to border security, trade and immigration. Such initiatives may also address the BTI Institute's inherent responsibility to promote the safety and resilience of individuals and communities in our nation's border and coastal regions. The process implemented by the BTI Institute is outlined below.

- **Identify the Problem**

Regardless of whether the issue is raised by a member of a client agency/jurisdiction or another interested party, the BTI Institute will solicit and/or work with the client agency/jurisdiction to develop a clear, concise statement of the problem to be addressed and research requested. The problem statement must be approved by the representative of the client agency/jurisdiction.

- **Determine How the Project Supports Client Agency Mission and Priorities**



The BTI Institute will seek to ensure it attains a full understanding of the client agency/jurisdiction's mission, its strategic and operational priorities, performance metrics, and how the project requested will support them. This information will be included in white papers and proposals as the initiative moves forward.

As a consideration, not as a requirement, the BTI Institute's Director or designated official may seek the insight and guidance of Executive Advisory Board members on the initiative.

- **Confirm the Project's Nexus to the BTI Institute's Mission**

BTI Institute representatives will ensure that the project/initiative has a nexus to the Institute's mission.

- Should a nexus to the BTI Institute's mission be established, the project will move forward to the next step.
- Should it be determined that the project/initiative is not within the BTI Institute's purview, and is more appropriately addressed by another Center of Excellence, the Executive Director, Strategic Partnerships will: contact that Center directly; provide them with the problem statement; brief them on the initiative; provide background on client agency mission and priorities; and provide introductions to client agency/jurisdiction representatives to ensure a smooth project transition.

- **Appointment with the Agency's Sector Chief or Agency Headquarters**

As a prequel to any further commitment of time and resources, the BTI Institute will receive a commitment by agency/jurisdiction representatives for a meeting with the appropriate executive of that agency/jurisdiction (i.e., Chief Sector Agent, Special Agent in Charge, etc.)

- **White Paper**

After receiving confirmation of the aforementioned meeting, the BTI Institute will conduct a meeting with appropriate researchers, faculty, and staff to develop a white paper (one page, front and back) that incorporates: the problem statement, supported agency mission and priorities, proposed course(s) of action, anticipated costs, and any outstanding or related issues.

- **Meeting with Agency Executive(s)**

As previously agreed, a BTI Institute representative(s) will meet with the Agency Sector Chief or appropriate executive official before further commitment of resources. The objectives of this meeting will be to:

- Confirm the problem statement
- Confirm strategic and operational priorities
- Receive the agency/jurisdiction's commitment to the project
- Discuss proposed course of action moving forward
- Determine funding

- **Funding the Project**

- **Through Agency Funding (Basic Ordering Agreement)**

Should the Agency's Executive Official make funds available, the BTI Institute's representative will explain and answer relevant questions for use of the Basic Ordering Agreement. Should funding not be available, the project can be forwarded to the Agency's Headquarters in Washington, D.C., for consideration.

- **Request for Proposals**

Should funding not be available, but need for the research confirmed, the project may be scheduled for submission in future BTI Institute Request for Proposals, as funded by DHS.

- **Project Approval**

Once approved, the project will proceed in accordance with the procedures outlined by the Department of Homeland Security Office of University Programs.

### **H.2.a. Unsolicited White Papers**

The BTI Institute developed a process to identify knowledge and capability unknowns and associated homeland security (HS) challenges relevant to its mission that are outside the RFP selection process. Guidelines and instructions for developing white papers for submission to the BTI Institute were made available to interested parties; submitted white papers were forwarded to the BTI Institute's Research Committee and DHS for consideration. The possible outcomes are:

- Invite the White Paper author to submit a pre-proposal
- Include the challenge identified in the White Paper in a BTI Institute RFP
- Decline to take action

### **H.3. PROCESS TO REALLOCATE PROJECT FUNDING**

The BTI Institute recognized the need for codifying a process to reallocate funding from unproductive or less relevant projects, and initiated a process that culminated in the inclusion of the following guidelines in its approved work plan for period 3.

**Project Review.** Each BTI Institute research project each year undergoes: 1) three progress reviews (by the BTI Institute Research Committee); 2) a work plan development/review for the following performance year (by the BTI Institute Research Committee); 3) a work plan review and approval (by OUP and the Project Champion).

Additionally, BTI Institute research projects are reviewed by the Board of Directors and Office of University Programs during scheduled biennial reviews. Research Projects are reviewed based upon criteria established in the "COE Biennial Review Process, DHS S&T Office of University Programs – Standard Operating Procedures," (undated).

**Termination.** Research projects funded under the Cooperative Agreement may be terminated for a variety of reasons to include: loss of Principal Investigator (due to illness, death, loss of job, etc.); lack of sufficient progress; or if its research is deemed no longer relevant by Project Champions and/or prospective customers and end-users. Should the BTI Institute's Project Team determine that the funded research project has made insufficient progress or that the research is no longer relevant, the BTI Institute may submit a recommendation through the Director to the Office of University Programs Program Manager for project termination.

As a professional courtesy, prior to submitting the recommendation for termination, the Director will inform the Project Principal Investigator and the leadership of its partner university of the pending action.

Research projects may also be terminated by the decision of the Office of University Programs PM and Board of Directors. **Final decision on termination of DHS-funded research projects rests with the Office of University Programs.**

**Project Closure.** Upon notice to the Project Principal Investigator of the OUP's decision to terminate, research ends. The Project Principal Investigator, in coordination with their university's Finance Office, will follow the project termination procedures specified in their subcontract.

**Alternate Project List.** The BTI Institute will request and maintain a list of unfunded research projects as submitted through prior Requests for Proposals (RFPs). The BTI Institute Director will request a list of previously proposed, but unfunded research projects, ranked by the Board of Directors and PM based on need. This list will also include projected cost and time required to accomplish the research.

**New Project Nomination.** Within seven days of a project termination, the BTI Institute's Director will review the Alternate Project List and provide nominations to the Office of University Programs PM of the top three projects most suitable for reallocation of remaining funds. The Director will offer to discuss the nominations with the PM and Board of Directors.

As a consideration, not as a requirement, the BTI Institute's Director or designated official may seek the insight and guidance of the BTI Institute's Executive Advisory Board members on the nominations and rankings, prior to submission to OUP.

**New Project Approval.** The Office of University Programs will decide which research project will be funded and the amount of that funding. Typically, the PM will notify the Director, BTI Institute in writing of OUP's decision (email is sufficient).

**New Project Notification of Award.** Within three working days following project confirmation and written approval by the PM the BTI Institute will notify the new Project Principal Investigator and partner university that their project will be funded, outline required next steps, identify members of the BTI Institute Project Team in support of that research, and schedule an introductory meeting/orientation.

#### **H.4. DHS GRANT TO PREPARE COMMUNITIES FOR A COMPLEX COORDINATED TERRORIST ATTACK (CCTA)**

Terrorist incidents, such as those in London, England; Boston, Massachusetts; Nairobi, Kenya; San Bernardino, California; Paris, France; and Brussels, Belgium highlight an emerging threat known as complex coordinated terrorist attacks.

In December 2016, the South East Texas Regional Planning Commission (SETRPC) requested the BTI Institute's assistance in its application for the Fiscal Year (FY) 2016 Program to Prepare Communities for Complex Coordinated Terrorist Attacks (CCTA Program). The CCTA Program provides funding to selected recipients to improve their ability to prepare for, prevent, and respond to complex coordinated terrorist attacks in collaboration with the whole community.

The SETRPC's application sought to develop a Unified Regional Response Plan for a Coordinated Complex Terrorist Attack in the Beaumont, Port Arthur, and Orange region of South Texas, which includes a National Strategic Port and significant critical infrastructure in oil and gas pipelines, petroleum and natural gas storage, petrochemical plants, and port facilities.

In 2017, the SETRPC was awarded a \$1,076,336 CCTA Program grant to develop and implement an effective, sustainable, and regional approach for enhancing preparedness for complex coordinated terrorist attacks, which include the following components: identifying capability gaps, developing and/or updating plans, training to implement plans and procedures, and conducting exercises to validate capabilities.

Early in the grant submission process, the BTI Institute sought the collaboration of the National Consortium for the Study of Terrorism and Responses to Terrorism (START) at the University of Maryland, another Department of Homeland Security Center of Excellence, for research in completing a comprehensive review of threat tactics and development of a compendium and presentation of possible threat tactics based on terrorist publications, statements, past attacks, and online chatter. The BTI Institute partnered with the SETRPC and START in the grant application.

Through this initiative, the BTI Institute will develop replicable planning and response tools for cities and jurisdictions to prepare for and respond to a Complex Coordinated Terrorist Attack. Ultimately, these products will be applicable not only to the SETRPC, but to other regions, cities, and jurisdictions nation-wide. These tools will include:

- Review of After Action Review recommendations, best practices, and lessons learned from terrorist attacks and active shooter incidents
- Planning and conduct of workshops for the areas of Intelligence, Operational Communications, Tactical Response, Medical Response, Victim and Family Services, and Public Information
- Creation of a template for Unified Regional Response Plans for Coordinated Complex Terrorist Attacks
- Development of the South East Texas Regional Planning Commission's Unified Regional Response Plan for a Coordinated Complex Terrorist Attack
- Formulation of an associated Action Plan identifying actions needed to fully implement the plan
- Creation of a template Synchronization Matrix - a decision support tool used to clearly identify mission, tasks and capabilities by jurisdiction, Emergency Support or organizational functions, organizations, and teams.
- Creation of a "One File System" for victims of attacks
- Conduct of Training Seminars on Regional CCTA plans and actions in response
- Conduct of a Webinar on the South East Texas Regional Planning Commission's Unified Response Plan to a Complex Terrorist Attack
- Enhancement of a Mass Witness App, a technological application for tablets and smartphones to assist law enforcement officers that allows for the rapid interview, photograph/video, and information gathering of multiple witnesses at the incident scene. The enhancement would introduce biometrics for facial recognition and fingerprinting to help verify witness identification.

Work on the grant is slated to begin in the next performance period.

## **I. STRATEGIC PARTNERSHIPS**

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The BTI Institute strives to establish and maintain strategic partnerships with agencies and entities at the Federal, State, Tribal, Territorial, and local levels. Partnerships may also be extended to private corporations and organizations involved in homeland security, immigration policies, and international trade.

## **I.1. SCOPE**

The stakeholders involved in the areas of Border Security, Trade, and Immigration covering land, air, maritime, and cyber domains at federal, state, tribal, territorial and local levels are extensive. With a relatively small full-time staff and obvious limits to bandwidth and finances, the BTI Institute's outreach and relationships will be enacted in stages and expanded over time.

The BTI Institute created the BTI Fellows (Section C.2) with an eye to both individual expertise and geographical location to establish close relationships with Federal, State, Tribal, Territorial and local partners in border and coastal regions throughout the United States and its territories. BTI Fellows are currently located in the Pacific Northwest (Washington State, and Vancouver), New York, Louisiana, Florida and New Mexico. Representatives attended the spring meeting of the Southwestern Border Sheriff's coalition and have met with local law enforcement representatives from Lafayette and Baton Rouge, Louisiana; Austin, Houston, Port Arthur, Beaumont, Corpus Christi, San Antonio and El Paso, Texas.

In 2017, the initial focus of the BTI Institute's outreach was to stakeholders along the Southern Border. There is emerging outreach activity to partners as summarized below.

## **I.2. STAKEHOLDERS**

### **Federal**

Federal agencies with whom the BTI Institute provides direct support are: the Department of Homeland Security, U.S. Customs and Border Protection (to include U.S. Border Patrol, Office of Field Operations and Air and Marine Operations), Immigration and Customs Enforcement (ICE), Federal Emergency Management Agency (FEMA); the Office for Bombing Prevention (OBP), the Office of Biometric Identity Management (OBIM), the U.S. Coast Guard (USCG), the U.S. Secret Service (USSS), U.S. Citizenship and Immigration Services (USCIS), and the Transportation Security Administration (TSA). The BTI Institute has worked with the Federal Bureau of Investigation (FBI) and other Department of Justice agencies.

### **Border and Coastal States**

The BTI Institute will provide support to states bordering Mexico (Texas, New Mexico, Arizona and California). Significant attention will be offered to the State of Texas, which shares a 1,200 mile border with Mexico and a 360 mile coastline on the Gulf of Mexico.

### **Tribes**

The BTI Institute focuses on federally recognized tribes in border and coastal regions. Significant attention will be paid to those tribes sharing international borders with Mexico (Traditional Kickapoo Tribe of Texas) and Canada (St. Regis Tribe).

### **U.S. Territories**

Recognizing Homeland Security, Trade, and Immigration issues outside of the U.S.-Mexico border, the BTI Institute will support the inhabited U.S. territories of American Samoa, Guam, the Northern Mariana Islands, Puerto Rico, and the U.S. Virgin Islands.

### **Local Entities and Jurisdictions**

The BTI Institute conducts outreach to support Urban Area Security Initiative cities and other cities, counties, and organizations along United States' international borders. A significant partnership is with the Southwest Border Sheriffs Coalition, covering 31 border counties from the Gulf of Mexico (Brownsville, Texas) to the Pacific Coast (San Diego County, California).

### **Private Corporations and Organizations**

The BTI Institute also coordinates with the Border Commerce and Security Council, POLARIS, the National Center on Sexual Exploitation (NCOSE), and other private non-profit organizations in the fulfillment of its mission.

### **I.3. MEMBERSHIP IN COUNCILS, TASK FORCES, AND WORKING GROUPS**

The BTI Institute provides representatives to the following committees to gain information, insight, and identify possible research opportunities:

- **Texas Homeland Security Council**  
The Director represents the BTI Institute at the State of Texas' Homeland Security Council.
- **Texas State Transportation Innovation Council (TxSTIC)**  
The Executive Director, Strategic Partnerships represents the BTI Institute on the Texas State Transportation Innovation Council.
- **InfraGard**  
The Executive Director, Strategic Partnerships represents the BTI Institute in the Houston Chapter of InfraGard. InfraGard is a partnership between the FBI and members of the private sector. The InfraGard program provides a vehicle for seamless public-private collaboration with government that expedites the timely exchange of information and promotes mutual learning opportunities relevant to the protection of Critical Infrastructure. With thousands of vetted members nationally, InfraGard's membership includes business executives, entrepreneurs, military and government officials, computer professionals, academia and state and local law enforcement; each dedicated to contributing industry specific insight and advancing national security
- **Business Executives for National Security (BENS)**  
The Executive Director, Strategic Partnerships represents the BTI Institute in the Houston Chapter of Business Executives for National Security. BENS is a nonpartisan nonprofit comprised of senior business and industry executives who volunteer their time and expertise to address the national security community's most pressing challenges.
- **Texas Continuity Working Group**  
The Executive Director, Strategic Partnerships represents the BTI Institute on the Texas Continuity Working Group, a committee of government and private sector subject matter experts in government Continuity of Operations (COOP) and Business Continuity planning. As a result of his participation, the BTI Institute will provide Mobile Training Teams (MTTs) as a part of COOP Training to requesting border regions in Texas.

### **I.4. REPRESENTATION ON COUNCILS, TASK FORCES, AND WORKING GROUPS**

The BTI Institute, while not formally named as a member, also "sits in" where allowed on meetings of existing organizations to stay abreast of current issues, maintain contacts, and discern the needs and resulting research opportunities posed by stakeholders.

- **Joint Task Force – West (JTF-W)**  
The BTI Institute hosted JTF–W at its meeting in June 2017. The BTI Institute provided an overview of the BTI Institute's mission, capabilities and availability as a resource to Department of Homeland Security and Department of Justice agencies in border and coastal regions. JTF-W has asked, and the BTI Institute has offered to host future meetings at the University of Houston.
- **Maritime Security Committees**  
BTI Institute representatives participate as guests on US Coast Guard sponsored Maritime Security Committees. These committees serve to: identify critical port infrastructure and

operations; identify risks (i.e., threats, vulnerabilities, and consequences); determine mitigation strategies and implementation methods; develop and describe the process to continually evaluate overall port security by considering consequences and vulnerabilities, how they may change over time, and what additional mitigation strategies can be applied; advise and assist the Captain of the Port in developing, reviewing, and updating the Area Maritime Security Plans; and participate in the development and evaluation of the required annual exercise of the Area Maritime Security Plan. Participation by BTI Institute members provides significant insight to port security needs.

- **Texas Human Trafficking Prevention Task Force**

The BTI Institute began work on the Prevention of Human Trafficking in January 2017. At that time, the Texas legislative agenda had already been set precluding the BTI Institute from being named to the Texas Human Trafficking Prevention Task Force in 2017. The BTI Institute will continue to observe and work with the Texas Human Trafficking Prevention Task Force in 2017-2018 and, through coordination with the Office of the Attorney General of Texas, seek full membership on the Task Force during the next legislative session.

- **Houston Area Council on Human Trafficking**

Nicole F. Bromfield, Ph.D., Associate Professor and Associate Dean for Academic Affairs in the Graduate College of Social Work at the University of Houston, was nominated as the BTI Institute's representative to the Houston Area Council on Human Trafficking.

## **I.5. INSTITUTE RELATIONSHIPS**

### **I.5.a. The Cross-Border Institute (CBI), Ontario, Canada**

In February 2017, the BTI Institute initiated discussions for a collaborative partnership with the Cross-Border Institute, located at the University of Windsor in Ontario, Canada. The affiliation is part of the BTI Institute's effort to expand and sustain its northern border focus.

The Cross-Border Institute (CBI) is dedicated to research, education and public outreach related to the movement of people, goods and services across the Canada-US border. CBI takes a multi-disciplinary perspective, incorporating engineering, economics, the social sciences, management and law. It focuses its work on land-border crossings, especially the largest trade corridor between Canada and the U.S. between Windsor, Ontario, and Detroit, Michigan. CBI houses expertise to assess economic and social outcomes of decisions taken by the public and private sector on land-border issues, with the goal of identifying fruitful paths to removing impediments to trade and travel while ensuring border security and protecting the rights of border users.

The BTI Institute and CBI are exploring an intern exchange partnership in 2018. CBI representatives were invited to attend the BTI Institute's Performers Showcase in Washington, D.C. on October 17-18, 2017.

### **I.5.b. The Universidad Nacional Autónoma de México**

The BTI Institute has initiated discussions to create a collaborative partnership with the National Autonomous University of Mexico (UNAM). UNAM is a public research university in Mexico City, cited as one of the top universities in the world and the best university in Mexico by US News. UNAM has excelled in many areas of research and hosts many of Mexico's premiere research institutions, attracting students and hired professional scientists from all over the world to create a unique and diverse scientific community. Scientific research at UNAM is divided between faculties, institutes, centers and schools, and covers a range of disciplines in Latin America. Its research centers tend to focus on multidisciplinary problems particularly relevant to

Mexico and the developing world, most notably, the Center for Applied Sciences and Technological Development, which focuses on connecting the sciences to real-world problems (e.g., optics, nanosciences), and the Center for Energy Research, which conducts world-class research in alternative energies. UNAM currently produces 60% of all scientific publications in Mexico.

#### **I.5.c. National Maritime Law Enforcement Academy**

In June 2017, the BTI Institute began a partnership with the National Maritime Law Enforcement Academy (<http://nmlea.org/>) in initiatives to expand the Institute's footprint in the maritime and port security areas. The National Maritime Law Enforcement Academy provides education and training for law enforcement personnel as well as for the critical infrastructure industries located in or near the maritime environment. In addition to improved tactical operations within an agency, this education covers coordination among applicable agencies at times of catastrophic events exercising the National Incident Management System (NIMS).

The NMLEA will work with the BTI Institute in the development of an annual Border Security Special Response Team Conference (February–March timeframe, 2018) in developing conference tracks for Maritime Units and Public Safety Dive Teams.

#### **I.5.d. Naval Postgraduate School Center for Homeland Defense and Security University and Agency Partnership Initiative**

The BTI Institute applied to participate in the Naval Postgraduate School Center for Homeland Defense and Security University and Agency Partnership Initiative. This initiative brings together institutions that are dedicated to advancing homeland security education. ([www.uapi.us](http://www.uapi.us))

Through the Homeland Defense and Security University and Agency Partner Initiative, the BTI Institute is provided:

- Access to homeland security course syllabi, content, and educational resources at no cost
- Use of the Homeland Security Digital Library, the nation's premier collection of homeland security documents
- Use of an interactive simulation environment where strategies and policies can be tested
- Continuous CHDS review and scrutiny of all Center content to ensure currency and relevance to the advancement of homeland security as an educational discipline

The BTI Institute's participation requirements are:

- Commitment to strengthen homeland security education and related fields
- Have an existing or developing strength in at least one discipline or field of study critical to homeland defense and/or homeland security
- Develop curriculum and share results with UAPI partners and CHDS
- Share "lessons learned" with UAPI partners and CHDS
- Strengthen national preparedness through collaborative online discussions and participation in the nationwide network of UAPI partners
- Offer programs at certificate, associate, bachelor's, master's and doctoral levels
- Deliver in-residence, distance, and/or hybrid format programs or courses



## **I.6. MEETINGS AND CONFERENCES**

### **I.6.a. Meetings**

In 2016-2017, the focus of the BTI Institute's outreach was to stakeholders in the land, air, maritime, and cyber domains along the Southern Border. The BTI Institute established close relationships with the Southern Border Sheriffs' Coalition; and began the process of creating partnerships with Customs and Border Patrol (Border Patrol, Office of Field Operations, and Air and Marine Operations), Immigration and Customs Enforcement (ICE), Southern Border States (Texas, Louisiana, New Mexico, Arizona and California), and establishing contacts with territories, ports, and local jurisdictions along the southern border.

The outreach with Federal stakeholders was achieved through a series of meetings, orientations, conference presentations, webinars and teleconferences sought by BTI Institute representatives through Sector Chiefs and a variety of representatives from Customs and Border Protection Air and Marine Operations, Office of Field Operations, U.S. Border Patrol, U.S. Coast Guard, Transportation Security Administration, Office of Biometric Identity Management, and the CBP's Southwest Research Center. The Institute also worked with representatives from the Department of Justice and Department of State (US Embassy to Mexico and US consulates in Mexico).

Outreach to territorial representatives was conducted initially by telephone calls and webinar presentations as well as direct contact at the National Homeland Security Conference held in Buffalo, New York.

### **I.6.b. Conferences**

In 2017, BTI Institute representatives provided presentations on the BTI Institute and selected initiatives at the following conferences:

- The Emergency Management Association of Texas (EMAT) Symposium (San Marcos, TX); March 5-8, 2017; <http://www.emat-tx.org/?page=sympsched2017>
- Spring meeting of the Southwestern Border Sheriff's Coalition (Lakeway, TX); April 3, 2017
- Border Affairs Digital Video Conference-U.S. Embassy to Mexico (State Department), April 5, 2017
- The Louisiana Emergency Preparedness Association Conference (Lake Charles, LA); May 1-4, 2017; [https://lepa.org/Main/conferences/2017\\_conference.aspx](https://lepa.org/Main/conferences/2017_conference.aspx)
- Joint-Task Force-West, (Houston, TX); June 22, 2017

The BTI Institute participated in the following conferences. While not provided an opportunity to present on the Institute, its representatives engaged stakeholders present, listened to their issues and identified needs, established contacts and scheduled follow-on meetings.

- The fifth Annual Maritime Security East 2017 (Galveston, Texas); March 7-9, 2017; <http://www.maritimesecurityeast.com/>
- The Border Security Expo (San Antonio, Texas); April 11-13, 2017; [http://www.bordersecurityexpo.com/files/bse17\\_prospectus\\_071316.pdf](http://www.bordersecurityexpo.com/files/bse17_prospectus_071316.pdf)
- IEEE 2017 International Symposium of Technologies for Homeland Security (Waltham, Massachusetts); April 25-26, 2017; <http://www.wikicfp.com/cfp/servlet/event.showcfp?eventid=57059&copyownerid=81998>
- Counter-UAS 2017 (London, UK); May 23-25, 2017; <https://www.asdevents.com/event.asp?id=15795>

- The National Homeland Security Conference (Buffalo, New York); June 6-8, 2017; <http://www.cvent.com/events/national-homeland-security-conference-2017/event-summary-1af89c9d6eef4b82a4167bf288364a82.aspx>
- Third Annual CREATE-TSA Symposium (Los Angeles, California); June 27-28, 2017; <http://create.usc.edu/create-tsa-symposium-0>

Detailed trip reports are available upon request.

## **I.7. COLLABORATIONS WITH OTHER CENTERS OF EXCELLENCE**

The BTI Institute will continue to build upon past collaboration with DHS Centers of Excellence and Federal Research Laboratories in a directed effort to share knowledge and information. Ongoing efforts build upon collaboration initiated in 2017, to include:

### **I.7.a Coordinated Complex Terrorist Attack (CCTA) Grant**

South East Texas Regional Planning Commission requested the BTI Institute's assistance in the development of Unified Regional Response Plan for a Coordinated Complex Terrorist Attack in the Beaumont-Port Arthur-Orange region of South East Texas. The BTI Institute reached out to the National Consortium for the Study of Terrorism and Responses to Terrorism (START) to participate in the project by researching the tactical diversity of perpetrators carrying out terrorist attacks in the United States, including both completed attacks and also tactics advocated for in propaganda pieces. DHS awarded the three-year grant to the SETRPC in July 2017. Work is slated to begin in the next performance period.

### **I.7.b. Border Security Unmanned Aerial Systems Working Group**

In creating the Border Security Unmanned Aerial Systems Working Group, the BTI Institute reached out to several Centers of Excellence and other government centers. Current membership includes representatives from such DHS Centers of Excellence as: START, the Critical Infrastructure Resilience Institute (CIRI), the Center for Risk and Economic Analysis of Terrorism Events (CREATE), and the Coastal Resilience Center (CRC). Other participating government centers include the Combating Terrorism Center (U.S. Military Academy) and the Lone Star UAS Center of Excellence & Innovation (Texas A&M). The Border Security Unmanned Aerial Systems Working Group, led by the BTI Institute, will continue to meet on a bi-monthly schedule in 2017-2018.

### **I.7.c. Tunnel Detection Working Group**

In seeking to develop reliable technology to detect illegal tunnels under the US - Mexico border, the BTI Institute solicited the collaboration and participation of representatives from START and the Combating Terrorism Center (U.S. Military Academy). These researchers will partner with representatives of the Customs and Border Protection and the Department of Defense in this research effort. The Tunnel Detection Working Group, led by the BTI Institute, will continue to meet on a bi-monthly schedule in 2017-2018.

### **I.7.d. COE Directors' Retreat**

On February 17, 2017, the BTI Institute hosted a retreat for the Directors of DHS Centers of Excellence in Houston designed to share information, best practices, and lessons learned among the Directors and Deputy Directors of DHS Centers of Excellence. Attendees at the COE Directors' Retreat agreed that such a conference was beneficial and needed. As a result of the conference, the Directors established four committees for specific focus areas: Directors, Communications, Education and Technology (Research) Transition. The BTI Institute currently

participates in the Directors, Communications, and Education committee meetings. In 2018, as the BTI Institute's research projects mature and the Institute hires a Research Transition Manager, the Institute will participate in the Technology Transition Committee.

The Director, BTI Institute will participate in future Center of Excellence Directors' Retreats as scheduled:

- September 2017 St Paul, MN (hosted by Food Protection & Defense Institute)
- March 2018 Anchorage, AK (hosted by Arctic Domain Awareness Center)

## **J. MEDIA AND COMMUNICATIONS**

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### **J.1. TASKS**

The BTI Institute has completed the following tasks specified in the work plan.

- Attended monthly communication working group calls and acted on the action items requested
- Created and distributed two Institute newsletters: Fall 2016 and Spring 2017
  - The newsletters highlighted research project(s) and provided personal profiles of a member of the External Advisory Board and a BTI Institute researcher in each edition. The newsletters also provided information and photos on new initiatives, research, programs and partnerships, and a calendar of future events. The newsletters were formatted for both print and web page, and are accessible through the BTI Institute's website.
  - The BTI Institute's next scheduled newsletter will be published in Fall 2017.
- Created SOPs for RFP distribution, media strategies, and social media strategies
- Created branding materials: logo, name
- Created and maintained stakeholder mailing lists
- Promoted Homeland Security Symposium series via website and social media
- Established presence on additional social media platforms such as LinkedIn
- Planned and promoted the BTI Institute's Ribbon Cutting ceremony
- Distributed and promoted a call for White Papers
- Maintained the website: updated with new events, research activities, Request for Proposals, and added several web pages including pages for the External Advisory Board, the BTI Fellows, Affiliates, and Executive Program under Education
- Created publicity materials for projects funded in Y1
- Updated the Center's fact sheet
- Updated HSUP website (BTI Institute's section)
- Maintained social media
- Produced and pitched news media as newsworthy events occurred and updated repository (e.g., ribbon cutting and RFP)
- Evaluated events (symposium series; ribbon cutting with project presentations)
- Conducted evaluation of performance on website and social media
- Communicated in plain English and provided communication products in user-friendly formats

The following tasks were initiated, but not fully completed during this performance period.

- Stakeholder and expert databases were partially created. We did not complete the full database, but did establish a Fellows Program with 12 experts.
- Two, instead of four, issues of the newsletter were released. However, in February 2017, we initiated weekly/monthly updates for our stakeholders.
  - **Weekly Updates:** In February 2017, the BTI Institute began to provide updates of BTI Institute activities to members of the Institute and the University of Houston leadership. Distribution has since expanded to include TIMES, BTI Fellows, selected members of the External Advisory Board (who choose to receive the Weekly Update). Distribution of this information is restricted as directed by the Director, BTI Institute.
  - **Monthly Report:** Beginning in January 2017, the Executive Director, Strategic Partnerships compiled and distributed the BTI Institute's Monthly Report to provide information on the BTI Institute's activities, programs and initiatives to the Institute's faculty, staff, researchers, University of Houston community, members of its external advisory board, BTI Fellows, and stakeholders.
- Supplemental publicity materials for projects funded in Y2 were not updated, but a news release was created.

## J.2. MILESTONES

- Branding was completed including the change in center logo and name (from CBTIR to BTI Institute), and the Ribbon Cutting Ceremony.
- Mediated communication channels for stakeholder engagement were established and utilized. These include the center website, newsletter, and social media (Twitter and LinkedIn)
  - **Website:** In addition to serving as an external communication portal, the website functions to enhance information sharing through a website archive by which members of the External Advisory Board, the BTI Fellows and members of the Institute on travel have immediate access to talking points, presentations, information papers, and other communications documents. Archives are accessed at [www.uh.edu/bti/Archive/](http://www.uh.edu/bti/Archive/)
  - **LinkedIn:** The BTI Institute began posting information on its new LinkedIn page in Spring 2017. Short articles and photos of BTI Institute activities are available to the Department of Homeland Security and the Institute's partner agencies.
  - **Request for Proposals (RFP):** The BTI Institute refined its procedures for advertising its Request for Proposals. For RFP-17-02, the Communications Advisor posted the announcement on the BTI Institute's website and then disseminated the information through an assortment of major academic funding databases and professional list serves. These included: ProQuest Community of Science/Pivot, SPIN Funding Opportunities Database, SciVal Funding, GrantScoop, and GrantForward. The BTI Institute also coordinated with DHS S&T to promote the announcement via its wider distribution channels.
  - As a result of these efforts, the BTI Institute received 44 proposals submitted in response to RFP-17-02.
- Communication infrastructure and databases were partially established. As explained in the tasks section, the projects funded in Y1 were updated and stakeholder lists and segments were created and maintained through Emma, an email marketing platform. However, a database of experts and supplemental resources was only partially created.

- Face-to-face communication channels for stakeholder engagement were established and utilized. The first external advisory board meeting was held.
- Communication content was created and utilized for projects and events (e.g., ribbon cutting) publicity.

### J.3. OUTPUTS

- Created media kits
  - In 2017, the BTI Institute developed, updated, and maintains the following documents and presentations in a media kit to assist in communicating information to its partners and stakeholders:
    - Information Paper – The BTI Institute
    - Talking Points – The BTI Institute
    - Information Paper – BTI Fellows
    - Synopses – BTI Institute Research Projects
    - Information Paper – Basic Ordering Agreement
    - Information Paper – Border Security Unmanned Aerial Systems Working Group
    - Information Paper – Tunnel Detection Working Group
    - Information Paper – Prevention of Human Trafficking Initiatives
    - Information Paper – Continuity of Operations Training
    - Information Paper – Coordinated Complex Terrorist Attack
- Created one feature story from the Homeland Security Symposium and included it in the Fall 2016 issue of the BTI Institute’s newsletter
- Conducted one meeting with the External Advisory Board
- Established LinkedIn account with 78 followers as of August, 2017, surpassing our objective of 50.
- Created and updated feature story on the BTI Institute’s Ribbon Cutting Ceremony which was posted on the website.

### J.4. PERFORMANCE METRICS

- **Newsletters:** The open rates for the Fall 2016 issue and the Spring 2017 issue are 26% and 25%, respectively. The click rates for the two issues are 16% and 15%, respectively. Click rates for both issues are above industry average (20% and 6%, respectively), surpassing our goal.
- **Stakeholder mailing lists:** The appropriateness and reach to stakeholders are measured in average click rate and open rate. Across all mailings, due to the different nature of the content (e.g., RFPs vs. general news, event announcement vs. event reminders), the rates ranged from 16% - 41% for the open rates, and 8% - 39% for the click rates. Overall, the average open and click rates are 39% and 19%, respectively, almost double and triple the industry average (20% and 6%), respectively.
- **Feature stories:** Website traffic for the Homeland Security Symposium Story as assessed by Google Analytics was about 67 page views with 60 unique page views.
- **Expert database:** We initially planned to establish this database with 50 experts to proactively pitch the media and respond to media inquiries. We did not complete the full database, but did establish a Fellows Program with 12 experts. We initially aimed for media interviews with at least three experts. This goal was not achieved.
- **Publicity materials for projects:** Page view stats for all projects are: 587 page views with 448 unique page views, surpassing our goal of 100 unique page views.

- **Website:** The website traffic was assessed through Google analytics. Overall we had 14,816 page views, with 11,351 unique page views. Average time spent on the site was 1 minute 29 seconds.
- **Social media:**
  - For Twitter, we have 93 followers and 346 likes, the followers and likes for the other two recently-established peer COEs are 109 and 246; 887 and 247, respectively. One of the peer COEs has been in existence much longer than the BTI Institute. After our formal branding (ribbon cutting), the tweets earned 3.5K impressions.
  - For LinkedIn, the number of followers reached surpassed our objective of 50
- **Project presentations:** We initially scheduled five events. One was implemented during the ribbon cutting ceremony.

## K. EVENTS

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### K.1. RIBBON CUTTING

The BTI Institute hosted an open house on March 27<sup>th</sup> to promote its mission to strengthen border security, facilitate legitimate trade and travel, and ensure the integrity of our nation's immigration policies.

The ribbon cutting ceremony started with a dance performance from the Karen Stokes Dance group, with visual representation of the flows of goods and people across borders.

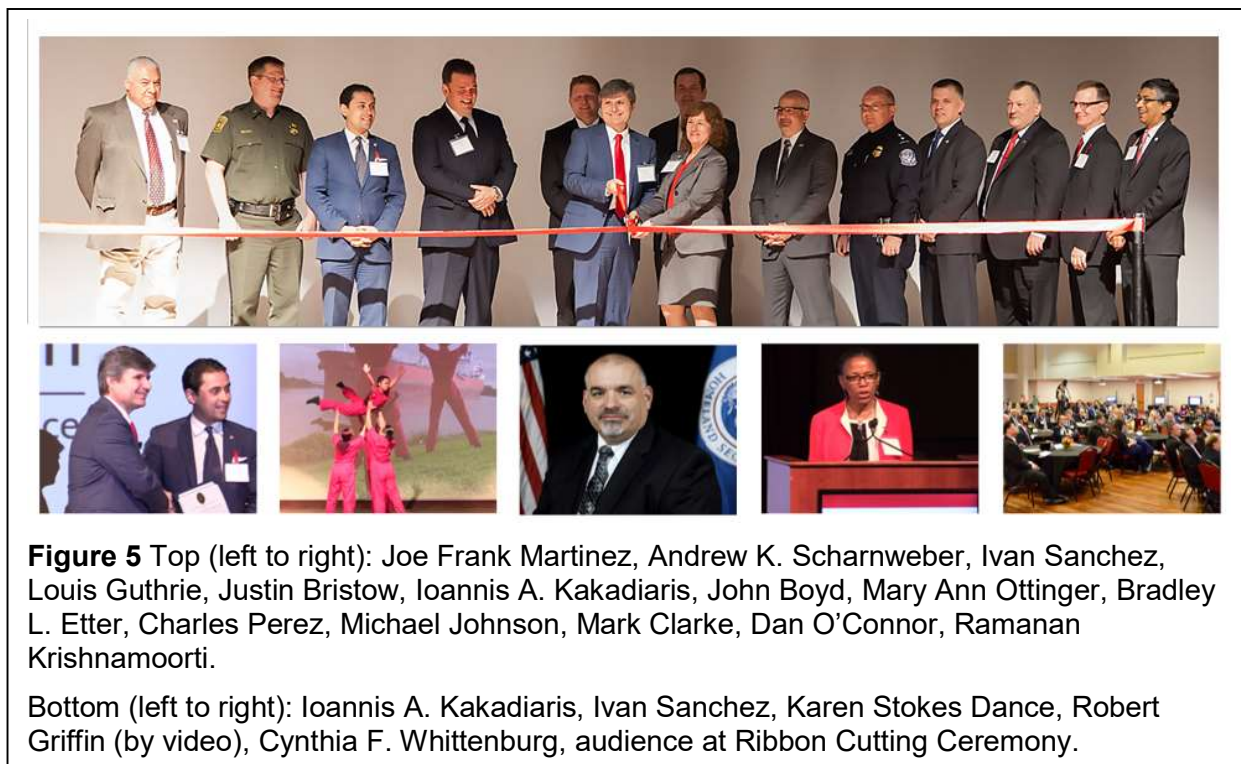
The ribbon cutting ceremony featured several distinguished speakers and guests, including:

- Robert Griffin, Under Secretary (Acting) for DHS Science and Technology Directorate (by video)
- Matthew Clark, Director of the Office of University Programs, DHS Science and Technology Directorate (comments via letter)
- Cynthia Whittenburg, Deputy Executive Assistant Commissioner, Office of Trade, U.S. Customs and Border Protection
- Andrew K. Scharnweber, Associate Chief, U.S. Border Patrol, U.S. Customs and Border Protection
- Louis Guthrie, Chief, Alabama-Coushatta Tribal Police Department
- Joe Frank Martinez, Sheriff of Val Verde County and Chairman of the Southwest Border States Sheriffs Coalition
- Bradley L. Etter, Chief Intelligence Office, Immigration and Customs Enforcement
- Oscar Solis Floris, Consul, Mexico
- Carlos H. Pacheco-Murillo, Consulado General de Costa Rica en Houston
- Oscar Rodriguez-Cabrera, Consul General Mexico

In addition, Ivan Sanchez presented a certificate of support for the mission of the BTI Institute to Director Ioannis Kakadiaris on behalf of United States Congresswoman Sheila Jackson Lee.

Video of the Ribbon Cutting Ceremony available:

<http://www.uh.edu/bti/news/events/2017/march/ribbon-cutting/ribbon-cutting-event/>



## K.2. ME TO WE

The BTI Institute's Media and Communications Advisor, Dr. Lan Ni, led a student team that won third place<sup>1</sup> in the DHS sponsored Peer to Peer: Challenging Extremism competition, managed by EdVenture Partners and supported by Facebook. This social media campaign, Me to We, was conducted during the performance period covered in this report and focused on dispelling extremism through engaging in dialogue and civil conversations despite differences of opinion<sup>2</sup>.

The students presented their project in front of policy makers, senior leaders, and guests in Washington, D.C. on July 18, 2017. The judges included officials from DHS, the National Counterterrorism Center, the Countering Violent Extremism Task Force and Facebook. Forty nine teams participated in this competition. According to the organizer, the UH team is the first team that has ever placed in the top three as a first time competitor in the competition.

The team was then invited by the former head of the National Association of Government Communicators (NAGC) to deliver a webinar later in 2017 to their members, who are communicators in the federal, state, and local government, on how government agencies may implement similar programs to help combat hate, intolerance and extremism.

<sup>1</sup> <https://edventurepartners.com/peer-to-peer-challenging-extremism-spring-2017-u-s-final-winners-announced/>

<sup>2</sup> <http://www.uh.edu/class/communication/news/archive/2016/Speak%20Up.php>

### K.3. HIGH PROFILE VISITS

Federal representatives engaged the BTI Institute’s Director in discussions related to homeland security.

**Congressman Michael McCaul:**

Representative Michael McCaul (TX 10), Chairman of the U.S. House Committee on Homeland Security, visited the BTI Institute on September 1, 2016 to be briefed on BTI Institute activities.

**Congresswoman Sheila Jackson Lee:**

Representative Sheila Jackson Lee (TX 18), Ranking Member of the U.S. House Subcommittee on Crime, Terrorism, Homeland Security, and Investigations, visited the BTI Institute on September 2, 2016 to be briefed on BTI Institute activities.



**Figure 6.** UH President and Chancellor Renu Khator shakes hands with Congressman Michael McCaul at the congressman’s visit to the BTI Institute. BTI Institute Director Ioannis Kakadiaris stands at center.



**Figure 7.** BTI Institute Director Ioannis A. Kakadiaris (right) discusses the BTI Institute with Representative Sheila Jackson Lee during her visit.

DHS representatives visited the BTI Institute on March 6, 2017 and were introduced to the Institute’s executive leadership and thrust leads.



**Figure 8.** (L-R) Dr. Jason Ackleson, Director of Strategy, Office of Strategy Plans, Analysis, and Risk, Dr. Mary Ann Ottinger, University of Houston; Dr. Susan Coller Monarez, Deputy Assistant Secretary (Strategy and Analysis); and Dr. Ioannis Kakadiaris, Director, BTI Institute.