



Binational Cooperative Pilot/Israel – U.S. Binational Industrial Research and Development (BIRD) Foundation

December 11, 2019

Fiscal Year 2019 Report to Congress



**Homeland
Security**

Science and Technology Directorate

Foreword from the Senior Official Performing the Duties of the Under Secretary for Science and Technology

December 11, 2019

I am pleased to present the following report, “Binational Cooperative Pilot/Israel – U.S. Binational Industrial Research and Development (BIRD) Foundation,” which has been prepared by the Department of Homeland Security (DHS) Science and Technology Directorate.

This document has been compiled pursuant to language set forth in Senate Report 115-283 accompanying the Fiscal Year 2019 DHS Appropriations Act (P.L. 116-6).

Pursuant to congressional requirements, this report is being provided to the following Members of Congress:

The Honorable Lucille Roybal-Allard
Chairwoman, House Appropriations Subcommittee on
Homeland Security

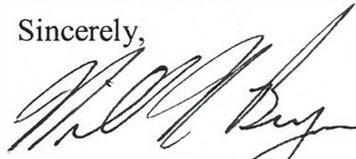
The Honorable Chuck Fleischmann
Ranking Member, House Appropriations Subcommittee on Homeland Security

The Honorable Shelley Moore Capito
Chairman, Senate Appropriations Subcommittee on Homeland Security

The Honorable Jon Tester
Ranking Member, Senate Appropriations Subcommittee on Homeland Security

Inquiries relating to this report may be directed to me at (202) 254-8392.

Sincerely,



William N. Bryan
Senior Official Performing the Duties of the
Under Secretary for Science and Technology





Binational Cooperative Pilot/Israel – U.S. Binational Industrial Research and Development (BIRD) Foundation Fiscal Year 2019 Report

Table of Contents

I.	Legislative Language.....	1
II.	Background.....	2
III.	Binational Cooperative Pilot Overview.....	3
IV.	Explanation of Current Activity	4
IV.	FY 2019 Next Steps.....	5
V.	BIRD First Responder Pilot Funding 2016-2018	6
	Appendix: Abbreviations.....	12

I. Legislative Language

This document has been compiled pursuant to language set forth in Senate Report 115-283 accompanying the Fiscal Year (FY) 2019 Department of Homeland Security (DHS) Appropriations Act (P.L. 116-6).

[The Committee] is pleased that S&T has been engaged in a three-year binational research and development pilot. The recommendation includes \$2 million for continuation of this pilot. The pilot should continue its focus on border security, maritime security, biometrics, cybersecurity, and video analytics among other topics. Within 180 days of the enactment of this act, S&T shall provide a report to the Committee on the results of each grant awarded through the pilot and on any commercialization or transition to practice that has resulted from the pilot's projects.

II. Background

The Binational Industrial Research and Development Foundation (BIRD) was established in 1977 as a joint initiative between the U.S. and Israeli governments to stimulate, promote, and support joint (nondefense) industrial research and development (R&D) of mutual benefit to Israel and the United States. In 2016, the DHS Science and Technology Directorate (S&T) established a contractual mechanism with Israel's Ministry of Public Security (MOPS) under the 2009 "Agreement between the Government of the United States of America and the Government of the State of Israel on Cooperation in Science and Technology for Homeland Security Matters"¹ to fund the binational R&D pilot (the Pilot). A dedicated technical annex (TA) between DHS and MOPS titled, "NextGen First Responder Technologies," established a path forward. In its annual call for proposals, BIRD actively seeks out companies and institutions that have a high probability of addressing the requirements set forth by DHS S&T and MOPS. BIRD, in turn, requires proposers to demonstrate that:

- They have the resources to carry out the development of the technology under the proposal;
- They are capable of commercialization efforts;
- They have the necessary R&D capabilities required for the development of the technologies; and
- The subject of their proposal is likely to qualify as a significant technological innovation.

The program is funded equally by the United States (DHS S&T) and Israel (MOPS) and is managed by BIRD.

¹ https://www.dhs.gov/xlibrary/assets/agreement_us_israel_sciencetech_cooperation_2008-05-29.pdf

III. Binational Cooperative Pilot Overview

Under the BIRD framework, three “BIRD First Responders” calls for proposals have been issued from FY 2016 to FY 2018 in alignment with DHS First Responder Capability Gaps. The United States and Israel each have contributed \$1 million for a combined total of \$2 million annually, totaling \$6 million. The six projects funded to date via the Pilot total \$5.65 million, with the remaining funds associated with annual exchange rate differences and project administration. Government funding is leveraged by a 50-percent match from private-sector funding, totaling at least \$12 million.

The DHS BIRD First Responder program has been successful in raising awareness of first responder capability gaps within the global innovation ecosystem and in building relationships between industry and first responder organizations, both in Israel and the United States.

Given the nature of the technologies involved and the mandate to ensure that the use of technologies sustains, and does not erode, privacy protections related to the use, collection, and disclosure of personal information, DHS will conduct appropriate privacy risk assessments for each project.²

² Homeland Security Act of 2002, 6 U.S.C. §142.

IV. Explanation of Current Activity

In 2019, the BIRD process and model expanded to “BIRD Homeland Security” (BIRD HLS) to take a more comprehensive approach to the DHS mission and to follow P.L. 116-6 guidance, which states that the Pilot “...should continue its focus on border security, maritime security, biometrics, cybersecurity, and video analytics among other topics.” The list of homeland security-based problem sets and capability gaps, jointly agreed upon between DHS S&T and MOPS, now includes:

- Law enforcement-supporting technologies to combat cybercrime;
- Technologies and methods to secure critical infrastructure and public facilities (“soft targets”);
- Safe and secure cities;
- Border protection, including maritime security (e.g., biometrics, screening systems, robotics, etc.);
- Unmanned aerial systems (UAS); and
- Advanced First Responder Technologies (as identified in the First Responders’ Capability Gaps List on BIRD’s website).

2019 BIRD HLS Action Timeline

Date	Action
January 30, 2019	BIRD HLS call for proposals released
April 8, 2019	First deadline for executive summaries; 22 proposals received
May 15, 2019	Deadline for full proposals; 9 moved forward in BIRD down-select
Fall 2019*	Final awardee decisions*

*** Note:** A variety of factors has contributed to the timeline delay for the BIRD HLS call, including the U.S. Government lapse in appropriations and the passage of P.L. 116-6 on February 15, 2019, after the 2019 call was released. With the infusion of significant additional funds, DHS S&T Office of General Counsel also conducted additional due diligence on the BIRD TA to ensure appropriate delineation of intellectual property rights. The TA between DHS and MOPS associated with the BIRD engagement was signed on September 10, 2019.

IV. FY 2019 Next Steps

At the annual Board of Governors' meeting on December 17, 2019, in Tel Aviv, Israel, DHS and MOPS leadership will finalize selections of an anticipated one to three projects to complete the BIRD HLS 2019 cycle. To improve visibility into the work further, DHS S&T will conduct site visits, at minimum, with the U.S.-based companies in addition to BIRD's comprehensive reviews. DHS will receive status reports to include research progress and financial expenditures. Twice per year, the BIRD Foundation will submit technical, financial, and commercialization/utilization reports to DHS S&T and MOPS on the activities funded by BIRD HLS.

V. BIRD First Responder Pilot Funding 2016-2018

Technical Topic	Locating and Monitoring
Project Title	Indoor Positioning, Locating, and Reporting System
Project Description	In emergency response situations, first responders need positioning and communication solutions to assist evacuation and rescue operations. Successful emergency response to those in need is dependent upon a responder's ability to receive accurate location information to effect timely action and to communicate with the response team. This project sought to develop a smartphone platform that can provide three-dimensional (3D) location services, physiological status, and local hazard indicators, and that can allow for emergency response personnel to communicate with one another.
Project Specifics	The outcome of this joint project is a smartphone platform technology, providing indoor 3D location, physiological status, voice, local hazard indicators, and interresponder communications. The U.S. company provides the indoor navigation; the Israeli company provides the other elements.
U.S. Company	OptoKnowledge, Torrance, California: Developed vision-based navigation and mapping technologies for global positioning system-denied environments, applying these technologies to indoor navigation and mapping for first responder situational awareness.
Israeli Company	SayVU: Provides real-time reporting and event management systems by accessible life-saving technologies.
Award Amount	\$950,000
Commercialization Potential	Contender at Urban Navigation Technologies' contest, http://cttsc-x.com/the-contest ; discussions with Motorola Innovation, demonstration to corporate chief technology officers.
Project Start Date	December 1, 2016
Project Duration	30 months

Technical Topic	Communications/Search and Rescue (SAR)
Project Title	Unmanned Search and Rescue Systems
Project Description	In the event of an emergency or disaster where first responders are called to assist in rescue efforts, unmanned vehicles can play an important part in assessing the disaster impact and threat landscape of an incident. Unmanned ground vehicles (UGV) enable remote teams to monitor hazardous environments and active threats in real time and empower first responders to assess and prepare for recovery and threat mitigation efforts appropriately. This project sought to develop a UGV that allows emergency response teams to identify hazards and to monitor active threats via remote video and audio streaming.
Project Specifics	The outcome of the joint project was development of a UGV equipped with a variety of sensors integrated with communication systems that create generic, frequent agnostic <i>ad hoc</i> network streaming of video and audio. More specifically, the project developed a handheld controller with video screen to enhance control capabilities of the UGVs. This resulted in the ability to enable fully integrated operation of UGVs with command and control and first responder teams and the ability to enable connection of the local area network via long-distance broadband wireless links to emergency operations center to enable UGV real-time video streaming.
U.S. Company	Mantaro Networks, Germantown, Maryland: Develops and provides telepresence robotic systems for commercial businesses, healthcare, construction, and law enforcement. In addition, provides custom engineering and design services for Internet of Things and custom robotic products, applying its expertise in communications and radio frequency (RF) engineering.
Israeli Company	Beeper Communication: Provides emergency communication and critical messaging services for military and homeland security organizations, combining satellite and ground RF transmission to provide comprehensive and reliable coverage.
Award Amount	\$900,000
Commercialization Potential	Companies attended the Association of the U.S. Army tradeshow in Washington, D.C. (military applications); companies overall reported that they found much interest among potential users for demonstrations and for providing inputs to define system requirements.
Project Start Date	July 1, 2017
Project Duration	20 months

Technical Topic	Public Safety Off-network Broadband Communication
Project Title	Public Safety off-network broadband communications using multihop LTE [Long-Term Evolution] direct (ProSe [Proximity Services]) technology
Project Description	It is imperative that first responders are able to communicate with one another quickly and effectively in the event of an emergency. With the tremendous changes in emergency communications through the use of smartphones and similar devices, public safety organizations are also responsible for addressing the network service challenges to communicating through voice, video, and data over extended ranges. This project sought to enhance smartphone communication capabilities for public safety officials through the development of an extended-range, off-network broadband communication solution.
Project Specifics	The purpose of this joint project was to develop a public safety, off-network, broadband communication solution based upon the LTE direct ProSe standard for device-to-device connectivity, with a unique multi-hop technology for extended-range connectivity. This technology will enable first responders to continue getting broadband services (voice, video, and data) from their colleagues, within a 1-kilometer radius, by using their existing smartphones.
U.S. Company	M87, Wireless Networking and Communications Group at the University of Texas at Austin: This group is commercializing a groundbreaking, patent-pending software technology that makes wireless networks higher performing, more efficient, and easier to use. The technology was invented by a team from the Wireless Networking and Communications Group at the University of Texas at Austin.
Israeli Company	Elbit Systems Land and C4ISR [command, control, communications, computers, intelligence, surveillance, and reconnaissance], Elbit Systems Ltd: Develops and implements advanced C4ISR systems, integrated intelligence, and communication systems.
Award Amount	\$900,000
Commercialization Potential	The companies focused on the first responders market and offered new tools and capabilities available nationwide, anytime, even without cellular LTE coverage (off-network).
Project Start Date	November 1, 2017
Duration	12 months (project terminated because of acquisition of U.S. company)

Technical Topic	Autonomous Drone-based SAR
Project Title	Autonomous Drone-based Search & Rescue
Project Description	After a disaster or incident, time is a precious commodity in rescue and recovery efforts. UAS can be an effective life-saving tool with the ability to scan a scene remotely for signs of life to identify and locate casualties and fatalities. This project seeks to develop UAS software and hardware that will enhance the detection and evaluation of human lives in an SAR scenario.
Project Specifics	The outcome of this joint project is a system to assist and enhance the use of UAS and autonomy in SAR missions. The product is an on-board software and hardware kit to enhance the capabilities of a multirotor UAS for victim detection, health evaluation, and communication.
U.S. Company	Sinclair College, Dayton, Ohio: Sinclair’s National UAS Training and Certification Center represents one of the most comprehensive and pioneering facilities for the advancement of UAS training and applied research support.
Israeli Company	Simlat: A leading provider of innovative, next-generation training solutions for UAS. These training solution systems enable training for any platform, payload, and mission.
Award Amount	\$950,000
Commercialization Potential	Starting marketing-related activities ahead of planned schedule. The companies have been demonstrating the technology at a number of trade shows.
Project Start Date	May 1, 2017
Project Duration	40 months

Technical Topic	Drone-based/Cellular SAR
Project Title	Autonomous Drone-based Search & Rescue
Project Description	After a disaster or incident occurs, the ability to locate persons trapped beneath rubble or other structures can be both arduous and inefficient if emergency responders don’t know whom to look for or where they are located. However, with the prevalence of smartphones in everyday life, emergency responders can utilize aerial technology to survey a disaster area and to detect cellular signals to locate trapped victims. This project seeks to develop an advanced drone technology that can locate victims accurately, using signals from cellular phones.
Project Specifics	The outcome of this joint project is the “Advanced Res-Q-Cell,” an advanced drone-mounted SAR system for locating victims under ruins and in disaster areas by accurately locating their cellular phones.

U.S. Company	TLC Solutions, St. Augustine, Florida: Provides secure wireless network solutions designed specifically for portability, ease-of-use, and tactical communications applications across a variety of standards.
Israeli Company	Elta Systems: A group and subsidiary of Israel Aerospace Industries, Elta Systems is an Israeli defense electronics company in the field of intelligence, surveillance, early warning and control, homeland security, self-protection and self-defense, and fire-control applications.
Award Amount	\$950,000
Commercialization Potential	The SAR equipment market is projected to grow from an estimated \$113.6 billion in 2017 to \$125.6 billion by 2022, at a compound annual growth rate of 2.03. The factors expected to drive the market in the coming years are increased focus of countries on the safety of their citizens and rising terrorism and insurgency. The companies view the market for a Res-Q-Cell System as worldwide and including all the national and international agencies. A list of agencies may be found in the “Search and Rescue Contacts” website https://sarcontacts.info . The target price for an integrated product (after full commercialization and excluding the installation platform) is estimated to be about \$400,000.
Project Start Date	October 1, 2018
Duration	24 months

Technical Topic	First Responders Communications
Project Title	First Responders Emergency Radio Repeater System (FRRS) for Existing High-Rise Buildings
Project Description	Geographical and structural obstacles can obstruct the communication device signals of emergency response teams when conducting rescue efforts in high-rise buildings, especially those in dense urban areas. Infrastructure obstacles, including reinforced concrete and structural steel, hinder radio signal strength and communication. First responders rely on portable radios to communicate with command and control centers, to account for personnel, and to communicate risks to other first responders while performing crucial rescue operations. This project seeks to enhance radio communication for first responders by developing a radio repeater that can receive and retransmit radio signals at a higher power, so that it can cover a greater distance.
Project Specifics	The outcome of this joint project is the development of an FRRS, which is a combination of a radio receiver and a

	radio transmitter that enables signals to cover longer distances for high-rise buildings.
U.S. Company	Allstate Sprinkler Corp (Bronx, New York) is a fire-protection contractor servicing the New York City Metropolitan area.
Israeli Company	HiRiseTech provides developers, building owners, general contractors, construction managers, and low-voltage contractors with turnkey Emergency Responder Radio Coverage System solutions, specifically configured for each structure. It designs, installs, and maintains each system while meeting the most stringent building code requirements regarding public safety radio communications.
Award Amount	\$950,000
Commercialization Potential	The commercial prospect for the FRRS project is significant; there are tens of thousands of high-rise buildings lacking an effective radio coverage system for first responders. An independent survey estimates the New York market at \$1 billion and an additional \$3 billion to \$5 billion in other U.S. metropolitan centers. The global market is estimated to be in excess of \$10 billion.
Project Start Date	September 1, 2018
Duration	24 months

Appendix: Abbreviations

Abbreviation	Definition
3D	Three-Dimensional
BIRD	Binational Industrial Research and Development
BIRD HLS	BIRD Homeland Security
C4ISR	Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
DHS	Department of Homeland Security
FRRS	First Responders Emergency Radio Repeater System
FY	Fiscal Year
LTE	Long-Term Evolution
MOPS	Ministry of Public Security
ProSe	Proximity Services
R&D	Research and Development
RF	Radio Frequency
S&T	Science and Technology Directorate
SAR	Search and Rescue
TA	Technical Annex
UAS	Unmanned Aerial System
UGV	Unmanned Ground Vehicle