THE ROLE OF TECHNOLOGY IN COUNTERING TRAFFICKING IN PERSONS

JOINT HEARING

BEFORE THE

SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT
SUBCOMMITTEE ON RESEARCH AND TECHNOLOGY

OF THE

COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
HOUSE OF REPRESENTATIVES

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C O N T E N T S

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Appendix II: Additional Material for the Record

THE ROLE OF TECHNOLOGY IN COUNTERING TRAFFICKING IN PERSONS

TUESDAY, JULY 28, 2020

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT,
JOINT WITH THE SUBCOMMITTEE ON RESEARCH AND TECHNOLOGY,
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY,
Washington, D.C.

The Subcommittees met, pursuant to notice, at 10:09 a.m., via Webex, Hon. Bill Foster [Chairman of the Subcommittee on Investigations and Oversight] presiding.

U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON INVESTIGATIONS AND OVERSIGHT AND
SUBCOMMITTEE ON RESEARCH AND TECHNOLOGY JOINT HEARING

HEARING CHARTER

The Role of Technology in Countering Trafficking in Persons

Tuesday, July 28, 2020
10:00 a.m. EDT – 12:00 p.m. EDT
Cisco WebEx

PURPOSE

The purpose of the hearing is to examine the role of science and technology in assisting nongovernmental organizations, State, local, and Federal governments, financial institutions, and others to disrupt domestic and international human trafficking, including trafficking for forced labor and sexual exploitation. The hearing will also explore the research, technology development, and coordination needs to strengthen Federal anti-trafficking strategies and will be an opportunity to discuss the impact of COVID-19 on human trafficking response.

WITNESSES

- **Ms. Anjana Rajan,** Chief Technology Officer, Polaris
- **Mr. Matthew Daggett,** Technical Staff, Humanitarian Assistance and Disaster Relief Systems Group, Lincoln Laboratory, Massachusetts Institute of Technology
- **Ms. Emily Kennedy,** President and Co-Founder, Marinus Analytics
- **Ms. Hannah Darnton,** Associate Director of Ethics, Technology, and Human Rights, Business for Social Responsibility

OVERARCHING QUESTIONS

- To what extent do we know the prevalence of trafficking in persons in the United States? What are the data gaps and data analysis challenges for understanding and countering trafficking in persons? What are the existing efforts and what are the opportunities for increased data collection and data sharing among nongovernmental organizations (NGO), State, local and Federal governments, law enforcement, and industry?

- How are machine learning and other data analysis tools being applied to data relevant to human trafficking and what is the potential of these technologies to improve understanding and response to trafficking in persons?
- What other types of technologies, including emerging technologies, are being deployed or have the potential to aid in anti-trafficking strategies? What are the challenges to incorporating these technologies into anti-human trafficking efforts in the United States?
- What role can Federal science agencies play in supporting research and technology development to help combat human trafficking?

Trafficking in Persons

Trafficking in persons is a multi-billion-dollar ($150 billion by Federal estimates), transnational illicit enterprise, second only to drug trafficking in terms of profitability.[1] It impacts every country around the world, including the United States, whether as the country of origin, transit or destination, or combination of all three.[2] While trafficking of foreign nationals across borders is a well-known issue, U.S. citizens are also victims of trafficking within the United States. Human trafficking operations range from the local level, including parents exploiting their own children, to international syndicates.

This year is the 20th anniversary of both the signing of the United Nations (UN) Protocol to Prevent, Suppress, and Punish Trafficking in Persons, Especially Women and Children (Trafficking in Persons Protocol) and enactment of the *Trafficking Victims Protection Act* (TVPA) [P.L 106-386],[3] the Federal law that guides the Federal response to human trafficking.

The UN Trafficking in Persons Protocol defines trafficking as the recruitment, transport, and transfer, harboring, or receipt of a person by such means as threat or use of force or other forms of coercion, abduction, fraud, or deception for the purpose of exploitation.[4] In the United States, the TVPA defines "severe forms of trafficking in persons" as sex trafficking in which a commercial sex act is induced by force, fraud, or coercion, or in which the person induced to perform the act has not attained 18 years of age; or the recruitment, harboring, transportation, provision, or obtaining of a person for labor or services, through the use of force, fraud, or coercion for the purpose of subjection to involuntary servitude, peonage, debt bondage, or slavery. According to the 2020 Trafficking in Persons Report, headed by the U.S. Department of

[1] Department of Homeland Security - https://www.dhs.gov/science-and-technology/news/2019/01/30/st-combatting-human-trafficking-using-social-science
[2] United National Office of Drugs and Crime - https://www.unodc.org/unodc/en/human-trafficking/faqs.html.
[3] The *Trafficking Victims Protection Act of 2000* was enacted as part of the *Victims of Trafficking and Violence Protection Act of 2000*. https://www.congress.gov/106/plaws/publ386/PLAW-106publ386.pdf
[4] https://www.unodc.org/unodc/en/human-trafficking/what-is-human-trafficking.html

State, the United States considers the terms "trafficking in persons," "human trafficking," and "modern slavery" as interchangeable.[5]

There are many international and domestic efforts to increase public awareness of human trafficking, including the global observation of July 30 as the annual World Day Against Trafficking in Persons. The 2018 Global Report on Trafficking in Persons, released last year by the UN Office on Drugs and Crime, found that reports and detection of trafficking were up globally; however, this could be the result of increased identification of victims or increased numbers of people being trafficked, or both.[6]

The TVPA established minimum standards for the elimination of trafficking, including 1) the prohibition of trafficking; 2) punishing or prosecuting any underlying crime; 3) punishment and prosecution to a degree that acts as a deterrent to trafficking; and 4) making efforts to eliminate severe forms of trafficking. The TVPA also required the establishment of the President's Interagency Task Force to Monitor and Combat Trafficking, which is chaired by the Department of State and also includes the Departments of Treasury, Defense, Justice, Labor, Homeland Security, Transportation, and several other Federal agencies. The Department of Health and Human Services is also a member of the Task Force and funds the National Human Trafficking Hotline, which has been operated by Polaris since 2007.

The Task Force submits an annual report to Congress measuring the progress of the United States and other countries in human trafficking prevention and protection and assistance to victims. It ranks countries using a four-tier system, with Tier 1 being the highest, meaning that the country meets TVPA's minimum standards.[7] The State Department's 2020 Trafficking in Persons Report states that "[a]lthough the [United States] government meets the minimum standards, it prosecuted fewer cases and secured convictions against fewer traffickers, issued fewer victim trafficking-specific immigration benefits, and did not adequately screen vulnerable populations for human trafficking indicators" in comparison to the previous year.[8]

Science and technology have important roles to play in combatting human trafficking. The 2019 UN Interagency Coordination Group Against Trafficking in Persons report, "Human Trafficking and Technology: Trends, Challenges, and Opportunities," states that technology can "help practitioners combat trafficking, such as by aiding investigations, enhancing prosecutions,

[5] 2020 Trafficking in Persons Report, page 3. https://www.state.gov/wp-content/uploads/2020/06/2020-TIP-Report-Complete-062420-FINAL.pdf
[6] Global Report on Trafficking in Person 2018 - https://www.unodc.org/documents/data-and-analysis/glotip/2018/GLOTiP_2018_BOOK_web_small.pdf
[7] U.S. Department of State's 2020 Trafficking in Persons Report - https://www.state.gov/wp-content/uploads/2020/06/2020-TIP-Report-Complete-062420-FINAL.pdf.
[8] *Id.* at page 515.

raising awareness, providing service to victims, and shedding light on the make-up and operation of trafficking networks."[9]

The COVID-19 Pandemic Impact on Human Trafficking

The COVID-19 pandemic may be cutting off some opportunities for traffickers while creating new ones. In particular, experts indicate that the social distancing, shelter-in-place orders, and travel restrictions implemented in response to COVID-19 are creating new opportunities to exploit the vulnerable who no longer have access to or have limited access to shelters, schools, income, and social service resources.[10] Law enforcement experts have reported a drastic increase in livestreaming of sexual exploitation and other cyber-enabled human trafficking online and on the Darknet since the COVID-19 pandemic.

Federal Science and Technology Anti-Human Trafficking Activities

One Federal agency with a significant role in countering human trafficking is the Department of Homeland Security (DHS). DHS operates the Blue Campaign, a national human trafficking public awareness effort to educate the public, law enforcement, and industry to recognize indicators of human trafficking and provide guidance on how to respond. The DHS Science and Technology Directorate (S&T) is working to combat the issue of human trafficking through social science-based research. DHS S&T has initiated the Counter-human Trafficking and Modern Slavery Foundational Effort and the Human Trafficking System Analysis and Technology Roadmap.

The purpose of the Counter-human Trafficking and Modern Slavery Foundational Effort is to provide a domestic and international understanding of human trafficking. The effort will include identifying organizations combatting human trafficking, defining their relationships with one another, and organizing them. DHS S&T is also conducting an analysis of key government stakeholders and non-governmental organizations in order to help the agency develop a more effective counter-human trafficking response capability. Finally, DHS S&T, through the Massachusetts Institute of Technology's (MIT) Lincoln Laboratory, developed a technology roadmap that consists of near-term, small- and large-scale technology recommendations. The data and results collected will aid operational partners, decision makers, and policymakers in combatting human trafficking and modern slavery.

The Department of Transportation (USDOT) also supports anti-human trafficking activities. The Advisory Committee on Human Trafficking, established in 2018 by the *Combatting Human Trafficking in Commercial Vehicles Act* [P.L.115-99], released its final report last year. The report states that "data collection, analysis, and information-sharing are critical to inform the

[9] https://www.un.org/sexualviolenceinconflict/report/human-trafficking-and-technology-trends-challenges-and-opportunities/

[10] https://news.un.org/en/story/2020/05/1063342

transportation industry regarding the nature and severity of human trafficking. Yet little academic research has been conducted and published, particularly empirically based, on the role of the transportation industry in facilitating or preventing human trafficking."[11]

USDOT also partners with DHS and U.S. Customs and Border Protection in the Blue Lightning Initiative to train aviation industry personnel to identify and report potential victims and traffickers to Federal law enforcement. Additionally, the National Academies of Sciences, Engineering, and Medicine Transportation Research Board is funding a project on this issue to study State departments of transportation contributions to the study, investigation, and interdiction of human trafficking.[12]

Finally, the National Science Foundation (NSF) is funding a number of active awards focused on human trafficking. For example, one award funds "A New Multi-layered Network Approach for Improving the Detection of Human Trafficking" to enable analysis of data from multiple overlapping networks, including human trafficking supply chains, transport logistics, and financial transactions.[13] Another award funds a project focused on "Disrupting Human Trafficking via Needs Matching and Capacity Expansion" to provide a need-based prevalence to determine the most efficient use of scarce shelter and services resources.[14] Other projects funded through NSF include research on "A Data Analytic Approach to Understand Human Trafficking Networks"; "Coordinated Interdiction for Disruption of Labor Trafficking in the Agricultural Sector;" and "Disrupting Exploitation and Trafficking Labor Supply Networks in Post-Harvey Rebuild."[15]

Research and Collaboration Opportunities; Technology Needs

Key areas of need for research in human trafficking are measuring the prevalence of trafficking, establishing metrics of success for ongoing efforts to combat trafficking, understanding long- and short-term needs of victims and survivors, and trafficking prevention and demand reduction. While international and U.S. efforts to combat human trafficking have been happening for more than two decades, in the past several years there have been calls to address the lack of adequate methods and data to measure the prevalence of human trafficking.

The National Academies of Sciences, Engineering, and Medicine recently published the proceedings of a workshop held in April 2019 on "Approaches to Estimating the Prevalence of

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[11] U.S. Department of Transportation Advisory Committee on Human Trafficking Final Report, "Combatting human Trafficking in the Transportation Sector," July 2019. https://www.transportation.gov/sites/dot.gov/files/docs/mission/administrations/office-policy/343931/advisory-committee-human-trafficking-final-report.pdf

[12] https://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4378

[13] National Science Foundation Award Abstract #1837881 - https://www.nsf.gov/awardsearch/showAward?AWD_ID=1837881&HistoricalAwards=false

[14] National Science Foundation Award Abstract #1935602 - https://www.nsf.gov/awardsearch/showAward?AWD_ID=1935602&HistoricalAwards=false

[15] https://www.nsf.gov/awardsearch/simpleSearchResult?queryText=human+trafficking&ActiveAwards=true

Human Trafficking in the United States: A Workshop."[16] Patrick Hannon, former director of the Human Smuggling and Trafficking Center, spoke about the Center, which was established in 2004 and is administered by U.S. Immigration and Customs Enforcement as the only nationally directed Federal anti-human trafficking center in the United States. Mr. Hannon noted that the Center's goal to develop and deliver intelligence for law enforcement and policymakers to respond to human trafficking is challenging because of a "lack of a clear understanding of the priorities and gaps that exist in the research community."[17]

Another panelist, Amy Leffler, lead researcher of the National Institute of Justice's (NIJ) trafficking in persons research portfolio, said that "prevalence is just one piece of a very complex puzzle. She urged the research community to work with stakeholders from different academic disciplines, law enforcement, and victims' services to determine what methodological approaches work for each population. She also underscored the need to be mindful of protecting the populations being studied, who are often vulnerable and traumatized."[18] As the research, development, and evaluation agency of the Department of Justice, the NIJ supported seven projects focused on human trafficking in 2018, including a national census of victim service providers, a report of national data on human trafficking cases in the Federal criminal justice system, and a study to carry out interviews to better understand the victimization status of adults engaged in prostitution.[19]

Another obstacle for measuring prevalence and establishing metrics is a lack of standardized definitions and data used in trafficking in persons. For example, the International Labor Organization's "2017 Global Estimates of Modern Slavery: Forced Labor and Forced Marriage Report" found that in 2016, 40.3 million people were victims of modern slavery, including 25 million people in forced labor and 15 million people in forced marriage. According to this report, women and girls account for 71 percent of modern slavery victims.[20] However, different statistics are presented by DHS, which claims that it is estimated that 20.9 million people are victims of sex trafficking, forced labor, and domestic servitude worldwide.[21] Other organizations report data on calls and tips made to their specific organization.

There are many NGOs and private industry entities participating in anti-trafficking efforts and elevating the role of technology to contribute to this mission. One such effort is the IBM Watson AI to Solve Global Issues XPrize, of which Marinus Analytics is a semi-finalist for their work in using artificial intelligence to combat human trafficking. IBM Watson also helped fund and build out the Traffik Analysis Hub in 2017, an open platform maintained by Stop the Traffik, a global

[16] https://www.nationalacademies.org/our-work/approaches-to-estimating-the-prevalence-of-human-trafficking-in-the-united-states-a-workshop#sectionCommittee
[17] *Id.*
[18] *Id.*
[19] https://www.state.gov/human-trafficking-research-chart-of-u-s-government-funded-research/
[20] https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/documents/publication/wcms_575479.pdf
[21] https://www.dhs.gov/science-and-technology/news/2019/01/30/st-combatting-human-trafficking-using-social-science

coalition of NGOs, technology companies, financial institutions, and law enforcement organizations that serves as a repository of real-time, global human trafficking data.

Chairman FOSTER. And, without objection, the Chair is authorized to declare a recess at any time.

But before I deliver my opening remarks, I want to note the unusual circumstances under which we're meeting today. Pursuant to House Resolution 965, today, the Subcommittee is meeting virtually. Both of them are meeting virtually. And I want to announce a couple of reminders to the Members about the conduct of this remote hearing. First, Members should keep their video feed on for as long as they are present in the hearing. Members are responsible for muting and unmuting their own microphones, so please keep your microphones muted or unmuted, as appropriate.

Finally, if Members have documents that they wish to submit for the record, please email them to the Committee Clerk, whose email address was circulated prior to the hearing.

And so with that, good morning, and welcome to today's remote hearing entitled "The Role of Technology in Countering Trafficking in Persons." This is a joint Subcommittee hearing between the Investigations and Oversight Subcommittee and the Research and Technology Subcommittee, and I'm so pleased to welcome Chairwoman Stevens and Ranking Member Norman and Representative Baird, as well as our colleagues.

Representative Baird and I represent the entire supply of Ph.D. scientists in the U.S. Congress, which is a fact I seldom miss an opportunity to point out to this Committee. But I am also the son of a civil rights lawyer. My father wrote much of the enforcement language behind the *Civil Rights Act of 1964*. My dad knew Martin Luther King, Ralph Abernathy, and many of the early heroes of the civil rights movement, and Dad had dinner at the kitchen table with Myrlie and Medgar Evers just 6 weeks before Medgar Evers was shot down in his driveway.

John Lewis, who we're all mourning this week, used to sit with me between votes in the House and where John would tell me more about all of the stories of the early civil rights movement that I'd grown up listening to from my father.

My dad was also a scientist, but he stepped away from his career in science because he saw civil rights as the great moral challenge of his generation. Certainly, stopping human trafficking and modern-day slavery is one of the great moral challenges of today, and we must bring every tool that we have to that fight.

So, as we prepare to mark the annual World Day Against Trafficking in Persons on July 30, I can think of no better time to shine a light on the tragic persistence of human trafficking and explore the new technologies that will assist our efforts to defeat this scourge once and for all.

Trafficking in persons is a complex problem in the United States and around the world. We need to develop better tools to disrupt criminal networks, to bring the perpetrators to justice, and to support the victims of human trafficking. This hearing is an opportunity to learn about new research and novel technologies and to consider how America can better integrate these assets into the fight against human trafficking.

And let's be clear. Technology is frequently misused to facilitate human trafficking in persons. It provides new opportunities for traffickers to target potential victims, conduct anonymous and il-

licit financial transactions, and expand their criminal markets. Yet despite its obvious challenges, technology is also an important asset for those involved in combatting trafficking in persons. Its positive use can aid investigations, enhance prosecutions, raise awareness, provide services to victims, and shed new light on how trafficking networks operate.

With this in mind, our ability to counter trafficking in persons largely depends on how we harness this technology in our efforts. We know there's a lot of good work happening to combat human trafficking, but there also seems to be a lot of opportunity to elevate the role of Federal research and development (R&D) in increasing collaboration between the agencies.

The National Science Foundation (NSF), the National Institute of Standards and Technology, the Department of Homeland Security's Science and Technology Directorate, the Department of Transportation's R&D programs, and others can all contribute to the goals of prevention and disruption of this crime. And we have at our disposal a wide range of tools that could be used to support antitrafficking efforts, including artificial intelligence (AI) and machine learning. For example, AI can help make predictions, recommendations, and decisions to identify financial transactions that may be indicative of human trafficking networks.

I'm looking forward to hearing from today's panel of witnesses because they bring real-world experience to the table, and can recommend ways that we on the Science Committee can support efforts to meet challenges with cutting-edge technology. This hearing is a great opportunity to think outside the box when it comes to research and technology that can address many of the causes and consequences of human trafficking.

The more obvious examples are technologies that can aid law enforcement in identifying potential perpetrators and victims. But beyond that, there are analysis tools that can comb through the dark web for illicit transactions; blockchain analytics that can help companies and the government track their supply chains and identify vulnerabilities that increase the risk of human trafficking; and there's an acute need for social science research to assess the medical, emotional, and material needs of victims and ensure that they are connected to the resources that can help them as they reenter society.

So thank you to all our witnesses for appearing today and for the work that you do. Your expertise is invaluable as we consider how the Science Committee's oversight and legislative powers can help in the fight against human trafficking.

[The prepared statement of Chairman Foster follows:]

Good morning, and welcome to today's remote hearing entitled "The Role of Technology in Countering Trafficking in Persons." This is a joint Subcommittee hearing between the Investigations and Oversight Subcommittee and the Research and Technology Subcommittee, and I'm so pleased to welcome Chairwoman Stevens and Ranking Members Norman and Baird, as well as all of our colleagues. As we prepare to mark the annual World Day Against Trafficking in Persons on July 30, I can think of no better time to shine a light on the tragic persistence of human trafficking and explore the new technologies that will assist our efforts to defeat this scourge once and for all. Trafficking in persons is a complex problem, in the United States and around the world. We need to develop better tools to disrupt criminal networks, bring the perpetrators to justice, and support the victims of human trafficking. This hearing is an opportunity to learn about new research and novel tech-

nologies, and to consider how America can better integrate those assets into the fight against human trafficking.

Let's be clear—technology is frequently misused to facilitate trafficking in persons. It provides new opportunities for traffickers to target potential victims, conduct anonymous and illicit financial transactions, and expand their criminal markets. Yet despite its obvious challenges, technology is also an important asset for those involved in combatting trafficking in persons. Its positive use can aid investigations, enhance prosecutions, raise awareness, provide services to victims, and shed new light on how trafficking networks operate. With this in mind, our ability to counter trafficking in persons largely depends on how we harness technology in our efforts.

We know that there is a lot of good work happening to combat human trafficking, but there also seems to be a lot of opportunity to elevate the role of the Federal research and development enterprise and increase collaboration between the agencies. The National Science Foundation, the National Institute of Standards and Technology, the Department of Homeland Security's Science and Technology Directorate, the Department of Transportation R&D programs, and others can all contribute to the goals of prevention and disruption of this crime.

We have at our disposal a wide range of tools that could be used to support anti-trafficking efforts, including through artificial intelligence and machine learning. For example, AI can help make predictions, recommendations, or decisions to identify financial transactions that may be indicative of human trafficking networks. I'm looking forward to hearing from today's panel of witnesses because they bring real-world experience to the table, and can recommend ways that we on the Science Committee can support efforts to meet challenges with cutting-edge technology.

This hearing is a great opportunity to think outside the box when it comes to research and technology that can address the many causes and consequences of human trafficking. The more obvious examples are technologies that can aid law enforcement in identifying potential perpetrators and victims. Beyond that, there are analysis tools that can comb through the dark web for illicit transactions; blockchain can help companies track their supply chains and identify vulnerabilities that increase the risk of human trafficking; and there's an acute need for social science research to assess the medical, emotional, and material needs of victims and ensure they are connected to resources that can help them as they reenter society.

Thank you to our witnesses for appearing today. Your expertise will be invaluable as we consider how the Science Committee's oversight and legislative powers can help in the fight against human trafficking.

Chairman FOSTER. And the Chair now recognizes Ranking Member Norman for an opening statement.

Mr. NORMAN. Thank you, Chairman Foster, and Chairwoman Stevens. And I want to thank our witnesses for taking the time to participate in this joint Subcommittee hearing on this sad but real issue, problem that we have going on in America. I'm looking forward to learning more from our expert witnesses about how technology is being leveraged to combat human trafficking and what tools are needed to tackle it.

Human trafficking is a heinous crime that unfortunately impacts all countries. Experts estimate that there are approximately 25 million victims of human trafficking around the world, many at very young ages, generates roughly $150 billion in illegal profits annually for criminal organizations, terrorists, and rogue nations.

The internet makes it easy for traffickers to exploit victims online and abuse technology to advance their criminal enterprises. On the other hand, technology can also be used for prevention, prosecution, and the protection of victims and the survivors.

The United States is leading the charge to eradicate human trafficking. The Trump Administration has made it a priority to confront human trafficking head on using available resources to end this horrendous crime once and for all. In 2018, President Trump became the first sitting President to attend a meeting of the President's Interagency Task Force to Monitor and Combat Trafficking

in Persons since it was created in 2000. The President's recent Executive Order on Combating Human Trafficking and Online Child Exploitation in the United States establishes a comprehensive and coordinated response to preventing and countering human trafficking on United States soil.

It is imperative that we do not turn a blind eye to human trafficking in our own communities and work together to address and end this crime for good. I again want to thank the witnesses for taking the time to share your expertise with us today. I yield back the balance of my time.

[The prepared statement of Mr. Norman follows:]

Thank you, Chairman Foster, and Chairwoman Stevens. And thank you to our witnesses for your participation today in this joint subcommittee hearing.

I am looking forward to learning from our expert witnesses about how technology is being leveraged to combat human trafficking and what tools are needed to tackle it.

Human trafficking is a heinous crime that unfortunately impacts all countries. Experts estimate that there are approximately 25 million victims of human trafficking around the world, generating roughly $150 billion in illegal profits annually for criminal organizations, terrorists, and rogue nations.

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Chairman FOSTER. Thank you. And the Chair now recognizes Chairwoman Stevens for an opening statement.

Ms. STEVENS. Well, good morning and let me say we are all ears as we examine the role of science and technology (S&T) in combatting human trafficking. I am very eager to hear the testimony and responses to our questions from this very distinguished panel, particularly as we reflect on World Day Against Trafficking in Persons later this week.

The perpetrators of human trafficking exploit the most vulnerable for profit. They often charm or befriend victims, mostly the young and those in desperate circumstances, by offering a place to live, money, or attention. Then they use force, fraud, and coercion to strip them of their freedom. In my home State of Michigan, we have had the 11th highest call volume in the National Human Trafficking Hotline. I have personally attended many symposiums and dialogs on this issue in my home district. Particularly in Oakland County, the Human Trafficking Task Force serves as a resource for victims and their advocates and parents, professionals, and others. National and international antitrafficking efforts have helped rescue countless survivors of sexual exploitation and forced labor.

Unfortunately, trafficking statistics are increasing despite these efforts for the past 20 years. And COVID–19 has only rededicated these illicit activities toward more cyber-enabled exploitation, especially the sexual exploitation of minors. This is a $150 billion enterprise in part because it is low risk and high reward for the perpetrators. We simply lack the tools to disrupt human trafficking at scale, which is what we are here today to discuss, explore, and try to solve.

However, increased and focused investments in science, technology, and collaboration enable us to achieve significant progress in our antitrafficking efforts. We do not have standardized and interoperable data sets to understand and measure the prevalence of human trafficking and not having identifiable metrics for measuring effectiveness of interventions. But increased collaboration among organizations collecting various types of data and tools such as machine learning can help us overcome these challenges.

I'm calling today on our National Science Foundation, the Department of Transportation, the National Institute of Standards and Technology, all agencies that fall under our jurisdiction on the Research and Technology Subcommittee to utilize their resources, to develop tracking, standards, detect patterns, and develop data analytics to combat the existence of human trafficking at a national and global level.

We have a lot of work to do, and I am very proud to be here with all of you today on this topic. Let's get something done. Thank you, Mr. Chairman. I yield back.

[The prepared statement of Ms. Stevens follows:]

Good morning and welcome to this hearing to examine the role of science and technology in combatting human trafficking. I look forward to hearing testimony from our distinguished panel of witnesses on this critical issue, especially as we prepare to reflect on World Day Against Trafficking in Persons later this week.

The perpetrators of this crime exploit the most vulnerable for profit. They often charm or befriend victims, mostly the young and those in desperate circumstances, by offering a place to live, money or attention. Then they use force, fraud, and coercion to strip them of their freedom. In my home state of Michigan, we have the 11th highest call volume to the National Human Trafficking Hotline. In my own district, the Oakland County Human Trafficking Task Force serves as a resource for victims and their advocates and parents, professionals, and others.

National and international anti-trafficking efforts have helped rescue many survivors of sexual exploitation and forced labor. Unfortunately, trafficking statistics are increasing despite these efforts for the past 20 years. And COVID-19 has only re-directed these illicit activities toward more cyber-enabled exploitation, especially the sexual exploitation of minors. This is a $150 billion enterprise in part because it is low risk and high reward for the perpetrators. We simply lack the tools to disrupt human trafficking at scale.

However, increased and focused investments in science, technology, and collaboration may enable us to achieve significant progress in our anti-trafficking efforts. We do not have standardized and interoperable data sets to understand and measure the prevalence of human trafficking and not having identifiable metrics for measuring effectiveness of interventions. But increased collaboration among organizations collecting various types of data and tools such as machine learning can help us overcome these challenges. I am calling on the National Science Foundation, the Department of Transportation, the National Institute of Standards and Technology and other federal research agencies to utilize their resources to develop tracking, standards, detect patterns, and develop data analytics to combat the existence of human trafficking at a national and a global level.

We have a lot of work to do and I look forward to today's discussion.

Thank you and I yield back.

Chairman FOSTER. Well, thank you. And the Chair will now recognize Ranking Member Baird for an opening statement.

Mr. BAIRD. Well, thank you, Chairman Foster and Chairwoman Stevens, for convening this hearing to examine the role of science and technology in disrupting this horrendous trade of human trafficking. It's good to see my colleague Ranking Member Norman, and I do want to thank all the witnesses for being here today and sharing their expertise. Many of my remarks, Mr. Chairman, are going to be very similar to some of those that have already been made, but I think that kind of demonstrates how significant this problem is and how important it is that we utilize all of our experience and the experience of the witnesses here today to try to counteract this problem.

You know, and someone already mentioned there's 25 million people worldwide are exploited and subjected to forced labor through human trafficking every year. To say human trafficking is a monumental challenge, I think, would be an understatement. It's a challenge that requires a global response. It requires international coordination and engagement between government, industry, non-profit organizations, and academia. We have such a capability in our world today to move internationally and move these kinds of situations internationally, and so I do think it takes the international coordination and engagement.

As they've already been mentioned, this is the 20th anniversary of the signing of the United Nation's Trafficking in Persons Protocol and the enactment of the *United States Trafficking Victims Protection Act*. And over these 20 years, public awareness of human traffic has grown substantially. Reporting and detection of trafficking is also up globally. This anniversary is the opportunity to recognize the progress that has been made, but it's also a chance for us to take a look at the future to examine and accelerate the new tools to prevent, combat, and end human trafficking over the next 20 years.

It's amazing to me when we think about the advancements in technology in the last 20 years, these last two decades, so being able to utilize that technology, it has been an enhancement for traffickers. It makes it easier for them, but it also may serve as a tremendous tool for us to have counterefforts to prevent this kind of thing from taking place.

Today, we see NGOs (non-governmental organizations) and governments and industry using technology to protect victims, to stop the traffickers, and prevent trafficking by identifying and dismantling the systems that allow them to operate. We're lucky to have the experts in these fields with us today as our witnesses.

I would like to applaud the work of the Trump Administration in strengthening the Federal responsiveness to human trafficking and encouraging increased collaboration from government, industry, and law enforcement.

Lastly, I would be remiss if I did not mention how the COVID–19 pandemic has magnified the need for all stakeholders to work together in this fight. We know persons who are targeted by traffickers tend to be the most vulnerable. Isolation and the closure of critical services caused by the pandemic means the number of vul-

nerable people susceptible to exploitation by traffickers is rapidly growing.

So I look forward to hearing from our witnesses today on how their organizations are utilizing research and technology to stem this tide and strengthen efforts to combat human trafficking. Thank you all for taking your time to be here with us this morning, and I yield back the balance of my time.

[The prepared statement of Mr. Baird follows:]

Thank you, Chairman Foster and Chairwoman Stevens, for convening today's hearing to examine the role of science and technology in disrupting the horrendous trade of human trafficking.

Nearly 25 million people worldwide are exploited and subjected to forced labor through human trafficking every year. To say human trafficking is a monumental challenge would be an understatement. It is a challenge that requires a global response. It requires international coordination and engagement between government, industry, non-profit organizations, and academia.

This year is the 20th anniversary of the signing of the United Nation's Trafficking in Persons Protocol and the enactment of the *United States Trafficking Victims Protection Act*. Over the last 20 years, public awareness of human trafficking has grown substantially. Reporting and detection of trafficking is also up globally. This anniversary is an opportunity to recognize the progress that's been made. But it is also a chance for us to look to the future to examine and accelerate new tools to prevent, combat, and end human trafficking over the next 20 years.

Technology will play a critical role in combatting human trafficking in the future. Although technology can be a tool in the hands of the trafficker, it can also be a key tool in our efforts to combat trafficking. Today, we see NGOs, governments and industry using technology to protect victims, stop traffickers, and prevent trafficking by identifying and dismantling the systems that allow them to operate. We are lucky to have experts in these fields with us today as our witnesses.

I would also like to applaud the work of the Trump Administration in strengthening the Federal responsiveness to human trafficking and encouraging increased collaboration from government, industry, and law enforcement.

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I look forward to hearing from our witnesses today on how their organizations are utilizing research and technology to stem this tide and strengthen efforts to combat human trafficking. Thank you all for taking your time to be here with us this morning and I yield back the balance of my time.

Chairman FOSTER. Thank you. And if there are any Members who wish to submit additional opening statements, your statements will be added to the record at this point.

[The prepared statement of Chairwoman Johnson follows:]

I want to thank Chairman Foster and Chairwoman Stevens for holding this important hearing, and I want to thank our witnesses for joining us here today. As many of you know, July 30th is the U.N. World Day Against Trafficking in Persons. It is thus very timely for the Science, Space, and Technology Committee to convene a hearing to discuss how research and technology can be leveraged to help address the horrific problem of human trafficking.

The Federal government can and should do more to invest in research and technology to deal with the many facets of the causes and consequences of human trafficking. Earlier this year, the Dallas Area Rapid Transit system received funding to help identify and adopt specific measures to address human trafficking. In order to ensure such money is being used to implement science driven, effective approaches to reducing trafficking, we must invest in the promising work being done by scientists across the country. From analyzing illicit online activity, to identifying potential victims and perpetrators of human trafficking, to understanding and addressing the needs of victims as they reenter society, the research community has much to contribute to this important fight.

As we battle a worldwide pandemic, we must not forget about the perennial problem of human trafficking, which touches every country and every state. I look for-

ward to hearing from our witnesses about how this Committee and this Congress can support the research community's important work.

Thank you, I yield back.

[The prepared statement of Mr. Lucas follows:]

Human trafficking is a global problem, causing untold suffering and pain. And while it often remains an unseen problem, the truth is that it is far more widespread and destructive than it may seem.

Emerging and evolving technologies can help us fight this plague, though. One of the reasons I enjoy serving on the Science Committee is our ability to focus on solutions to some of the greatest challenges we face.

Trafficking in people is a complex problem and fighting it requires work on many fronts, from deterrence to detection and from enforcement to survivor support. The encouraging news is that advances in technology give us new tools at every step of this process.

Using AI to perform big data analysis can help us identify patterns of trafficking-a task far too time-consuming for human agents to perform. AI tools can comb through websites to find advertisements for trafficked people. Photo recognition software can help agents identify where victims are being held by analyzing photos for similarities to known locations. Similarly, facial recognition software can identify similarities between photos of trafficked people and missing person notices. Because of machine learning, the more these tools are used, the better they become.

This is just a small sampling of technological interventions we can employ to fight trafficking, and our witnesses will share many more today.

The President's Interagency Task Force to Monitor and Combat Trafficking in Persons is committed to ending human trafficking and supporting survivors of this modern-day slavery.

As Members of the Science Committee, we can help focus and enhance the technological tools available to the federal government in this effort.

This is one more area in which investing in basic research can produce exceptional dividends. Strategic investment in the fundamental knowledge needed to advance technologies like AI and big data analysis will pay off in discoveries and innovations that law enforcement, private industry, and non-governmental organizations can use to coordinate and improve their efforts to fight trafficking in persons.

It's one of thousands of applications that will benefit from technological advancements, and it is one more reason I've proposed doubling our national investment in basic research in the *Securing American Leadership in Science and Technology Act*.

I hope that our Committee can work together to support the technology needed to end human trafficking.

Chairman FOSTER. At this time, I'd like to introduce our witnesses. Our first witness is Ms. Anjana Rajan. Ms. Rajan is the Chief Technology Officer of Polaris, an NGO that uses data-driven strategies to disrupt and prevent human trafficking and modern slavery. Prior to her role at Polaris, Ms. Rajan was the former Chief Technology Officer of Callisto, a nonprofit that builds cryptographically advanced technology to combat sexual assault and a Tech Policy Fellow at the Aspen Institute.

After Ms. Rajan is Mr. Matthew Daggett. Mr. Daggett is a member of the Technical Staff of the Humanitarian Assistance and Disaster Relief Systems Group at the Massachusetts Institute of Technology's (MIT'S) Lincoln Laboratory, where he's worked since 2005. Mr. Daggett's current research focuses on developing analytic technologies and systems for the study of dark and illicit social networks such as human trafficking operations.

Our third witness is Ms. Emily Kennedy. Ms. Kennedy is the President and Co-Founder of Marinus Analytics, which was founded in 2014. Ms. Kennedy has led Marinus Analytics national and international social impact efforts, product deployment, and partnerships expansion. Marinus Analytics is a semifinalist in the global IBM Watson AI XPRIZE competition.

Our final witness is Ms. Hannah Darnton. Ms. Darnton is an Associate Director of Ethics, Technology, and Human Rights at Business for Social Responsibility. Ms. Darnton focuses on the intersection of human rights and new disruptive technology and leads the Tech Against Trafficking Collaborative Initiative. Prior to her position at Business for Social Responsibility, Ms. Darnton worked with the Skoll Foundation.

And, as our witnesses should know, you will each have 5 minutes for your spoken testimony. Your entire written testimony will be included in the record of the hearing. And when you've all completed your spoken testimony, we will begin with questions. Each Member will have 5 minutes to question the panel.

And we will now start with Ms. Rajan. You are recognized for 5 minutes.

TESTIMONY OF MS. ANJANA RAJAN, CHIEF TECHNOLOGY OFFICER, POLARIS

Ms. RAJAN. Thank you, Chairman Foster, Ranking Member Norman, Chairwoman Stevens, Ranking Member Baird, and Members of the Subcommittees, for having me here today. My name is Anjana Rajan, and I'm the Chief Technology Officer of Polaris.

Polaris's mission is to eradicate human trafficking and restore freedom to survivors. We do this in two main ways. First, we provide immediate response to victims and survivors of human trafficking through our technical operation of the National Human Trafficking Hotline. Second, we take the 13 years of data and insight from the hotline to make long-term systems change. We tackle the underlying systems that enable sex and labor trafficking, and we work with financial institutions to make trafficking less profitable and higher risk. Survivors' perspectives inform all of our work.

At its core, human trafficking is the business of exploiting people for profit. It is a $150-billion-a-year criminal industry with 25 million victims worldwide. Fighting human trafficking must focus on the broader systems that make people vulnerable to sex and labor trafficking, and technology should be part of an overall strategy to drive change at the systems level.

Human trafficking is about people with power exploiting and controlling vulnerable people for their own profit. Survivors tell us that restoring their sense of control, including choosing when law enforcement intervenes, is paramount to their healing. Technology should not only enable law enforcement to identify traffickers, it should also be used to put power back in the hands of victims and survivors.

To pass meaningful and effective legislation, it is imperative for legislators to fully understand how these technologies work. One of the technologies that has recently been discussed in this space is encryption. Since my background and expertise are in applying cryptography to human rights and national security issues, I would like to focus my testimony on the importance of encryption in fighting human trafficking.

In the public debate around encryption, we often only see two sides represented, one side that says we should identify and apprehend perpetrators at all costs even if that means we break

encryption to do it, and the other side that says we should protect encryption at all costs even if that means victims and survivors get hurt. This is a false dichotomy. There is a third way that can optimize for both virtues because encryption protects victims and survivors. In fact, we can hold perpetrators and the platforms that enable them accountable for their abuse and exploitation using advanced cryptography, but doing so will require innovative thinking and an accurate understanding of how these technologies work.

The threats victims and survivors face are very dangerous, uniquely complex, and highly dynamic. They face prolonged control and manipulation from traffickers and organized crime networks. They face physical, psychological, and sexual violence. They face intimidation from conspiracy theorists who weaponize disinformation about human trafficking. They may even face threats from law enforcement agencies who arrest them instead of helping them find freedom.

To honor the exploratory nature of this Committee hearing, I am proposing three possible ideas on how encryption could be used help fight human trafficking and support victims and survivors.

First, victims and survivors need safe trauma-informed reporting channels. Cryptographic reporting escrows are examples of systems where they can learn about their options and have the power to take action that is best for them. The underlying technology pinning these escrows is called secure multiparty computation.

Second, human trafficking is inherently a commercial enterprise. Financial system intervention in human trafficking has the potential to increase the risk for traffickers and reduce a community's vulnerability to trafficking. Homomorphic encryption could allow human trafficking researchers to run analytical functions directly on a financial institution's encrypted data without ever seeing the sensitive plaintext.

And third, since human traffickers have eagerly adopted the use of cryptocurrencies, law enforcement could leverage the fact that these transactions are permanently stored on a public decentralized blockchain ledger. With known wallet addresses and their corresponding public transactions, law enforcement agencies can build an open source data set of human trafficking buyers and sellers and ultimately map out the entire network of a human trafficking ring.

In conclusion, human trafficking is a complex problem that requires nuanced solutions. It is the result of social, policy, and market failures. Technology at its best can help rebalance power. However, it is not a panacea. The unchecked use of advanced technologies have the potential to suppress freedom rather than restore freedom to survivors. We need to design and deploy technology with the best interest of victims and survivors at the center.

Thank you for the opportunity to testify. I'm happy to answer any questions you may have. Thank you.

[The prepared statement of Ms. Rajan follows:]

Testimony of

Anjana Rajan
Chief Technology Officer, Polaris

Before the
United States House of Representatives
Committee on Science, Space, and Technology
Subcommittee on Investigations & Oversight and
Subcommittee on Research & Technology

Hearing on *"The Role of Technology in Countering Trafficking in Persons"*

July 28, 2020

Introduction

Chairman Foster, Ranking Member Norman, Chairwoman Stevens, Ranking Member Baird, and members of the Subcommittees, thank you for the opportunity to appear before you today to discuss the important role of technology in the fight to combat human trafficking. My name is Anjana Rajan and I am the Chief Technology Officer of Polaris.

Polaris and Our Technology Strategy

Established in 2002, Polaris's mission is to eradicate human trafficking and restore freedom to survivors. We do this in two main ways. First, we provide immediate response to victims and survivors of human trafficking through our operation of the U.S. National Human Trafficking Hotline. The Trafficking Hotline, which is funded in part by the U.S. Department of Health and Human Services, connects victims and survivors of sex and labor trafficking with services and support to get help and stay safe. Second, we take the knowledge and insight that we have gained in the 13 years we have operated the National Human Trafficking Hotline to make long-term systems change. We tackle the underlying systems that enable sex and labor trafficking, and work with financial institutions to make trafficking less profitable and higher risk. Survivors' perspectives inform all of our work.

Polaris is a technology forward, data-driven organization and technology powers our work. Our technology strategy serves the organization's larger strategy in four key pillars. The first pillar is *survivor engagement*. We do this in two ways: first, we derive signals directly from victims and survivors and those who know them in order to understand their situations and needs; second, we deliver value back to them in a trauma-informed, survivor-centered way. We do this primarily by operating the National Human Trafficking Hotline, and we are now exploring new and innovative ways to increase our reach through technology. The second pillar is *data and analytics*. At Polaris, we analyze the data we receive from the hotline, along with other third-party data and open-source intelligence, to derive meaningful insights and trends about how human trafficking works. The third pillar is *tech policy*. There is a strong role for technology in the fight against human trafficking, but it is important that policymakers understand how these technologies can both help or harm victims and survivors, and ways to effectively leverage them ethically. The final pillar is *security*. At Polaris, we think about the complex threats and risks within the human trafficking ecosystem, and we identify strategic ways to protect victims and survivors, our organization, and our mission.

At its core, human trafficking is the business of exploiting people for profit. It is estimated to be a $150 billion a year criminal industry, with 24.9 million victims worldwide. Effectively fighting human trafficking must focus on the broader systems in place that make people vulnerable to sex and labor trafficking. The application of technology should be part of an overall strategy to drive change at the systems level.

Using Encryption to Help Fight Human Trafficking

Human trafficking is about people with power using every means possible to exploit and control those who are vulnerable for their own profit. Survivors tell us that being able to choose when and how they experience interventions - including when law enforcement intervenes - and restoring their sense of

control is paramount to their healing. Technology should not only enable law enforcement to identify traffickers; it should also be used to *put power back in the hands of victims and survivors.*

To pass meaningful and effective legislation to combat human trafficking by leveraging technology, it is imperative for legislators to fully understand how these technologies work and impact victims and survivors directly. One of the technologies that has recently been discussed in this space is encryption, otherwise known as the encoding of information.

Because my background and expertise are in the application of cryptography to human rights and national security issues, I would like to focus my testimony today on the importance of encryption in fighting human trafficking.

In the public debate around encryption, we often only see two sides represented: one side that says we should protect victims and survivors at all costs, even if that means we break encryption to do it, and the other side that says we should protect encryption at all costs, even if that means victims and survivors get hurt.

This is a false dichotomy. There is a third way that can optimize for both virtues because *encryption protects victims and survivors*. And, while we protect the integrity of encryption, we can still hold perpetrators (and the platforms that enable them) accountable for their abuse and exploitation. But doing so will require innovative thinking and an accurate understanding of how these technologies work.

To honor the exploratory nature of this committee hearing, I am proposing three possible ways encryption could be used to help fight human trafficking and support victims and survivors. These ideas are meant to spur a larger dialogue, and would of course require a great deal more consultation with survivors:

- Using **secure multiparty computation** to build safe, survivor-centric reporting channels
- Using **homomorphic encryption** to enable financial institutions to share data in privacy-preserving ways
- Using **cryptocurrency transactions** to map and dismantle human trafficking networks

Using secure multiparty computation to build safe, survivor-centric reporting channels

In order to understand the complexity of the human trafficking problem, we must understand the threats victims and survivors face. The security threat model for victims of human trafficking is very dangerous, uniquely complex, and highly dynamic, and victims face a variety of risks from many types of adversaries. They face prolonged control and manipulation from traffickers and organized crime networks. They face physical, psychological, and sexual violence. They face intimidation from conspiracy theorists who weaponize disinformation in order to thwart their pathways to safety. They may even face threats from law enforcement agencies who arrest them instead of helping them find freedom.

We see this every day at Polaris as we operate the National Human Trafficking Hotline. Victims and survivors often reach out to the Trafficking Hotline unsure about their options for getting help and staying safe. Trafficking Hotline Advocates discuss choices like finding a safe place to stay, obtaining legal assistance, and connecting with a case manager, as well as the option to report to law enforcement.

Especially for those with a history of criminal charges or past negative interactions with law enforcement, reporting can be a daunting experience. It is common for survivors to choose to connect with a service provider for wrap-around support before deciding if they are comfortable reporting to law enforcement. Since Polaris began operating the National Human Trafficking Hotline in 2007, 9,943 situations of likely human trafficking have been shared with the hotline directly by adult victims and survivors. *In only 23 percent of those situations did the victim or survivor consent to or request that the National Hotline provide details about their trafficking situation to law enforcement.*

The problem of low victim and survivor reporting rates can be understood as a game theory problem. Simply put, this means that there is a low incentive for someone experiencing human trafficking to disclose vulnerable information to law enforcement for fear of retribution, but if the person can decide to disclose when they are ready after learning more information about their options, they are more likely to take action. In addition to hotlines, there are innovative ways to use cryptography to empower survivors to take action and seek justice.

A *cryptographic reporting escrow* is an example of a solution for situations in which somebody should report something in order to protect society but may be reluctant to come forward on their own. Such an escrow would be a trusted third-party system (that the government does not own or have direct access to) that allows victims to report abuse and exploitation. The report is only unlocked and given to law enforcement if and when a threshold of severity is met. Cryptographic escrows build trust in a fundamentally new way. Four key principles define such systems:

- *Threshold-based:* one victim's record stays locked until a threshold of risk is met by one or more people;
- *Zero-Trust Network:* the data stored in the escrow is protected from both outside and inside threats;
- *Human Legal Firewall:* the record is unlocked by a person who can establish privilege and block disinformation; and
- *Multiple Calibrated Options:* victims have several holistic options for how they choose to take action.

The underlying technology pinning these escrows is called *secure multiparty computation*. It is a cryptographic protocol that distributes a computation across multiple parties where no individual party can see anyone else's data. I have built information escrows using secure multiparty computation in other use cases, such as combatting sexual assault and countering domestic terrorism, and I believe this technology could potentially be applied to combat human trafficking as well.

Using homomorphic encryption to share financial institutions' data in privacy-preserving ways

Human trafficking is a diverse crime, often perpetrated through complex psychological manipulations, the exploitation of economic desperation, or taking advantage of emotional need. But behind all the complexity, human trafficking is, inherently, a commercial enterprise.

Financial system intervention in human trafficking has the potential to increase the risk for traffickers, reduce the profitability of trafficking, and reduce vulnerability to trafficking within particular

communities. That is why Polaris has partnered with PayPal to create the first financial intelligence unit housed within an anti-trafficking organization. The financial services industry has data that can serve as a unique leverage point which, when properly analyzed, supports both fights against sex and labor trafficking. The use of financial evidence in the criminal justice process could mitigate the burden placed on victims to participate in investigations and prosecutions and facilitate the financial restitution process. Ultimately, Polaris is working toward a world where trafficking in sex and labor will be a less profitable and higher risk business venture.

While data analysis is key to understanding and solving the human trafficking crisis, this vast data is often highly sensitive and has many privacy implications. With financial regulation now mandating the responsibility of financial institutions to proactively spot the warning signs of trafficking, there is increasing urgency to solve this problem.

Homomorphic encryption could be an answer to this problem because it could allow human trafficking researchers to run analytical functions directly on a financial institution's encrypted data without ever seeing the plaintext sensitive data. Homomorphic encryption secures data while it is used, whereas other forms of encryption only secure data while it is in transit or at rest. More importantly, homomorphic encryption can support encrypted analytics, meaning machine learning and artificial intelligence models can be applied to this encrypted data set as well. Since homomorphic encryption is a type of lattice-based cryptography, it provides the additional benefit of being resistant to quantum computing attacks. Therefore, we can continue to accelerate our ability to analyze important financial data to identify and dismantle trafficking rings, while also acknowledging the data's sensitivity and prioritizing privacy during this analysis.

Using cryptocurrency transactions to map and dismantle human trafficking networks

Human traffickers have eagerly adopted the use of cryptocurrencies to finance their operations. Cryptocurrencies, such as Bitcoin, are appealing for two main reasons. First, their decentralized nature means that there is no centralized authority that can shut down accounts or freeze funds. Second, cryptocurrencies provide a certain level of anonymity; one can create a Bitcoin address and receive tokens without needing to provide a valid name or address. According to Chainalysis, a technology company that analyzes blockchain data, there were nearly $1 million worth of Bitcoin and Ethereum payments in 2019 for child sexual abuse material.

The problem of cryptocurrencies has been discussed in many contexts, including domestic terrorism and violent extremism. On January 15, 2020, the House of Representatives Committee on Financial Services held a hearing entitled, "A Persistent and Evolving Threat: An Examination of the Financing of Domestic Terrorism and Extremism." One of the recommendations presented at this hearing was that cryptocurrency providers should ban extremist organizations, with the intention that cutting off their financial supply would hinder their ability to mobilize effectively. One could argue that a similar recommendation should be made for networks that facilitate human trafficking.

However, there are several limitations to this recommendation. First, cryptocurrency advocates will argue that this violates the intended value proposition of a decentralized currency, and private sector

stakeholders thus are likely to push back heavily on this regulation. Second, such a solution simply treats the symptom, not the root cause; bad actors will continue to find new and illicit ways to finance their operations, and removing access to cryptocurrencies would only impose temporary friction. *Most importantly, eliminating access misses a significant opportunity to leverage this technology's properties to ultimately solve the primary problem of dismantling human trafficking networks altogether.*

The unique properties of blockchain technologies offer a big opportunity to help the fight against human trafficking. While aspects of cryptocurrencies are anonymous, part of what drives consensus around the currency's legitimacy is that the transactions are permanently stored on a public, decentralized ledger. If law enforcement uncovers the Bitcoin wallet address of a person or organization, they can easily trace their entire transaction history with other Bitcoin addresses. With known wallet addresses and their corresponding public transactions, law enforcement agencies can build a dataset of human trafficking buyers and sellers, and ultimately map out the entire network of a human trafficking ring. Additionally, metadata trends can also help law enforcement agencies detect suspicious activity, such as time and size of transactions. This data analysis could be used by law enforcement to build out better risk profiles and have higher success rates in dismantling networks.

Conclusion

Human trafficking is a complex, multifaceted problem that requires nuanced solutions. It is a result of social, policy, and market failures. Technology, at its best, can help rebalance power. However, it is not and should not be treated as a panacea. The unchecked use of advanced technologies - whether it be artificial intelligence, machine learning, facial recognition technology, or others - *have the potential to suppress freedom, rather than restore freedom to survivors.*

We need to design and deploy technology with intention, a clear understanding of the problems they are meant to solve, and the best interests of victims and survivors at the center, ultimately recognizing that their needs and wants are complex and not homogenous.

Thank you for the opportunity to testify on Polaris's approach to using technology in the fight to end human trafficking. I am happy to answer any questions you may have.

Anjana Rajan

Anjana Rajan is a technology executive and entrepreneur whose expertise is applying cryptography to national security and human rights issues. She is the Chief Technology Officer of Polaris, an NGO that uses data-driven strategies to disrupt and prevent human trafficking and modern slavery.

Anjana is the former Chief Technology Officer of Callisto, a nonprofit that builds cryptographically-advanced technology to combat sexual assault. In this role, Anjana led the engineering, security, and design teams, with a focus on building products that protect the privacy of sexual assault survivors. Callisto is funded by Greylock Partners, Y Combinator, and the Skoll Foundation.

Recently, Anjana was a Tech Policy Fellow at the Aspen Institute. During her fellowship, she created policy solutions to create privacy-preserving methods to eradicate mass gun violence caused by white supremacist terrorists. She is also an independent research consultant for the Homeland Security Advisory Council that supports the country's top national security leaders on cybersecurity policy.

Previously, Anjana lived in London and worked at Palantir Technologies, where she built and deployed big data software platforms. At Palantir, she served as a Commanding Officer for a deployment in the Middle East and worked across commercial and international government projects. Prior to joining Palantir, Anjana worked as a technologist at Johnson & Johnson focusing on building new software products across global healthcare markets.

Anjana was a Knight Scholar at Cornell University and received her bachelor's and master's degrees in Operations Research and Information Engineering. Anjana is also a former elite triathlete who raced for Team USA.

Chairman FOSTER. Thank you. And next is Mr. Daggett.

**TESTIMONY OF MR. MATTHEW DAGGETT,
TECHNICAL STAFF, HUMANITARIAN ASSISTANCE
AND DISASTER RELIEF SYSTEMS GROUP,
LINCOLN LABORATORY,
MASSACHUSETTS INSTITUTE OF TECHNOLOGY**

Mr. DAGGETT. Good morning, Chairman Stevens, Ranking Member Baird, Chairman Foster, Ranking Member Norman, and Members of the Subcommittee. Thank you for the honor and the privilege of joining you today to represent the Massachusetts Institute of Technology's Lincoln Laboratory and discuss with you some of our research and recommendations toward improving the role of technology in countering human trafficking.

MIT Lincoln Laboratory researches and develops a broad array of advanced technologies to meet critical U.S. Government national security needs. One of our core areas of research involves developing technologies for global humanitarian assistance and disaster relief, and as part of that initiative, we are building novel technologies and systems to counter human trafficking. In that role, we're leveraging advances in data science, machine learning, and related fields to develop enhanced digital evidence analysis capabilities and collaborations with Federal and State agencies to reduce the time and human-intensive nature of trafficking investigations and prosecutions. We also developed a human trafficking technology roadmap for the Federal Government consisting of targeted findings and recommendations sequenced into a prioritized and phased implementation strategy.

I hope that my testimony today will provide a unique perspective on the challenges and opportunities of current research and technology for combating human trafficking, and the following recommendations, which are detailed in my written testimony, may help inform actionable policy initiatives.

First, the most urgent need for applying technology to counter human trafficking is substantially increasing Federal funding for research and development, R&D efforts. Today, several agencies fund primarily academic research and studies, and more funding is greatly needed for prototyping and development of new technology. Comparatively, Federal R&D budgets that counter other types of illicit and organized crime such as narcotics smuggling and counterterrorism are several times greater than those for human trafficking. This scarcity of funding in size and in frequency limits the establishment of a community of engineers, scientists, and technologists who understand the human trafficking domain and can become practitioners in developing needed solutions.

Second, we need to establish an interagency R&D entity specifically for human trafficking and fundamentally rethink how we approach R&D initiatives. Today, point solutions are solicited, funded, and developed within individual agencies and are often not coordinated across interagency operations and result in more limited impacts than if developed in concert with other initiatives as part of a broader research strategy and vision. And an interagency structure specifically for R&D that is focused on and empowered to take risks could revolutionize the funding, development,

operationalization of technology, while improving collaboration and reducing duplication of effort.

Third, we must enhance our R&D agility in technology transition. Often, technology is not fully informed by and developed in concert with the operations they seek to impact and fail to be adopted by practitioners once mature. Agencies should adopt a user-centered paradigm where operators are joint stakeholders at every stage of the R&D process. User-centered methods enable technology to adapt to the mission much more quickly and the mission to evolve with continual advances in the technology resulting in increased agility, improved adoption, and enhanced operations. Additionally, we must transition capabilities to our State and local partners, as those agencies need new technology the most and have significant opportunities for impact.

Fourth, we need to cross-leverage government technology delivered within one mission that has a direct impact—application or could be modified for a different mission area. For example, Department of Defense capabilities to characterize and interdict terrorist networks have strong corollaries to human trafficking networks. To increase opportunities for cross-leverage, the government could establish and elicit a network technology working group to create a conduit for shared research and technical capabilities across agencies.

Fifth, we need to measure—develop measures of effectiveness and assess our impacts. A key component of a coordinated R&D strategy is a process to measure progress against an objective. And while Federal and State agencies track performance statistics such as individuals prosecuted or victims provided with a service, no measure of merit exists to assess the effectiveness of the collective government response to human trafficking. In order to frame such numbers, we need national levels of models of vulnerability, prevalence, and demand estimation. Measures of performance and effectiveness need to be developed alongside research initiatives so that they can impact these investments, and the resultant capabilities can assist.

Six, we need to address the existing technology gaps today, including developing capabilities to automate time-consuming analytical tasks and reduce workloads for investigators and prosecutors; enhancing financial telecommunication and forensics device evidence analysis; establishing repositories of tools, evidence templates, and trafficking signatures to be shared among organizations; improving the standardization, completeness, and consistency of trafficking data collection; and establishing incentive mechanisms to greater enable data-sharing.

Human trafficking is a challenging and pervasive problem that necessitates broad action and bold ideas. Thoughtfully designed technology can empower the collective human trafficking community to disrupt these illicit operations. Increased R&D holds the potential to make a tremendous impact by accelerating justice and hastening the healing of victims.

I want to thank you for your interest in this pressing issue and for the opportunity to speak with you today. Thank you.

[The prepared statement of Mr. Daggett follows:]

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
LINCOLN LABORATORY

July 28, 2020

TO: The Subcommittee on Research and Technology and the Subcommittee on Investigations and Oversight, Committee on Science, Space, and Technology, U.S. House of Representatives

FROM: Matthew Daggett, Technical Staff, Humanitarian Assistance and Disaster Relief Systems Group, MIT Lincoln Laboratory

SUBJECT: Prepared Testimony for the Congressional Hearing on *The Role of Technology in Countering Trafficking in Persons*

INTRODUCTION

Chairwoman Stevens, Ranking Member Baird, Chairman Foster, Ranking Member Norman, and members of the Subcommittees, thank you for the honor and privilege of submitting this written statement and joining you today to represent the Massachusetts Institute of Technology (MIT) Lincoln Laboratory and discuss with you some of our research on the role of technology in countering human trafficking.

MIT Lincoln Laboratory is a non-profit Federally Funded Research and Development Center (FFRDC) that researches and develops a broad array of advanced technologies to meet critical United States (U.S.) national security needs. The Laboratory's technology for national security mission is accomplished through three overarching lines of effort: quantitative systems analysis, rapid technology prototyping, and long-term technology development. One of our core areas of research involves developing technologies for global humanitarian assistance and disaster relief, and as part of that initiative we are building novel technologies and systems to counter human trafficking. In this testimony, I am pleased to highlight some our efforts to combat this complex and pervasive challenge.

First, we are leveraging modern advances in data science, machine learning, and related fields to develop enhanced digital evidence analysis capabilities to reduce the time- and human-intensive nature of human trafficking investigations and prosecutions. These capabilities are built on open-source advances in image recognition, automatic speech recognition, cross-language machine translation, and natural-language processing, and are honed through operational collaborations with

investigators and prosecutors at the Department of Homeland Security (DHS), the Federal Bureau of Investigation (FBI), the Department of Justice (DOJ), and other state-level agencies. Second, we have performed a systems analysis of the human trafficking domain and developed the *Human Trafficking Technology Roadmap* for the DHS Science and Technology (S&T) directorate [1–3]. The roadmap consists of twenty-nine targeted findings and recommendations sequenced into a prioritized and phased implementation strategy, and informed DHS's first published strategy to combat human trafficking earlier this year [4]. Lastly, we are planning a first-of-its-kind workshop focused on technology for counter human trafficking that will bring together U.S. government agencies; federal, state, and local law enforcement and prosecutors; trafficking-related non-governmental and commercial organizations; and academic researchers to share and discuss ideas on how to address some of the most challenging problems in human trafficking through the use of technology.

I hope that my testimony will provide a unique perspective on the challenges and opportunities of current research and technology in combating human trafficking and that the recommendations may help inform actionable policy initiatives.

THE USE OF TECHNOLOGY IN HUMAN TRAFFICKING

Human trafficking, also referred to as trafficking in persons, is a form of modern-day slavery that involves the use of force, fraud, or coercion for the purposes of involuntary labor and sexual exploitation. Because trafficking is often an unseen crime, it is hard to get accurate statistics of its prevalence; however, it is known to affect tens of million of victims worldwide and generates tens of billions of dollars in illicit profits annually [5, 6]. Human trafficking is a heterogeneous crime that takes on many forms, and one Non-Governmental Organization (NGO) has developed a typology of twenty-five different forms of human trafficking present in the U.S., each with different business models; trafficker and victim profiles; and recruitment and control strategies, that enable the facilitation of trafficking [7, 8]. While agencies across the U.S. government employ a diverse range of resources to combat human trafficking in the U.S. and abroad, this heterogeneity makes it a challenge to measure, investigate, and interdict [9, 10]. Technology plays a key role in many different facets of human trafficking, and will be detailed throughout this testimony.

The democratization of technology has fundamentally reshaped the world, from greater economies of scale in the commercial sector to dramatic shifts in strategic advantages in national security, and those facilitating human trafficking have also benefited from these technological advances. In the last decade, the advertising of sex trafficking victims has moved from the streets to the internet, providing greater efficiency and anonymity for traffickers and complicating the ability of law enforcement to disrupt these illicit organizations. Traffickers routinely use advanced technologies to conceal their operations and proceeds, from using encrypted communications on mobile phones, to leveraging cryptocurrency and elaborate money laundering schemes [11–13]. One area where these advances have had a significant impact is the federal criminal process in which investigators and prosecutors are routinely inundated with complex digital evidence including voluminous telephone records; loosely structured business records; forensic device extractions containing imagery, video, and audio; and information in foreign languages. These data are currently time- and human-intensive to analyze with limited purpose-built technology to assist, leading to missed connections and lost opportunities for interdiction and justice.

At the same time, a patchwork of commercial companies, NGOs, government laboratories, and academic institutions are developing both general purpose and focused point-solutions to specific human trafficking problems. To holistically describe all of the ways in which technology is used to counter human trafficking is beyond the scope of this document, but it is important to provide some specific examples of areas where novel impact is being made and to identify technology, process, and policy gaps that need addressing. To appropriately reduce the scope, the following technology examples will primarily focus on domestic sex trafficking operations, across state and federal echelons. One of the major reasons the counter human trafficking community has had more success in combating sex trafficking as opposed to the various forms of labor trafficking, is that commercial sex services rely on an open marketplace where demand, the buyers, can find supply, the providers. While nowhere near fully transparent, the commercial sex marketplace is observable, measurable, and like any market, able to be disrupted. Before delving into specific examples, it is important to discuss two major inherent factors that underpin the success of criminal process operations across the country at multiple echelons.

First, there is a wide disparity in investigative and prosecutorial resources across the federal government, states, cities, and towns. For example, some states have dedicated human trafficking response teams at the attorney general or district attorney level that both investigate and prosecute trafficking, while other regions may only have a handful of state or local police officers assigned to cover investigations across an entire state or city. Several states also have regional human trafficking task forces: grant-funded multidisciplinary anti-trafficking teams that pool prosecutors, officers, victim service providers, and other groups into a coordinated, collaborative organization. This disparity of resources hinders development of a more uniform national-level response to countering human trafficking. Second, there is a wide disparity in the availability of purpose-built technology to assist trafficking investigations and prosecutions. Some states have advanced capabilities such as electronic forensic exploitation teams, dedicated financial analysis cells, and in-house software developers. In other states, investigators and prosecutors have few purpose-built capabilities beyond NGO-developed tools and standard spreadsheet software. There is also a wide range in the cost of technology, with some NGO-developed tools provided free to law enforcement, while some electronic forensics tools cost tens of thousands of dollars in annual licensing and maintenance fees. High cost can be a significant to insurmountable burden for smaller agencies to access relevant technology to assist in investigations. Lastly, across this spectrum, investigating and prosecuting trafficking cases is significantly time- and human-intensive, often requiring over a year of work to complete a single case.

Technology to Measure Marketplace Supply

The first technology example focuses on systems to collect, structure, and visualize data from commercial sex marketplaces. The ability to find and characterize advertisements that connect providers and buyers is critical to the investigative process. Currently there are three major software platforms that investigators can use to search and analyze advertisements and user posts from commercial sex classified websites and buyer review forums. Together these platforms provide access to hundreds of active and inactive websites comprising several hundred million unique archived web pages of advertisements, provider reviews, and buyer discussion threads. Web-based interfaces allow authorized law enforcement users to query and filter ads on the basis of geographic region, keyword,

phone number, and other identifiers [14]. Users can upload photos of investigative interest, detect faces, and find advertisements with faces similar to the uploaded image [15]. Additional advanced capabilities for social network building, classification of advertisement text, and other features are available on a subset of platforms [16,17]. Capabilities under development will also enable advanced image recognition and filtering, such as determining which hotel chain a photo was taken in [18].

Technology to Interdict Marketplace Demand

Technology can be used to counter the demand-side as well as the supply-side of sex trafficking. The next example focuses on several NGOs that have developed buyer deterrence platforms to automate elements of buyer sting operations. Traditional sting operations target buyers knowingly prepared to engage in commercial sex services, where an undercover law enforcement agent posts decoy sex advertisements, poses as a provider when negotiating with the targeted buyer, and arrests the buyer upon arrival to a service location, such as a hotel room. Building on this approach, an NGO has developed a buyer deterrence platform that combines a text message back-end with an autonomous chat bot trained on conversations between sex buyers and undercover agents. When a buyer sends a text message to a phone number found in a decoy sex advertisement, the chat bot engages with the most relevant response from the transcripts it has been trained on. Subsequent interaction may lead to negotiating a service, price, location, and possibly establishing that the buyer is aware the provider is likely a minor. Once this phase is reached, the chat bot sends a deterrence message informing the buyer that purchasing sex is a crime and providing internet links to educational resources. Several days later local law enforcement send a message to the buyer informing them their phone number is now known to them and reminds them of possible arrests and fines. This system uses the threat of law enforcement action to deter buyers from seeking commercial sex in the future [19]. Another NGO has developed a similar system that uses a distributed network of human operators who engage buyers responding to decoy advertisements via a cloud-based text message and call center dashboard. Its intent is to have one-on-one conversations with buyers to raise their awareness of human trafficking and to change their attitude towards purchasing sex [20]. Both of these platforms aim to deter buyers and limit the need for resource-intensive law enforcement sting operations.

Digital Forensics Technology

The last example discusses the role of digital forensics in the prosecutorial process. State and federal trafficking investigations increasingly depend on evidence derived from the forensic extraction of data from cell phones, tablets, computers, vehicle systems, and other electronic devices. Cell phones have become integral devices for many people, capable of storing sensitive and intimate details of daily life. The same is true for phones owned by traffickers and victims, and the ability to reconstruct time-lines, patterns of movement, text communications, and social networks has become a critical tool for corroborating victim testimony and discovering incriminating information about traffickers. In the last decade, there has been an explosion of hardware and software for digital forensics [1]. Generally, forensic extractions begin with hardware that physically attaches to the device and use various sensitive and proprietary methods to subvert the manufacturer's access controls to expose the device's data and record it to a device image [21]. Specialized vendor software is used to read and decode the device image to enable messaging and call analysis, image and video

analysis, extraction of information from third-party phone applications, or retrieval of cloud-based information. Most of these tools are intended for law enforcement only and have sensitive technical capabilities, and almost all of them require search warrants or consent in order to be used. This aspect of digital forensics represents an area of human trafficking-related technology that is largely being solved by the commercial sector, and does not require federal research and development investment.

These examples illustrate some of the successes of commercial entities and NGOs in developing point-solutions to specific facets of the counter human trafficking problem. However, there is much work to be done at the federal level where multi-organizational research and development is needed to create solutions that otherwise may not be intrinsically driven by market-based or philanthropic use cases. The following policy recommendations represent steps the federal government could take to transform the research and development posture for creating, delivering, and making best use of technology to combat human trafficking. Each recommendation is scoped to be enacted independently, but would have a dramatic force-multiplier if enacted in concert.

RECOMMENDATION: INCREASE HUMAN TRAFFICKING R&D FUNDING

The most urgent need for applying technology to counter human trafficking is substantially increased federal funding for research and development efforts. Across the federal government, several agencies are funding human trafficking research, such as the Office to Monitor and Combat Trafficking in Persons at the U.S. Department of State, the Counter-Trafficking in Persons programs at U.S. Agency for International Development, the Bureau of International Labor Affairs at the Department of Labor, the National Institute of Justice at the U.S Department of Justice, the Administration for Children and Families at the Department of Health & Human Services, the Science and Technology Directorate at the Department of Homeland Security, and others. The total weight of effort across these grants, solicitations, and other activities is estimated in the tens of millions of dollars per fiscal year; however, it is challenging to derive a holistic amount due to budget categorization and fidelity. Additionally, much of this funding is focused on academic research and studies, rather than on prototyping and development of new technology. R&D budgets to counter other types of illicit and organized crime, such as narcotics smuggling or counter-terrorism, are several times greater than those for human trafficking. Across the counter human trafficking community, academic and government researchers and NGOs have had to be creative in getting funding, by pursuing philanthropic sources and foundations; by developing intellectual property under non-human trafficking federal research initiatives and later applying it to human trafficking, and in some cases by gaining access to state-level forfeiture funds derived from successful prosecutions of traffickers. The scarcity of funding in size and in frequency limits the establishment of a community of engineers, scientists, and technologists who understand the human trafficking domain and can become practitioners in developing needed technology solutions year-on-year.

RECOMMENDATION: ESTABLISH AN INTERAGENCY R&D ENTITY

The interdisciplinary and heterogeneous nature of human trafficking, in the context of limited research funding, necessitates a fundamental rethinking of how to approach R&D initiatives. Under the current paradigm, independent solutions are solicited, funded, and developed within individual agencies, but are often not coordinated to yield the widest impact across interagency operations. These point-solutions become uncoordinated piece-wise improvements against a wide ranging problem, resulting in a more limited impact than if they were developed in concert with other initiatives as part of a broader research strategy or vision. The Victims of Trafficking and Violence Protection Act of 2000 (TVPA) established the President's Interagency Task Force to Monitor and Combat Trafficking in Persons (PITF), a cabinet-level entity consisting of 19 agencies responsible for coordinating primarily policy initiatives across the federal government. What is now needed, is a PITF-like interagency structure specifically for human trafficking research and development, and could be designed after the Joint Interagency Task Force (JIATF) model used within the Department of Defense. A JIATF may be formed when the mission requires close integration of two or more coordinated U.S. government agencies, and uses a unique organizational structure to focus the orgqnization on a single mission. A JIATF-like entity for counter human trafficking would be staffed and led by personnel from multiple trafficking-related agencies under a single director, and would have its own line of funding in order to provide for a unified effort; centralized planning and direction; and decentralized execution. The interagency process would require this entity to be especially flexible, responsive, and cognizant of the capabilities of the agencies it comprises, as well as of NGOs, FFRDCs, and industry, and must be empowered to take risk, even if those risks that don't pay off. The creation of this autonomous, focused, and agile entity could revolutionize the funding, development, and operationalization of technology, while also improving collaboration and reducing duplication of effort.

RECOMMENDATION: ENHANCE R&D AGILITY AND TRANSITION

Many research and development efforts begin with a process of an agency soliciting for ideas around a general need area; down-selecting and funding proposals; and performers building material solutions based on their proposals, often without direct consideration of potential operational users. Additionally, within operation-centric federal agencies that have internal research directorates, there is often what is referred to as the *technology valley of death*, where new prototype capabilities developed by a research directorate were not fully informed by and developed in concert with the operations they seek to impact, and often fail to be adopted into mission directorates. A good development methodology must take into account procedural and institutional barriers that can cause friction and affect technology transition.

To mitigate this, human trafficking research and operational agencies should adopt an agile user-centric development paradigm. To achieve this, operators need to be joint stakeholders at every stage of the development process, from the codifying of requirements to testing and deployment. Knowing the urgent problems in need of solutions is critical to this process, and the government should engage in periodic studies to reduce duplication of effort across other agencies, industry, and NGOs. Agencies should move to a co-development model where engineers and developers

are embedded within operational organizations. Such a model has been used to great effect in the special operations community. This enables the technology to adapt to the mission much more quickly, and the mission to evolve with continual advances in the technology. Also, modern software development methodologies should be employed such as automated testing, continuous integration, and continuous delivery to users, in order to more efficiently address gaps between developers, IT infrastructure, and operations. All of these methods will increase development agility, improve technology adoption, and enhance operations, maximizing limited human trafficking research and development funding. Lastly, federal initiatives should be structured in such a way that developed technologies can be also transitioned to state and local partners, as those agencies are often the most in need of new technology and have significant opportunity for impact.

RECOMMENDATION: CROSS-LEVERAGE GOVERNMENT TECHNOLOGY

Often technology developed in one mission area of the government can directly be applied or can be modified for use in a different mission area. For example, many of the capabilities developed in the Department of Defense and the Intelligence Community to characterize and interdict terrorist networks, have strong corollaries to human trafficking networks. Similarly, tools and techniques developed for investigating traffickers could also be used for other missions, such as narcotics trafficking or white collar crime. An example of this cross-leveraging is the Defense Advanced Research Projects Agency's MEMEX program, which developed tools to index illicit marketplaces on the deep and dark web [22] . As part of the MEMEX effort, software developed by the program's performers was posted to open software repositories on the internet, and two of the major law enforcement tools that index commercial sex marketplaces were built with components that derived from the MEMEX software catalog [14, 23]. This is an example of technology transition and reuse from government research to NGOs, enabled by an open software catalog.

To increase opportunities for cross-leverage, the government should establish an illicit network technology working group, to create a conduit for sharing research and technical capabilities across agencies. This working group could include representation from federal law enforcement agencies, the intelligence agencies, the special operations community, and specialty organizations, such as the Combating Terrorism Technical Support Office and the Office of Terrorism and Financial Intelligence.

RECOMMENDATION: MEASURE EFFECTIVENESS AND ASSESS IMPACTS

A key component of a coordinated research and development strategy is a process to measure progress against an objective. While federal and state agencies currently track performance statistics such as the number of in investigations initiated, the number of individuals prosecuted, and the number of victims provided with services, no measures of merit exist to assess the effectiveness of the collective government response to human trafficking. In order to frame these numbers in the context of a measure of effect, much more work needs to be done on national-level models for estimated vulnerability, prevalence of trafficking, and buyer demand, as many in the federal and NGO human trafficking community have noted [6, 24–26]. Specific to technology initiatives, measures of performance and effectiveness need to be developed alongside research projects, so that the impact

of these investments and their resultant capabilities can be assessed. Example metrics include how many more cases were initiated as a direct result of instantiating state and federal information sharing technology or how much time was saved during evidence analysis due to a specific automated software analytic. Implementing meaningful measures of merit will require continual effort and institutional change, but can begin by incorporating measurement and assessment strategies into current federal programs.

RECOMMENDATION: ADDRESS EXISTING TECHNOLOGY GAPS

In order to enhance the federal government's ability to counter human trafficking, the following technology, process, and operational gaps should be considered for future research and development initiatives. These findings are based on a multi-year process of interviews, assessments, and work-domain observations of over 45 federal, state, and local agencies; federal and academic researchers; private sector companies; and NGOs involved in counter human trafficking activities. Accordingly, these are meant to be a representative sample of actionable short-term needs from specific facets of human trafficking rather than a complete or holistic accounting. Greater detail on many of these recommendations appears in the *Human Trafficking Technology Roadmap* [1], and other studies [2, 27–29]. The recommendations apply across sex trafficking, labor trafficking, or both, and are focused on domestic and bilateral trafficking initiatives with other nations, but not fully international initiatives. Lastly, the recommendations are technical in nature and do not discuss general process improvements or issues that can be addressed with cultural, organizational, and non-technological interventions. The technology gaps and recommendations group around four selected areas: investigations and prosecution, information sharing, measurement of trafficking, and marketplace interdiction. Each of these is addressed below.

Investigations and prosecution: Technologies that can assist federal and state law enforcement and prosecutorial organizations in investigating complex cases involving the analysis of large quantities of complex heterogeneous data.

1. **Trafficking Signatures.** Indicators of trafficking or illicit commercial sex operations; which can appear on sex advertisement sites, in social media accounts, or within communications between individuals; can be important cues for investigators. These indicators can be based on specific language usage in speech or text, or based on visual appearance, such as specific objects or scenes in imagery or video. A repository and taxonomy of known indicators and signatures accessible to federal, state, and local law enforcement organizations should be developed, enabling the search and retrieval of known signatures, and labeling and submission of new ones.

2. **Vulnerability Monitoring.** Traffickers regularly use social media to look for susceptible or vulnerable individuals to contact and groom for later exploitation. Vulnerability indicators include sexually suggestive photos or postings of content and hash-tags with themes associated with familial trouble, truancy, drug use, running away, and depression. A capability should be developed to monitor publicly available social media profiles in a given region and provide warnings to law enforcement and social service agencies when a profile begins to express

indicators associated with vulnerability, interest in the commercial sex industry, or potential trafficking.

3. **Knowledge Management.** Many law enforcement agencies have limited case and knowledge management technology and often employ ad-hoc analysis logs and spreadsheets to keep track of discovered information during an investigation. A purpose-built integrated case and knowledge management platform for collaborative trafficking investigations across multiple law enforcement and prosecutorial organizations, should be acquired or developed. The capability should include natural-language processing to extract and structure pertinent entities and metadata from primary evidence stored in the system, and should provide full-text search functionality.

4. **Data Templates.** Commercial entities such as banks and social media platforms use unique data and document formats when responding to judicially-compelled record requests. Several law enforcement organizations are building capabilities to read and parse these formats, incurring collective duplication of effort. A working group of commercial tool vendors, law enforcement agency software teams, and other stakeholders should be established to develop templates for common judicially-compelled record formats and forensic device reports, and develop the structured extraction software libraries for each format.

5. **Data Enrichment.** Investigators often have to work with complex data formats that are difficult to use efficiently, such as scanned business records, photos of physical evidence, full social media profile archives, and electronic device forensic extractions. An integrated software capability should be developed to leverage natural-language processing, computer vision, machine learning, and other techniques to extract, structure, and enrich information contained in primary evidence. Textual information, such as names, locations, organizations, phone numbers, IP addresses, and other information should be extracted automatically using statistical and rule-based methods. Faces, objects, and text overlays should be extracted from scanned documents, images, and videos, and used to enrich the source media with metadata. Social network analysis techniques should be employed to find connections between information within and across documents and data, in order to automatically discover relations between pieces of evidence to accelerate triage, analysis, and confirmation of entities in the investigation.

6. **Telecommunications Analysis.** Information derived from mobile, landline, and calling card phone records is a cornerstone of trafficking investigations. Investigators may receive months to years of call records in response to court orders. These records are often processed and analyzed with basic analysis techniques, such as ranked call frequency, using common spreadsheet software, which does not scale for complex cases. A capability should be acquired or developed to extract, structure, and store call records, apply social network analysis techniques to enable in-depth analysis of call behaviors, and represent spatiotemporal data on a map. The deployment of these tools should be augmented with personnel training in social network analysis techniques and best practices.

7. **Financial Analysis.** Illicit commercial sex operations use complex financial processes in order to conceal the generation, transfer, and storage of their proceeds, and uncovering these activities can be critical to successful trafficking investigations. These processes can range from small-scale all-cash schemes to large-scale complex international money laundering operations using the global financial system. Capabilities should be developed to better process, store, and analyze financial data, including large amounts of bank transaction and money transmitter records to more easily build integrated spatiotemporal networks of activities. Additionally, automated detection and alerting capabilities should be integrated for known indicators and coordinated behaviors, such as those from the Financial Action Task Force (FATF), the Financial Crimes Enforcement Network (FinCEN), and the broader anti-money laundering community.

8. **Video Analysis.** Many human trafficking cases often involve obtaining closed-circuit video surveillance footage from hotels, stores, banks, and other businesses that are associated with trafficking operations. However, current analysis methods are inefficient, with limited technology to assist. Video analytic capabilities should be employed to reduce the time- and human-intensive elements of surveillance video analysis. Technologies to consider include attribute-based search; which allows a user to find video segments based on attributes such as the color of as an article of clothing; and time compression or video summarization; which allows segments of video with little or no activity to be removed, focusing analysis on scenes with significant activity. Additionally, facial recognition and object detection techniques could be employed, if the video resolution and the camera geometries are suitable, to enable common image recognition techniques.

9. **Speech Analysis.** Investigators and prosecutors spend large amounts of time listening to, transcribing, and analyzing phone call speech content. Speech processing technology offers the potential for reducing the time- and human-intensive nature of call analysis. This technology may include speaker biometrics, to help keep track of unique parties on calls; language identification, to survey calls to determine what linguist personnel are required; and automatic speech recognition, to convert call audio into partial text transcripts. Partial transcripts can be helpful to assist in the triage of large volumes of calls, and can be processed with analytic methods, including word-frequency analysis, topic modeling, and text summarization; text-to-text machine translation; keyword spotting; and other techniques. While these technologies will not replace the need for manual transcription of calls for evidentiary or trial purposes, they can serve as critical tools for directing and prioritizing scarce resources to the highest calls of interest. Lastly, these component technologies could be combined to create a machine-assisted transcription system.

Information sharing: Technologies that enable sharing among the counter human trafficking community while addressing such concerns as victim re-traumatization, disclosure of personally identifiable information, and sharing protected data.

10. **Enterprise Federation.** Many federal agencies have trafficking-relevant information stored in disparate databases with no easy way to correlate information across both intra- and inter-agency systems, due to technology, policy, and vendor limitations. An enterprise federated

search solution should be pursued to enable real-time, simultaneous search of multiple disparate data sources, with correlation and display of results in a useful format to the user. Federated search across government enterprises will lead to increased information sharing and time savings.

11. **Data Partnerships.** Many novel data sources relevant to counter human trafficking efforts are not shared due to concerns about traumatizing victims, releasing personally identifiable information, or loss of control over proprietary data sets. A bottom-up approach to building collaborative data sharing agreements should be pursued among small groups of counter human trafficking organizations on a case-by-case basis in order to encourage sharing of novel data sources. Elements of this approach include identifying novel data sources and organizations willing to share them, developing public-private incentive mechanisms, implementing a system to instantiate a pilot sharing program, and extending this program to include other sources and organizations.

12. **Encrypted Sharing.** Many organizations are unable to share trafficking-related data with other organizations due to restrictions on sensitive data. This data can include personally identifiable information from the public sector, data collected as part of law enforcement operations, or medical information protected under the Health Insurance Portability and Accountability Act. The inability to share and co-mingle multi-modal data precludes a more complete picture of many facets of trafficking. Recent advances in computer science have enabled the ability to perform certain analytical operations on data that has been encrypted, without revealing the underlying sensitive data and without the pitfalls inherent in data anonymization [30,31]. One or more pilot programs should be considered to assess the utility of these encrypted analytic methods, with law enforcement, health care, and NGO participation.

Measurement of trafficking: Methods and studies needed to understand supply and demand in commercial sex marketplaces given incomplete and inconsistent data, in order to measure impact of counter human trafficking efforts.

13. **Measure Outcomes.** Many practitioners in the counter human trafficking community desire the ability to quantitatively understand the effect of their respective efforts on reducing the prevalence of trafficking. For example, state law enforcement agencies have the ability to perform sex buyer stings almost daily, but are unsure whether these stings have a general deterrence effect and whether they are an effective use of resources. Similarly, prosecutors who require convicted buyers to attend human trafficking awareness training in exchange for ex-punction of charges, want to know whether training results in lower recidivism. Outside of law enforcement, there is broad interest in understanding the impact of counter human trafficking statutes, operations, and awareness campaigns. An interdisciplinary working group should be organized to develop strategies to collect and model data to assess the impacts of counter human trafficking activities.

14. **Data Standardization.** A robust, quantitative understanding of the scale and scope of trafficking can be used to raise awareness, improve resource allocation, guide public policy by enabling quantitative evaluation of policy effectiveness, and ultimately reduce the prevalence of trafficking. Building such an understanding is challenging due to incomplete and inconsistent data collection, and researchers employ a variety of methods to address these challenges [32]. For example, differences in legal statutes can affect how trafficking-related activities are prosecuted; often traffickers may be prosecuted for other crimes that are easier to prove than trafficking. Inconsistencies can also arise from how trafficking activities are recorded geospatially and temporally. For example, some organizations may aggregate information annually or at the state level, while others may use finer granularity; or organizations may use different procedures for recording trafficking activity that occurs over wide geographic areas or for long durations. These data issues result in researchers extrapolating the data they have, rather than modeling from the data they want. A working group should be established to design data standards to improve the uniformity of data reporting among stakeholders at the local, state, and national levels, and to identify data that should be collected in support of longitudinal and multilevel analyses.

15. **Model Prevalence.** Accurate vulnerability and victimization prevalence estimates are crucially important to the counter human trafficking community because they drive awareness of the scope of the problem and how to allocate resources to address it. Many have advocated for a nationwide prevalence model, however the lack of primary data and a secure way to integrate those data precludes such a model [6, 24]. An integrated system should be developed to enable longitudinal, multilevel, and other studies of victim prevalence using a broad array of data sources at local, state, regional, and national levels. Potential data sources could include law enforcement reporting and arrest data; judicial data; case work; trafficking tip line reporting; hospital and medical services records including public health human trafficking reports; and victim services provider data. Minimization of data and sharing concerns should be addressed using recommendations made elsewhere in this document.

16. **Model Demand.** The demand for commercial sex has received less attention than victim prevalence. Studies often use surveys to attempt to understand buyer attitudes and motivations [25, 26]. While such studies are useful, there is a need for buyer demand modeling that leverages new data sources and methodologies to build a more complete understanding of demand over time, and at the local, state, and national levels. An automated capability is needed to measure marketplace attributes from sex advertising forums and buyer review sites, and methods for continuous measurement of buyer demand should be developed, to enable an understanding of the impact of policy changes, counter-demand activities, and other factors.

Marketplace interdiction: Technologies for augmenting state law enforcement in disrupting supply and demand in commercial sex marketplaces, in order to reduce human trafficking.

17. **Buyer Characterization.** While law enforcement would prefer to target high-frequency buyers during counter-demand operations, identifying buyers and characterizing their behavior are difficult. Technologies to monitor buyer review forms and profile high-frequency buyers

should be explored, with the intent of developing signatures that could be matched with activity on the open internet, possibly leading to buyer identification. Additionally, a federated national-level sex buyer repository should be developed that allows storing, searching, and sharing of data collected from buyer stings and from demand deterrence platforms.

18. **Demand Operations.** Buyer sting operations often involve time-intensive activities such as developing and posting decoy advertisements and negotiating with buyers. An integrated capability for workflow automation should be developed to make sting operations more efficient and effective. Partnerships with demand-deterrence NGOs should be explored to cross-leverage technology of mutual benefit in order to scale operations and achieved greater efficiencies.

19. **Undercover Personas.** The use of undercover social media personas is widespread in law enforcement operations. Such personas are time-intensive to create and maintain, and many agencies use poor operational security practices that could compromise undercover assets [33]. An integrated system should be developed to semi-automatically generate social media personas based on user-defined attributes, leveraging managed attribution services to protect personas and law enforcement personnel. Robust user training should be provided to mitigate the risks associated with this system.

CONCLUSION

Human trafficking is a challenging and pervasive problem that necessitates broad action and bold ideas. Thoughtfully designed technology can empower the collective counter human trafficking community and disrupt these illicit operations. Increased research and development for counter human trafficking initiatives holds the potential make a tremendous impact by accelerating justice and hastening the healing of victims. I want to thank you for your interest in this pressing issue, and for the opportunity to prepare this testimony for you.

ABOUT THE AUTHOR

Matthew Daggett is a member of the technical staff in the Humanitarian Assistance and Disaster Relief Systems Group. He joined the Massachusetts Institute of Technology's Lincoln Laboratory in 2005, and his current research focuses on developing analytic technologies and systems for the study of dark and illicit social networks, such as human trafficking organizations. He has pioneered novel operations research methodologies and quantitative human-system instrumentation to design and measure the effectiveness of prototype technologies and processes for complex sociotechnical systems. He has expertise in remote sensing optimization, social network analysis, computer vision, natural-language processing, data visualization, and the study of team dynamics and decision making. He holds a bachelors degree in electrical engineering from Virginia Polytechnic Institute and State University.

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ABOUT THE AUTHOR

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Chairman FOSTER. Thank you. And next is Ms. Kennedy, now recognized for 5 minutes.

TESTIMONY OF MS. EMILY KENNEDY,
PRESIDENT AND CO-FOUNDER, MARINUS ANALYTICS

Ms. KENNEDY. Chairman Foster, Chairwoman Stevens, Ranking Members Norman and Baird, and Members of the Subcommittees, thank you for the opportunity to appear before you today to discuss the role of artificial intelligence in fighting human trafficking. My name is Emily Kennedy, and I am President and Co-Founder of Marinus Analytics.

Sex trafficking is rape for profit, and it's one of the most egregious crimes of our time. I first encountered human trafficking when traveling through Eastern Europe as a teenager, and I knew that I had to spend my life doing something about it.

What started as my student project in Carnegie Mellon University robotics resulted in a tool that has helped identify an estimated 6,800 victims of sex trafficking just in the last 2 years. My company Marinus Analytics develops AI for social impact. Our flagship software Traffic Jam is an AI-based investigative tool used by law enforcement across the United States, Canada, and the U.K. to identify sex trafficking victims and dismantle organized criminal networks. It's also used by nonprofits like the National Center for Missing and Exploited Children (NCMEC), which uses Traffic Jam to process the approximately 10,000 child sex trafficking reports they receive every year.

Traffic Jam looks at data across publicly available online classified ads like the ones as notorious as Backpage.com where their victims are advertised. We see millions of data points weekly here in the United States. This activity is far too extensive for investigators to process manually, and it makes it easier for traffickers to stay hidden in the data.

Traffic Jam leverages AI to find patterns that aid in victim recovery and help reveal massive organized criminal networks. For example, the tool can identify trafficking rings operating across cities and States and help prioritize leads for critical resource planning.

Traffic Jam helps narrow the scope of relevant information to an amount that is manually digestible. It brings to light the most potentially actionable leads for an investigation, and it often cuts down investigative time from months to days for a fraction of the cost of a full-time equivalent.

In addition to helping find missing kids, we also identify organized crime groups exploiting dozens or even hundreds of victims. As a result of one of the leads that we generated, an organized crime ring was indicted in early 2019 for trafficking Chinese foreign nationals for sex in 12 U.S. cities and Toronto. The sting operation successfully took down nearly 500 website domains and computer systems that logged more than 30,000 customer phone numbers.

The COVID–19 pandemic has increased the economic risk for already-vulnerable persons to fall into human trafficking. We saw at most about a 20 percent drop in activity over the first half of this year, and activity has since grown back to near normal levels. This

could suggest new entrants into this space despite increased physical risks, and it could also suggest an increased reliance on digital forms of commercial sex.

Traffic Jam provides reports that highlight recent potentially vulnerable entrants into commercial sex during the lockdown, and by pairing this with victim-centered training, we help promote safeguarding during the pandemic.

There are also frequent upheavals in the online space. When Backpage.com was shut down, illicit activity rapidly shifted to a variety of smaller websites. But within 6 months, we saw the total activity on these websites surpass the volume on Backpage in the month before the shutdown. Many investigators had cases whose online presence went cold when they couldn't easily go to Backpage to find new activity, but we were able to quickly help them navigate this new environment.

And recently, we have seen new challenges in a flood of phishing and cyber fraud online. Money made from these schemes, in addition to money laundering of sex trafficking proceeds often fund organized crime. More research and development are needed here to identify and combat the funding channels sustaining organized crime groups.

All of this would not have been possible without the support of the National Science Foundation, who believed in our mission of AI for social good. The NSF bridges the crucial gap between scientific research and operational impacts. We participated in the NSF I-Corps program before receiving funding and found it invaluable. The I-Corps program meets a crucial need for commercialization of university research because it provides a training ground before entrepreneurs launch.

The funding we received through the NSF SBIR (Small Business Innovation Research) has also been crucial to our success. SBIR focuses on high-risk, high-reward research, which is important because criminals move so fast online that innovation is needed to keep pace. Now that we have grown from a startup to a small business, we would encourage you to help NSF and the SBIR program provide more exposure to potential Federal Government customer relationships and reduce procurement challenges for up-and-coming businesses who serve the public sector. We also encourage continued authorization of funding for NSF to do this work because it is driving the ingenuity that we need to solve these serious, worldwide problems.

I look forward to your questions. Thank you.

[The prepared statement of Ms. Kennedy follows:]

Testimony of

Ms. Emily Kennedy

President & Co-Founder of Marinus Analytics

Before the United States House of Representatives Committee on Science, Space and Technology Subcommittee on Investigations & Oversight and Subcommittee on Research & Technology

"The Role of Technology in Countering Trafficking in Persons"

July 28, 2020 10:00 a.m. via Cisco WebEx

Introduction

Chairman Foster, Chairwoman Stevens, Ranking Members Norman and Baird, and members of the subcommittees, thank you for the opportunity to appear before you today to discuss the role of Artificial Intelligence in fighting human trafficking. My name is Emily Kennedy, and I am President and Co-Founder of Marinus Analytics.

Sex trafficking is rape for profit, and one of the most egregious crimes of our time. I first encountered human trafficking when traveling through Eastern Europe as a teenager, and I knew that I had to spend my life doing something about it. What started as my student project in Carnegie Mellon University Robotics resulted in a tool that has helped identify an estimated 6,800 victims of sex trafficking, just in the last 2 years.

Marinus Analytics & Traffic Jam

My company, Marinus Analytics, develops AI for social impact. Our flagship software, Traffic Jam, is an AI-based investigative tool used by law enforcement across the United States, Canada, and the United Kingdom to identify sex trafficking victims and dismantle organized criminal networks. It is also used by non-profits like the National Center for Missing & Exploited Children**,** which uses Traffic Jam to process the approximately 10,000 child sex trafficking reports they receive every year.

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Our Approach to Machine Learning & Data Analytics

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[1] https://www.justice.gov/usao-or/pr/nationwide-sting-operation-targets-illegal-asian-brothels-six-indicted-racketeering

Data & Technology Gaps, Opportunities & Challenges

The COVID-19 pandemic has increased the economic risk for already vulnerable persons to fall into human trafficking. We saw at most about a 20% drop in activity over the first half of this year, and activity has since grown back to near normal levels. This could suggest new entrants into the space, despite increased physical risks; it could also suggest an increased reliance on digital forms of commercial sex. Traffic Jam provides reports that highlight recent potentially vulnerable entrants into commercial sex during the lockdown; by pairing this with victim-centered training, we help promote safeguarding during the pandemic.

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The Role of Federal Agencies in Supporting Research & Technology Development

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Now that we have grown from a startup to a small business, we would encourage you to help NSF and the SBIR Program provide more exposure to potential federal government customer relationships and reduce procurement challenges for up-and-coming businesses who serve the public sector. We encourage continued authorization of funding for NSF to do this work, because it is driving the ingenuity that we need to solve these serious, worldwide problems.

I look forward to your questions. Thank you.

Ms. Emily Kennedy

President and Co-Founder of Marinus Analytics, Emily Kennedy is passionate about bringing AI and technology to bear on our most pressing social problems, like human trafficking. What started as a student project spun out of Carnegie Mellon Robotics became a social impact company, when Ms. Kennedy co-founded Marinus Analytics in 2014 to create AI-for-good solutions to human trafficking and other vulnerabilities.

She has led Marinus Analytics' national and international social impact, product deployment, and partnerships expansion. She is a Forbes 30 Under 30 Social Entrepreneur, Toyota Mother of Invention, one of Entrepreneur's Most Powerful Women, keynote speaker, and podcaster.

Marinus Analytics has generously received funding from the National Science Foundation, IBM, and DARPA, and is a Semifinalist in the global IBM Watson AI XPRIZE competition.

Chairman FOSTER. Well, at this point we will begin our first round of questions. The Chair will now recognize himself for 5 minutes.

And, first, we have to thank Ms. Rajan for her shout out for homomorphic cryptographic systems. This, I think, is our second Subcommittee that I've chaired that has actually dealt with this issue, which is the solution—the potential solution for a large number of problems we face trying to strike the right balance between privacy and detection of criminal activities.

And so although the problem of human trafficking is certainly not a new one, there are modern technologies, you know, things like online marketplaces and so on——

VOICE. Chairman Foster——

Mr. WEBER. Hey, Bill——

VOICE [continuing]. I think we may have another witness.

Chairman FOSTER. Whoops. Oh, I am terribly sorry. OK. Thank—you know, I—all right. My apologies. And so I will now recognize Ms. Darnton for 5 minutes, and my apologies.

TESTIMONY OF MS. HANNAH DARNTON,
ASSOCIATE DIRECTOR OF ETHICS, TECHNOLOGY,
AND HUMAN RIGHTS, BUSINESS FOR SOCIAL RESPONSIBILITY

Ms. DARNTON. Not a problem. Thank you so much. Good morning, Chairman Foster, Chairman Stevens, Ranking Members Baird and Lucas, and Members of the Subcommittee. And thank you so much for having me here today.

I am Hannah Darnton from Tech Against Trafficking, and Tech Against Trafficking is a coalition of technology companies, including Amazon, AT&T, BT, Microsoft, and Salesforce.org that are collaborating with global experts to help eradicate human trafficking using technology. Launched in 2018, the goal of Tech Against Trafficking is to work with civil society, law enforcement, academia, and survivors to identify and support technology solutions that disrupt and reduce human trafficking that prevent and identify crimes and that provide remedy mechanisms for victims and survivors.

To inform the development of Tech Against Trafficking's long-term strategy, our first step was actually to map the landscape of existing technology tools being used to combat human trafficking. Together with partners, we've actually identified over 305 antitrafficking technology tools across a range of geographies, target users, and focus areas. The tools range from simple mobile apps informing vulnerable communities and individuals at risk of labor exploitation to more advanced technologies such as satellite imagery and geospatial mapping tools being used to track down fishing vessels engaged in illegal activity. We also identify tools using facial recognition and blockchain, big data analysis, and visualization.

Beyond individual organizations, technology presents a massive opportunity for the broader antitrafficking field. Technology can help disparate actors connect across geographies, share data to facilitate the identification and victims of traffickers—victims and traffickers, and improve case management and survivor care, as well as raising awareness in at-risk communities.

However, as was stated earlier by earlier panelists, the antitrafficking ecosystem is largely siloed. In collaboration and engagement between organizations, deploying these technologies is minimal. Efforts are often duplicated, and opportunities for new solutions are missed due to lack of information about similar initiatives, the lack of shared or compatible data, nominal technical infrastructure and expertise, and a dearth of sustained funding and support.

As an example, our mapping identified approximately 70 unique technology tools developed for the purpose of victim or trafficker identification. Our goal at Tech Against Trafficking is to help support the work of individual organizations looking to more effectively utilize and deploy technology to advance in skill their work by simultaneously creating the connective tissue to bring together organizations and technology tools operating across antitrafficking sectors and lead them to systems-level change.

To this end, in 2019 we launched the Tech Against Trafficking accelerator program. This accelerator advances and scales the work of selected organizations deploying promising technology solutions by providing resources and support from our member companies while building an ecosystem of actors that will provide ongoing support for the participating organization.

For the inaugural Accelerator, the Tech Against Trafficking members and advisors worked with the Counter Trafficking Data Collaborative, CTDC, an initiative of the International Organization for Migration, to explore and promote best practices around data anonymization, privacy, and security, and I'm happy to provide more information on this if needed.

Beyond the Accelerator, we've published findings from our landscape analysis in an interactive map on the Tech Against Trafficking website and partnered closely with the OSCE, the Organization for Security and Cooperation in Europe, to put out a seminal publication in June on the use of technology to fight trafficking in human beings. While I'd recommend reading the full paper to glean insights from the research, we do have a number of specific points that we'd like to highlight for government actors looking to support technology in the field.

The first is the need for ongoing technical support. Technology often acts as a multiplier effect in terms of organizational impact, but many of the civil society organizations, nonprofits developing and deploying these tools have limited capacity, resources, and personnel, which creates barriers and challenges to taking on and maintaining effective technology and scaling it. The maintenance of such tools is particularly important. Organizations often receive funding to use or develop technology. However, without that ongoing resource and support, they often have difficulties keeping the technology up-to-date and operational, iterating it and customizing it to become more effective, and it severely inhibits the usage, utility, and impact of such a tool. The government can play an enabling role here by building the capabilities and relationships between stakeholders that facilitate the effective use of these technologies.

Furthermore, we'd like to see active engagement and participation of those closest to the issues. Those who are funding, devel-

oping, and implementing technology-based solutions should ensure the active engagement and participation of vulnerable populations and target groups through the design, development, and deployment of solutions. We also want to make sure these technologies are fit-for-purpose, addressing the problems at hand, that we're looking at the limitations of what technology can do. They can't substitute for the range of other factors needed to effectively combat trafficking, and that we consider the easy solutions.

So a range of tech solutions are needed in this space, many actually, WhatsApp, Facebook Messenger, dedicated SMS (short message service) channels allow multiple avenues to communicate with victims seeking assistance, and these simple solutions can provide straightforward ways for victims to communicate in real-time with service providers or personal support networks. And the organizations are looking for simple tech solutions or focus on the underlying infrastructure that would allow them to use technology effectively.

And finally, and perhaps most importantly, we'd like to look at due diligence of these solutions. The provision of such technologies must be accompanied with training not only for the direct use of tools but for their ethical use with respect of human rights and data protection. Due diligence should be conducted on all technologies deployed by government, law enforcement, and service providers to identify, avoid, address, and mitigate potential adverse human rights impacts that may arise from the use of these technologies in accordance with the U.N. Guiding Principles on Business and Human Rights. I'll stop there.

[The prepared statement of Ms. Darnton follows:]


THE ROLE OF TECHNOLOGY IN
COUNTERING TRAFFICKING IN PERSONS
WRITTEN TESTIMONY SUBMITTED BY TECH AGAINST TRAFFICKING
MONDAY, JULY 27, 2020
TECH
AGAINST
TRAFFICKING

TECH AGAINST TRAFFICKING

BACKGROUND ON HUMAN TRAFFICKING

Human trafficking is a complex, thriving crime with a foothold in every country. Despite legislation and increasingly robust efforts to raise public awareness, an estimated 40.3 million people are subjected to some form of modern slavery, according to the 2017 Estimates of Modern Slavery by the International Labour Organization and the Walk Free Foundation, in partnership with IOM.

Today, increased access to personal technology enables perpetrators of human trafficking to more easily recruit victims and connect with buyers. New technologies, such as smartphones and mobile money transfers, have given human traffickers another medium through which to run their operations, extort ransoms, and receive payment, all while remaining anonymous.

Fortunately, advancements in technology also have the power to help combat human trafficking. Information and communications technologies can serve as powerful tools to disrupt modern slavery, identify, and prevent exploitation, and provide additional insights and data on how this crime is manifesting around the globe. Technology plays a significant role in addressing data gaps and increasing the efficiency of data sharing, leading to more effective use of resources and coordination between law enforcement, businesses, government, and civil society.

Given the magnitude of the problem and the complexity of tackling it, there is a need for expediency, increased stakeholder engagement, and collective effort in backing the right technologies at the right time to enable maximum impact.

OVERVIEW OF TECH AGAINST TRAFFICKING

Tech Against Trafficking is a coalition of technology companies collaborating with global experts to help eradicate human trafficking and modern slavery using technology.

By tapping into their technical expertise, capacity for innovation, and global reach, the five company members of TAT – Amazon, AT&T, BT, Microsoft, and Salesforce.org – believe that technology can and must play a major role in preventing and disrupting human trafficking and empowering survivors. Together, this group has committed to working with anti-trafficking experts to identify and support opportunities to develop and help scale promising technologies.

Tech Against Trafficking is supported by a network of Advisors, which includes: The Global Initiative Against Transnational Organized Crime, GSMA, the International Organization for Migration (IOM), Organization for Security and Co-operation in Europe (OSCE), techUK, University College London, UNSEEN UK, and the World Business Council for Sustainable Development.

The RESPECT Initiative, led by the Global Initiative Against Transnational Organized Crime, serves as the Research Lead for the group, while BSR acts as the Secretariat.

TECH AGAINST TRAFFICKING VISION

Tech Against Trafficking wants to see technology act as a step-change for organizations working to eradicate human trafficking and modern slavery. Effective, thoughtfully deployed technology solutions can be catalytic for organizations hoping to advance and scale the impact of their work.

Beyond individual organizations, technology presents a massive opportunity for the broader anti-trafficking field. Technology can help connect disparate actors across geographies, share data to facilitate the identification of victims and traffickers, improve case management and survivor care, and raise awareness in at-risk communities.

However, the anti-trafficking ecosystem is largely siloed, and collaboration and engagement between the organizations deploying these technologies is minimal. All too often, efforts are duplicated and opportunities for new solutions are missed due to incomplete information about similar initiatives, the lack of shared or compatible data, nominal technical infrastructure and expertise, and a dearth of sustained funding and support.

Tech Against Trafficking hopes to help support the work of individual organizations looking to more effectively utilize and deploy technology to advance and scale their work, while simultaneously creating the connective tissue to bring together organizations and technology tools operating across the anti-trafficking sector and lead them to systems-level change.

MAPPING THE LANDSCAPE OF TECHNOLOGY TOOLS

To inform the development of Tech Against Trafficking's long-term strategy, the coalition first mapped the landscape of existing technology tools being used to combat human trafficking.

To date, Tech Against Trafficking and partners have identified 305 tools across a wide range of geographies, target users, and focus areas: with the vast majority working on victim and trafficker identification and supply chain risk management. The tools range from simple mobile apps informing vulnerable communities and individuals of the risks of labor exploitation, to more advanced technologies – such as satellite imagery and geo-spatial mapping tools being used to track down fishing vessels engaged in illegal activity, facial recognition, blockchain, and big data analysis and visualization.

The findings of the landscape analysis can be found on the Interactive Map of Anti-Trafficking Technology Tools on the Tech Against Trafficking website.

This map is intended to serve as a resource for the field, updated regularly with all known anti-trafficking tools. We hope that both the interactive map and the OSCE publication referenced below will work to reduce the duplication of new technology tools being developed, facilitate more

impactful and scaled use of technology, develop synergies between existing technology tools, and encourage more strategic deployment of funding and resources on the development of new tech tools.

THE ACCELERATOR PROGRAM

In July 2019, the coalition launched the Tech Against Trafficking Accelerator Program, which aims to identify promising uses of technology in the anti-trafficking field and to harness the expertise and resources of member companies to advance and scale the work of the organizations deploying these technologies to combat human trafficking.

The Tech Against Trafficking Accelerator represents TAT's flagship program. This collaborative program advances and scales the work of selected organizations with promising technology solutions by providing potential resources and support from our TAT member companies, while building an ecosystem of actors that will provide ongoing support for the participant organizations over the course of the Accelerator. These resources may include technical expertise, network access, mentorship, access to funding, and educational opportunities, to accelerate the growth, scale, and resulting impact of high-potential tech solutions.

For the inaugural 2019 Accelerator, the Tech Against Trafficking members and advisors worked with the Counter Trafficking Data Collaborative (CTDC), an initiative of the International Organization for Migration (IOM), to explore and promote best practices around data anonymization, privacy, and security.

The CTDC, an initiative of the International Organization for Migration (IOM), is a global human trafficking data hub, publishing harmonized data from counter-trafficking organizations around the world.

Initial results from the Accelerator with CTDC can be found here.

TECH AGAINST TRAFFICKING

SUMMARY OF THE OSCE AND TECH AGAINST TRAFFICKING REPORT:

In June 2020, the OSCE and Tech Against Trafficking published the seminal paper "Leveraging innovation to fight trafficking in human beings: a comprehensive analysis of technology tools".

This publication highlights the role that technology, and the technology industry can play in combatting human trafficking. The paper showcases the potential dual use of technology solutions, but ultimately focuses on how technology can be used to proactively combat human trafficking – how it can be used to find more victims, conduct better investigations and prosecutions, improve access to services, and engage in better prevention.

Together, OSCE, Tech Against Trafficking, and partners evaluated the 300 technology tools identified during the landscape mapping of the anti-trafficking field, and analyzed how different stakeholders, including law enforcement, civil society, businesses and academia, can take advantage of technology to advance the fight against the human trafficking crime. The paper considers tech tools and trafficking from a strategic perspective – who develops the tools, who are they intended for, what are the objectives of these tools, and where can they provide value. It also addresses ethical considerations, data protection issues, and the need to respect human rights in the use of technology.

We recommend reading the full paper to glean insights from the research, however, we would like to call out several findings particularly relevant to this audience:

Identified trends:

- According to our findings, the private sector and NGOs are the two main stakeholders behind the development of technology tools to fight human trafficking, with governments accounting for a very small percentage of technology efforts and initiatives.
- The number of Victim Case Management and Support tools remains low. The rise in the number of victims detected would seem to imply a greater need for additional tools to support those victims. However, only 6% of identified tools can be classified as victim case management and/or support tools.
- There is a strong concentration of tech tools developed and operating in the Global North despite higher prevalence rates of human trafficking in the Global South. While this could be due to the linguistic limitations of the researchers conducting the analysis, preliminary indications show technology tools being used to combat human trafficking at exponentially higher rates in the Global North than the Global South.
- There is limited awareness of existing technology initiatives in the anti-trafficking field, which increases the risk of duplication of tools, fragmented resources, and disjointed development and use of technology-based tools. For example, we identified approximately 70 different tools focused on victim/trafficker identification.

- Although half of the tools are offered at no cost, the majority (more than three quarters) are proprietary technologies / innovations, creating barriers to replication, scaled impact, and cost-efficiencies.

- Tech solutions in this space do not have to be complex – WhatsApp, Facebook Messenger or dedicated SMS/ text/phone channels provide multiple avenues to communicate with a victim seeking assistance. Messaging apps can provide a straightforward way for victims to communicate in real time with service providers or personal support networks. In fact, most organizations are looking for very simple tech solutions, or are focused on the underlying infrastructure that would allow them to use technology effectively (e.g. laptops, stable internet, etc.). The majority of tools identified are relatively simple, straightforward tech interventions.

- There are limits to what technology can do. Technology is not a substitute for the range of other factors needed to efficiently combat trafficking, such as political will, adequate resources, or commitment from a wide range of actors with the mandate and competencies in this field. It is thus useful to view initiatives in terms of the specific types of counter-human trafficking work to which they can contribute.

***Recommendations*:**

The publication provides a set of general recommendations for all actors involved in the use of technology to combat trafficking, and a more specific set of recommendations for governments. The recommendations are aggregated below, slightly abridged from their original format.

General recommendations

1. **Those who are funding, developing, and implementing technology-based solutions should be clear about the purpose of these solutions and why such solutions are preferable to alternatives.**

   Tech-based initiatives should not be 'solutions looking for problems'. There are many possible uses of technology in counter-trafficking efforts. It is important to be clear about the specific problem that each technology-based initiative is planning to solve.

2. **Those who are funding, developing, and implementing technology-based solutions should ensure that these solutions are fit-for-purpose, taking into account issues regarding access, coverage, and literacy.**

   Having up-to-date technology and protocols means very little if the people in need are unable to access or use that technology. Victims in remote areas may not have access to the Internet, may not own mobile phones or have limited understanding of how to use them, may lack trust

in, or, conversely, have too much trust in certain information sources, or may simply be unable to afford maintaining a mobile phone subscription.

Effective technology must be user friendly. Developers and tech companies may understand their resources on a deep, complex level, but it is not realistic to expect victims, service providers, law enforcement, or the public to become experts in technology every time they want to use a tool. Tools developed for victims or potential victims have to use simple terms and language to be as intuitive as possible in their use. They also have to have simple design and few menu options in order to avoid confusing users with complicated features and commands. For this reason, new technology must balance cutting edge advancements with a user-friendly format. When developing new tools, technologists should consider the amount of training resources that must go into successful implementation.

3. **Those who are funding, developing, and implementing technology-based solutions should address issues of privacy, safety, trust, and retaliation risks.**

   Target audiences must feel confident that information they provide will not just be used, but be used safely and wisely to improve their situation, and that there is no possibility of adverse or unintended consequences, such as unauthorized access to information by third parties or unauthorized sharing of sensitive or confidential data.

   The risk of retaliation for victims of trafficking and others raising issues on their behalf is real. The relevant stakeholders must make sure to assess and mitigate this risk, including through use of technology tools based on anonymized responses, analysis, and management of data by third parties, agreements on non-retaliation from employers, recruiters, etc.

4. **Those who are funding, developing, and implementing technology-based solutions should only collect actionable data.**

   Knowing how the data will be used to advance the cause of the target group is critical to maintaining trust and confidence as well as ensuring the effective use of limited resources. There is little value in collecting data that cannot be used or acted upon. Unnecessary data collection may lead to disengagement and can even be dangerous. For example, there have been instances of resources being spent on developing and publicizing hotlines that are then unable to assist those who call.

5. **Those who are funding, developing, and implementing technology-based solutions should align their work with other ongoing initiatives.**

   With limited resources, efforts should be made to collaborate in sharing existing technology and data. For example, worker surveys can be used to complement audit data or to unearth sensitive or hard to detect information that may be missed by an audit. Likewise, initiatives for identifying child victims of human trafficking for sexual abuse online through facial recognition technology should use information and databases of already existing technology initiatives in this field and not duplicate them.

6. **Those who are funding, developing, and implementing technology-based solutions should consider whether a suitable application is already available before developing a new one.**

   OSCE and Tech Against Trafficking research identified more than 300 technology-based initiatives and these are only the ones that are currently public. Resources should not be spent duplicating work where existing remedies already exist. Instead, actors should seek to share relevant data and technologies, and aim innovative work at solving problems that lack existing efficient tools.

7. **Those who are funding, developing, and implementing technology-based solutions should keep up to date with changes in both technology and the human trafficking context.**

   Technology-based solutions must stay up to date with new developments, particularly: (1) changes in applicable legal frameworks; (2) emerging new forms of exploitation; and (3) potential counter-responses by perpetrators to actions that affect their operations and revenue.

8. **Those who are funding, developing, and implementing technology-based solutions should ensure the active engagement and participation of the target group in the development process.**

   Efforts by various stakeholders, however well meaning, may unintentionally make the lives of trafficked persons and vulnerable people worse rather than better. Many migrant workers, for example, are hugely dependent on overtime in order to save money and be able to return home as soon as they can. Developing tech tools for assisting the enforcement of low overtime caps without consulting workers can extend their stay in a foreign country considerably, which is not necessarily in the best interest of workers. Another example is the use of technology tools to promote more formalized recruitment processes aimed at increasing worker protection. Many such processes involve significant delays and costs, often placing workers in sizeable debt and increasing rather than decreasing their vulnerability to exploitation and abuse. It is essential to be aware that survivors, victims, or potential victims' perceptions of their own welfare may be different from those trying to help them.

   Another reason why victims and survivors of trafficking in human beings should be directly engaged in the development of technology tools to combat human trafficking is because they have the knowledge about the modus operandi of criminals and have witnessed how traffickers are misusing technology for their own advantage. This information is extremely important for the success of the anti-trafficking response and victims'/survivors' voices should serve as the primary resource when developing technology tools. Victims are the ultimate beneficiaries of all interventions in this field and they should play an important role in the development of tools designed to end human trafficking.

9. **Those who are funding, developing, and implementing technology-based solutions should test assumptions and measure outcomes.**

   While there are no universally agreed estimates of the size of the human trafficking problem, it is generally accepted that efforts to date have resulted in: (1) the identification of only a small proportion of victims of trafficking; and (2) the investigation and successful prosecution of an even smaller number of traffickers. Furthermore, there is little evidence that traditional trafficking prevention programmes based on awareness raising and alternative livelihoods have been effective in reducing the number of people being drawn into trafficking. With this in mind, the field must consider not if/when technology was used, but rather, assess the resulting impact or effect of that technology.

   That is, did the "good" that was envisioned in a "tech for good" application actually happen? Technology may help in finding and understanding a problem better, or to gather accurate data, but the problem itself must still be addressed.

   It is important to underline that the process of assessing outcomes begins during the design stage. Evaluations of counter-human trafficking work frequently highlight that the original design relied on a series of assumptions that were not supported by available evidence, and thus it was likely from the beginning that the intended outcomes would never be met.

Recommendations for Governments:

1. **Governments are encouraged to consider supporting the effectiveness of technology-based solutions with accompanying evidence-informed policy.**

   Notable examples are: (1) mandating and supporting faster official labour recruitment processes to make workers less susceptible to recruitment-induced, coercive debt obligations; (2) promoting ethical online recruitment to reduce reliance on exploitative sub-brokers in rural areas; and (3) enhanced laws and policies for regulating online temporary recruitment agencies, including cross-border.

2. **Governments are encouraged to develop international and/or national minimum standards for confidentiality in relation to the technology enabled provision of assistance and support to victims.**

   There are considerable risks related to the mismanagement, unauthorized use, and sharing of personal data stored on online resources of victims and all the individuals involved in a trafficking case. Since this type of data can be collected and managed by different, state and non-state entities, governments should develop international and/or national minimum standards for confidentiality related to the technology enabled provision of assistance and support to victims to ensure that there is a harmonized framework that would be used similarly by all stakeholders involved.

Recommendations relating to the role of government as law enforcer:

3. **Governments are encouraged to consider increased resourcing of technology-based solutions for government entities entrusted with identifying trafficking cases.**

   This includes supporting: (1) labour inspectors to use technology applications to verify conduct and ensure national labour laws are being upheld; and (2) law enforcement to vastly increase their abilities to counter online sexual exploitation and recruitment of victims through online fraudulent employment offers.

4. **Governments are encouraged to consider increasing resources and training for national and local law enforcement and service providers to support more effective use of technology-based solutions.**

   Governments should allocate sufficient resources for law enforcement and service providers to be able to benefit from specialized technology tools which could scale up the fight against human trafficking, including the necessary software, hardware, and training.

   The provision of such technologies must be accompanied with training not only on the direct use of tools but their ethical use with the respect of human rights and data protection.

   Furthermore, in accordance with the UN Guiding Principle on Human Rights, due diligence should be conducted on technologies deployed by law enforcement and service providers, to identify, avoid, address, and mitigate all potential adverse human rights impacts that may arise from the use of the technology.

5. **Governments are encouraged to consider increasing resources and training for policymakers, law enforcement, service providers, NGOs, and academia to understand the myriad ways in which technology is being misused by traffickers.**

   The modus operandi of technology-facilitated trafficking in human beings has its specific characteristics. Technology allows traffickers to hide their true identities, increase their anonymity online and exploit victims in new ways. These new developments have important consequences on the response to human trafficking and can increase the difficulties to identify traffickers and bring them to justice.

   As a result, all those involved in combating trafficking in human beings – policymakers, law enforcement, service providers, NGOs and academia – should be trained to better understand how technology is being misused by traffickers. Efficient responses to technology facilitated human trafficking cannot be developed unless the relevant stakeholders have a good understanding on how traffickers use technology for their own advantage.

Recommendations relating to the role of governments as investor:

6. **Governments are encouraged to consider expanding their support for partnerships with tech companies and businesses to invest in research and development, and to incentivize scaling.**

Governments should establish strategic partnerships with the technology sector in order to develop new innovative solutions to combat human trafficking and scale the response. As the Inter-agency Coordination Group Against Trafficking in Persons (ICAT) highlights in its issue brief on human trafficking and technology "future success in eradicating human trafficking, in its many forms, will depend on how countries and societies are prepared for, and equipped to, harness technology in their responses". Success in this field cannot be achieved without the expertise, knowledge, and capacity for innovation of the technology private sector.

7. **Governments are encouraged to consider increasing investment in multi-lateral institutions and other coalitions that bring together multiple stakeholders from various disciplines to collectively counter-human trafficking with the assistance of technology.**

   Trafficking in human beings facilitated by technology is global in nature and in some cases perpetrators could be located in one country, the victim in another one and the ICT infrastructure which enables the recruitment, control, advertising and exploitation of the victims in a different country. Therefore, a multi-lateral response is needed, along with coalitions built to efficiently address trafficking at the global level. Governments are encouraged to be proactive in this regard as it is first and foremost the responsibility of states to combat human trafficking.

   Examples of multi-lateral institutions and coalitions established to tackle technology-enabled human trafficking already exist, Tech Against Trafficking is one such coalition, however, there are also a number of platforms focusing specifically on trafficking of children for sexual exploitation online. WeProtect is a global alliance led by the UK government and supported by a large number of countries, technology companies and civil society organisations and which has the goal to end child sexual exploitation online.

8. **Governments are encouraged to consider placing greater emphasis on measuring the results of projects supported by technology.**

   Many existing reports on projects using technology-based solutions focus on the technology itself rather than the outcome of the intervention it supported. This encourages a focus on technology as an end in itself, rather than as a means. In the supply chain management field, for example, ample technology is already available to determine if a supplier is treating its workers fairly. However, both governments and companies often do not act upon this. While technology is being applied by some law enforcement departments to combat human trafficking, resources need to be increased to match the global scale of the problem.

Recommendations relating to the role of government as buyer:

9. **Governments are encouraged to consider using technology tools to assess, identify, and mitigate human trafficking risks in government procurement and also engage workers in their supply chains to prevent exploitative practices.**

Governments are some of the biggest spenders in national economies and they spend financial resources to provide public services. Many public resources are being spent on procuring goods and services from economic sectors where the risks of human trafficking are high such as construction and infrastructure, telecommunication, food, agriculture, healthcare etc. Since governments have a large number of direct suppliers, thousands or tens of thousands, it is very difficult to manage human trafficking risks without advanced analytical capabilities. This shortcoming is magnified by the large workforce in government supply chains which can span the globe. Therefore, procurement and sustainability departments are advised to use advanced technology tools to conduct thorough due diligence and improve government procurement transparency.

OVERVIEW OF DATA PRIVACY AND ANALYSIS CHALLENGES

One of the most important areas where technology and policy intersect is the topic of data, and in particular, data privacy. This is especially the case for data on individual victims of trafficking, where the sharing or publication of such data poses risks to victims represented in the data. These include the privacy risks of individuals being identified within the data, as well as the safety risks associated with traffickers identifying victims within the data and retaliating against the victim, their friends and family, or their community.

Despite these risks, it is crucial to develop safe forms of data sharing that allow for evidence-based policy and practice. Without access to data on the prevalence and nature of trafficking in different contexts and over time, it is difficult to make decisions about how and where to allocate resources for maximum impact. Data sharing agreements may sometimes be possible between the front-line organizations that capture data on the victims of trafficking and the government, law enforcement, and civil society organizations that need to access and analyse such data. However, it typically is not possible to complete such agreements at the speed and scale needed for a comprehensive and current overview of the problem. There will always be a data gap between the prospective providers and consumers of sensitive data, unless we can create a scalable data sharing solution with guaranteed privacy protections. This is where technology can help.

In the 2019 Tech Against Trafficking Accelerator, a research team from one of our member companies worked with the UN Migration agency (IOM) to develop a new form of data anonymization and analysis directly targeting the needs of the counter trafficking community. Since the primary risk is that traffickers will identify victims in published data based on identifying combinations of attributes (like age, gender, citizenship, as well as type of recruitment, trafficking, and control), the solution ensures that only common attribute combinations appear in published datasets, and therefore cannot be linked to individuals – or even small groups of individuals. This is achieved through the combined use of synthetic data, precomputed statistics, and interactive visual interfaces, enabling exploratory analysis and accurate reporting without exposing any data on actual identifiable individuals.

This new privacy-preserving data platform is being adopted by IOM's Counter Trafficking Data Collaborative (CTDC) as a way of enabling access to more data, more accurate data, and the means to analyse it more deeply than is currently possible – either on the CTDC website or using any other anonymization method. It has already been presented in a briefing to IOM leadership and worldwide offices and a pilot release with an internal IOM dataset is planned for the coming months. If successful, the goal is to incorporate data from other members of CTDC and to encourage data contributions from additional organizations who would not otherwise do so but for the strong privacy guarantees and simple privacy controls that the platform provides.

We see this as a great example of how policy and technology can influence one another in a virtuous feedback cycle. Data privacy policies have added significance in the counter trafficking space, demanding new and innovative technologies for privacy-preserving data sharing and

analysis. In turn, these technologies have the potential both to set new standards in privacy policy and to support evidence-based policy against trafficking in persons. Organizations like Tech Against Trafficking can play a critical role in mediating between the technology and policy spheres and facilitating the progression from problems to solutions.

CHALLENGES TO INCORPORATING TECH IN ANTI-TRAFFICKING EFFORTS IN THE US

Below are a few of the key challenges to incorporating technology into anti-trafficking effort in the US:

1. **Ongoing Technical Support**: Technology often acts as a multiplier effect in terms of organizational impact. But many of the civil society organizations developing and deploying these tools have limited capacity, resources, and personnel, which creates barriers and challenges to taking on and maintaining effective technology and scaling it.

   The maintenance of such tools is particularly important, organizations often receive funding to use or develop technology, however, without on-going resources and support, they often have difficulties keeping the technology up to date and operational, or to iterate/customize it to be more effective. This severely inhibits the usage, utility, and impact of such tools.

   Government can play an enabling role building the capacities and relationships between stakeholders that facilitates the effective use of these technologies. This may include funding capacity building, maintenance, and long-term staffing and technical support within organizations, as well as reevaluating current funding/grant restrictions and requirements related to overhead and administrative costs that prevent investments and funding of technology.

2. **Active engagement and participation of those closest to the issue**: NGOs are already on the front line of support for vulnerable groups, victims, and survivors of human trafficking, and are uniquely well-placed to inform how tech tools are designed and used to be most effective. Victims are the ultimate beneficiaries of all interventions in this field and they should play an important role in the development of tools designed to end human trafficking, however, they are often not included in the design, development, or deployment of these technology.

   They need to be at the table when these technologies are developed, and they need to benefit from the use of these technologies. Our analysis found that only 6% of identified tools can be classified as victim case management and support tools.

3. **Fit-For Purpose**: This plays into the importance of addressing and understanding the various stakeholder groups' needs before developing a technology solution. Those who are funding, developing, and implementing technology-based solutions should ensure that solutions are fit-for-purpose, taking into account issues regarding access, coverage, literacy, organizational resources, and technical infrastructure prior to deploying a solution.

   Practitioners have highlighted that organizations looking for technology-based solutions to combat human trafficking are not always clear about the specific problems they hope to solve.

There is a risk that technology will be seen as the solution itself rather than as a means to solve a problem.

Furthermore, due diligence should be conducted to see if the solution already exists. Resources should not be spent duplicating work where remedies already exist. Instead, actors should seek to share relevant data and technologies, increase collaboration, and aim innovative work at solving problems that lack existing efficient tools.

4. **There are limits to what technology can do.** Technology is cannot act as a substitute for the range of other actions needed to effectively combat trafficking, such as political will, adequate resources, or commitment from a wide range of actors with the mandate and competencies in this field. The human trafficking value chain needs to be addressed at multiple points, requiring significant collaboration across sectors, industries, and geographies.

5. **Consider the easy solutions**: Tech solutions in this space do not have to be complex – as stated above, WhatsApp, Facebook Messenger or a dedicated SMS/ text/phone channels provide multiple avenues to communicate with a victim seeking assistance. Messaging apps can provide a straightforward way for victims to communicate in real time with service providers or personal support networks. In fact, most organizations are looking for very simple tech solutions, or are focused on the underlying infrastructure that would allow them to use technology effectively (e.g. laptops, stable internet, etc.). The majority of tools identified are relatively simple, straightforward tech interventions.

TECH AGAINST TRAFFICKING

IMPACTS OF COVID-19 ON HUMAN TRAFFICKING:

The information below has been taken from a previous Tech Against Trafficking article, The Effect of COVID-19: Five Impacts on Human Trafficking, published on the Tech Against Trafficking website on April 16, 2020.

It is difficult to assess the long-term impacts of COVID-19 while we are in the midst of this unprecedented global event. The socio-economic crisis caused by COVID-19 is making informal work far more precarious and workers more susceptible to exploitation as people become economically distressed. The main drivers of vulnerability to human trafficking, namely, poverty and financial crisis, will intensify, prompting increased risk of exploitation, particularly for groups of people who are already marginalized.

What is already clear is that we are going to see a surge in the number of individuals newly at-risk to exploitation and human trafficking; that those who were vulnerable before, will only be more so now; and that current survivors of human trafficking will be at higher risk of being re-trafficked due to a lack of potential employment options and a decrease in critical services.

Overall, we are observed five key trends originating from COVID-19 that are creating profound consequences for the anti-trafficking field. These five key trends include:

1. Economic stress on families leading to increased vulnerability:

More than 81% of people in the global workforce are being affected by full or partial workplace closures, and there are two billion people in the informal sector, living primarily in developing countries, who lack the basic social protections that formal employment provides. The ILO estimates that 1.25 billion workers are employed in sectors identified as being at high risk of "drastic and devastating" layoffs and reductions in wages and working hours, potentially pushing an astounding number of people into vulnerable situations.

With increased financial insecurity for families, we are seeing indications of an increase in familial abuse, including familial trafficking. Several anti-trafficking organizations have already noted a rise in child marriage and forced labor, as families try to make ends meet. Families facing difficulties may see child marriage as a way to alleviate financial hardship – reducing the number of mouths to feed and generating income in a time of need.

These new financial shocks lead to greater risks for children, as well as adults, who may now be willing to accept riskier work offers that could lead to an increase in exploitation and labor trafficking.

2. Rise in online sexual exploitation of children

There are several ways in which COVID-19 may be exacerbating the online sexual exploitation of children. Last month, the FBI warned that school closings due to COVID-19 could increase the

potential for child exploitation. With adults staying home, and spending more time online, there's an opportunity for abuse communities to drive increased demand for the creation of new content. If a content producer has access to a child within their home, this could lead to an increase in the frequency and severity of abuse.

Similarly, traffickers living with their victims may expand to new forms of abuse, including online / livestreamed exploitation of current victims, or of newly vulnerable individuals.

Additionally, children are spending more time online with parents who are short on time and may lack familiarity with the platforms and services their children are using. This lack of oversight creates an unprecedented opportunity for an increase in grooming and online enticement. We expect to see an increase in self-generated child sexual abuse material during this time.

And finally, individuals who have lost their jobs and the incomes needed to sustain their families may look for alternative, illegal means of generating revenue. One of these options may be livestreaming sexual abuse of their children for payment.

3. Spikes in violence towards victims of trafficking

Similar to the increase in reports of domestic violence we've seen over the course of the pandemic, economic stress, coupled with physical confinement in the home is likely to lead to increased abuse and violence for those trapped in trafficking situations. Restricted in their ability to 'earn', victims of sex trafficking trapped with intimate partners or pimps are particularly vulnerable. These risks are only exacerbated by limited social support services, shelter closures, and restricted access to medical facilities and care.

4. Jobs and in-person services (like childcare) for survivors are no longer available

While some organizations providing survivor services have proactively switched to digital forms of support – including online trainings, online counselling, hotline services, etc. – many have been forced to pause operations, presenting negative trickledown effects for survivors of trafficking.

Beyond direct support, the pandemic has forced the closure of childcare facilities and barred access to many of the entry-level jobs that survivors rely on. These services are imperative for survivors getting back on their feet, as are the safehouses that have begun to shut their doors due to social distancing measures and the loss of staff.

5. Interrupted financial support to anti-trafficking organizations

The non-profits and civil society groups working to provide support are suffering deeply as well. From individual donors to corporate funding, grants and donations are in steep decline, and anti-trafficking organizations are facing the impacts of reduced financial support.

In the short-term, non-profits providing direct services are the most vulnerable, and their ability to serve at-risk communities and survivors will continue to diminish. We are expecting some frontline

organizations to close and not re-open. With a shortage of beds and services, most communities will experience heightened risks.

It is not yet clear whether the decrease in funding is a short-term response to uncertain times, or if it points to a fundamental shift away from financial support to at-risk communities and survivors of trafficking. The lack of consistent, reliable funding may cause an irreparable negative spillover effect in regions where these organizations are the sole providers of these services.

These are only the first of many ways we expect the COVID-19 crisis to impact human trafficking.

Hannah works with multinational companies to align business and human rights strategies and facilitate incorporation of sustainable practices into business operations across sectors.

She focuses on the intersection of human rights and new, disruptive technology and leads the Tech Against Trafficking collaborative initiative.

Prior to joining BSR, Hannah worked with the Skoll Foundation, where she co-led the portfolio and investments team's efforts to identify social entrepreneurs with the potential to drive large-scale social change. Her work led to over US$20 million in grants and investments between 2015 and 2018. Before Skoll, Hannah spent six years working in anti-human trafficking in West Africa, Southeast Asia, and the Bay Area. She is fluent in French.

Hannah holds a Master's in NGOs and Development from the London School of Economics and a B.A. in Political Science and French from the University of Michigan.

Chairman FOSTER. Well, thank you. And my apologies again for making a mistake in the order. I will try to limit myself to a little less than the 5 minutes that I normally take here.

And maybe I'll just sort of cut to the chase of one of the things. A number of the Members here wrestle with the issue of the tradeoff of privacy in payments versus—you know, versus the need for law enforcement to actually see what's going on. And we wrestle with that in Financial Services, as well as the Science Committee.

And so I guess if all the witnesses here could comment on whether you think that eventually we're simply not going to be able to allow anonymous cryptographic payment tools that are truly anonymous or whether we're going to have to be in a situation where you can go to a trusted court system, demonstrate probable cause, and unmask the participants in a digital payment transaction. How do all of you individually, collectively, see that tradeoff, and what—the endpoint we're going to have to go to there? Yes, just pick it up. I'll pick on someone or—Ms. Rajan, I bet you've thought about this.

Ms. RAJAN. Sure. I think you bring up a great point about the use of cryptocurrency in human trafficking. Like in many criminal enterprises, human traffickers have adopted the use of cryptocurrencies to finance their operations. And cryptocurrencies are appealing for many reasons. First, the decentralized nature means there's no central authority that can shut down or freeze funds. And second, it provides a certain level of anonymity because you can create a Bitcoin address and receive tokens without needing to provide a valid name or address.

According to a company called Chainalysis, which is a tech company that analyzes blockchain data, there was nearly $1 million worth of Bitcoin and Ethereum payments in 2019 for child sexual abuse material.

This isn't unique to human trafficking. We've seen this in domestic terrorism and extremism. In fact, the House Committee on Financial Services had a hearing earlier this year about the financing of domestic terrorism and extremism, and one of the recommendations presented at the hearing was that cryptocurrency providers should ban extremist organizations with the intention of cutting off their financial supply. And one could argue that it would—you can make a similar recommendation for human trafficking.

But there is a lot of limitations to that recommendation. First, I think it would—some cryptocurrency advocates would argue that it really violates the intended value proposition of a decentralized currency, and private-sector stakeholders are very likely to push back on this regulation. Second, it merely treats the symptom, not the root cause. Bad actors will continue to find new and illicit ways to finance their operations. But, most importantly, eliminating access misses the very significant opportunity to leverage the technology's properties to solve the primary problem of dismantling human trafficking networks altogether.

As I mentioned earlier, the unique properties of blockchain technology actually allow us to fight against human trafficking. Even though cryptocurrencies are anonymous, part of what drives the consensus around the legitimacy of the currency is that the transactions are permanently stored on a very public, decentralized im-

mutable ledger, so, again, if law enforcement can uncover the Bitcoin wallet addresses, you can actually map the whole network of a human trafficking ring and ultimately dismantle a human trafficking crime network.

Chairman FOSTER. Yes, that is true, and we have to speak, I guess, carefully because we can have very interesting classified briefings on the extent to which Bitcoin is truly anonymous. But the—there are next-generation cryptographic currencies that will be much closer to truly anonymous. And so the question is will we ultimately have to ban these as an essential part of preventing things like money laundering? Just, you know, what do you think the endpoint of that discussion is? You know, if you were in charge, anyone of our witnesses here, that if you were in charge of making a decision, should we ultimately have to ban truly anonymous, you know, value transactions? Or not? It's a tough one. All right. Matthew, I'll pick on you.

Mr. DAGGETT. OK. I'll try and take a stab at that. One of the things I would like for—to keep in mind is thinking about, you know, measures and counters. So when there was pressure put on Backpage to—for the credit card providers to stop accepting credit card payments, some of that moved to Bitcoin. The same thing when Backpage was taken down, you know, the—some of that activity scattered away from one large site to many smaller different sites.

So thinking about when you apply this Darwinian pressure to any one facet of this problem, you need to be thinking about what do you think that the next—you know, the primary and secondary effects are going to be from a policy initiative or some type of, you know, enforcement action.

The other thing to keep in mind is that because of the democratization of technology and how a low barrier to entry it is to get into this crime, you know, the saying used to be the cost of a Backpage ad and a burner cell phone and you essentially have a trafficking operation. There is still tremendous money being moved around in all cash, laundered through gift cards, as well as using, you know, money remitters for some of the more international ones, so it's——

Chairman FOSTER. OK.

Mr. DAGGETT [continuing]. Important to kind of—they won't be the most sophisticated actors. There will be a range of different actors.

Chairman FOSTER. OK. Thank you. And I will now recognize Ranking Member Norman for 5 minutes.

Mr. NORMAN. Thank you, Chairman Foster.

This is for Ms. Darnton. Ms. Darnton, the exploitation of children is huge in my district. With COVID–19, schools not being in session, the FBI (Federal Bureau of Investigation) has issued a warning about the closings. What measures are we taking to protect the children from sexual exportation when many times the parents are working and are just not there?

Ms. DARNTON. Thank you so much for the question. I think we've done a fair amount of analysis on the effects and impacts on human trafficking due to COVID–19. We have seen indications of a rise in online sexual exploitation of children. As you mentioned,

the FBI has warned that the school closings have led to additional cases of exploitations. And, similarly, traffickers living with their victims, they expand to new forms of abuse, including online live-streamed exploitation of current victims.

We have not looked into all of the different ways in which this can be combated to date, so Tech Against Trafficking really focuses on how the tech industry as a whole can come and leverage its support and use of this technology, and I think that this is something that still needs to be explored. But I am unable to speak to the specifics of individual member companies who I think are tackling this on an individual level.

Mr. NORMAN. OK. And I guess, Ms. Darnton, the other issues you highlighted, the importance of safe data-sharing to take a look at the practices that are put into effect, you identify the challenges of protecting the privacy of trafficking victim data. Can you tell us how technology is being leveraged to establish the privacy-preserving data methods and instilling confidence in victims to come forward because many of these victims just will not come forward from what I'm told because of the stigma that they're branded with for life.

Ms. DARNTON. Yes, happy to expand on that. So we actually worked on data privacy-preserving mechanisms in our first Accelerator program last year with the Countertrafficking Data Cooperative out of Iowa. And one of the important areas that we see is that really the case data on individual victims of trafficking, we need to be able to share it and publish such data, but this publication and sharing poses risks to the victims represented within the data sets, so we're looking at kind of data at a larger scale. And this includes the privacy risk of individuals, as you mentioned, being identified within the data, as well as the safety risk associated with traffickers identifying victims within the data and retaliating against the victims, their friends, families, or their community.

So despite these risks, it's crucial to develop safe forms of data-sharing that allow for evidence-based policy and practice. Without access to data on the prevalence and nature of trafficking in different contexts and over time, it's difficult to make decisions about how and where to allocate resources for maximum impact. So data-sharing agreements may sometimes be possible between frontline organizations or an individual victim perhaps that capture data on the victim's trafficking and the government, law enforcement, and civil society organization that need to access and analyze such data.

However, it is typically not possible to complete such agreements at the speed and scale needed for comprehensive and current overview of the problem. There's always going to be the data gap between prospective providers and consumers of sensitive data unless we can create a scalable data-sharing solution with guaranteed privacy protection.

So through our research, one of our member's research team worked with the U.N. Migration Agency to develop a new form of data anonymization and analysis directly targeting the needs of the counter trafficking community so that the primary risk is that traffickers will identify victims in published data based on identifying

combinations of attributes like age, gender, citizenship, as well as recruitment, trafficking, and control.

The solution asserts that only common attribute combinations appear in published data sets and therefore cannot be linked to the individual or even small groups of individuals. This is achieved through combined use of synthetic data, precomputed statistics, and interactive visual inferences—interfaces rather, enabling exploratory analysis and accurate reporting without exposing any data on actual identifiable individuals.

So we've actually published a paper that shows the new mechanisms and ways to do this, and we're happy to go into further detail.

Mr. NORMAN. Well, thank you so much. I want to thank all of our witnesses today for taking time. This is a sad yet it's a real problem all over this country. I yield back.

Chairman FOSTER. Thank you. And I will now recognize Chair Stevens for 5 minutes.

Ms. STEVENS. Thank you, Chairman Foster.

Emily, how did you get involved with combating human trafficking? I'm reviewing your bio and looking at your story and particularly you're an example of technology transfer if you think about it. You were at the university level, and you basically spun out this enterprise utilizing some of the best applications and technology, just to speak bluntly about it. But how did your work lead you to this field? And what promise and opportunity do you see in utilizing these technology applications to combating human trafficking?

Ms. KENNEDY. Absolutely. Thank you for the question. So my story personally of getting into this is a very windy story. I, unlike most of the other people on the witness panel, do not have a technology background. I—as I mentioned in my testimony—encountered what I was told was human trafficking in Eastern Europe when I was 16, and it honestly just kind of burned it into my brain that this kind of thing existed.

And so I knew, you know, going into high school and then college that I wanted to focus my career on it, but I didn't know what that would be. I had kind of assumed law school. I was studying the humanities, and it was really due to the—first, the interdisciplinary nature of Carnegie Mellon that I started to—it was around the time that Backpage became the most popular website. And I was looking at sex trafficking online, and there wasn't a lot of study around it and decided I wanted to focus my senior honors thesis on how can we use online data to fight human trafficking.

And so I basically took that to my humanities advisor, who then referred me to an advisor in the Robotics Institute because he said you're going to need some technology behind this. And back then I didn't know what machine learning was. I didn't know much about AI and was kind of thrown into the deep end of how it might be able to solve some of these problems. And so at the same time I connected with local law enforcement, as well as Pittsburgh FBI at the time and started to learn the challenges that they were having on the enforcement side and trying to identify victims.

So I kind of have always been a connector between the technology people who have the tech that can solve problems and the

people on the ground who need it. And as I refer to my testimony regarding NSF, I have too often seen that gap where there is awesome technology and research, there's amazing technology being published or it's in a lab, but my question was always how do we get this on the ground, you know, making a difference. So that has really been a big mission of mine.

And I think there's a lot more opportunities to kind of speed up that process to get technology out of research and into the hands of people who can use it.

Ms. STEVENS. And, Anjana, who—could you give us—with your work at Polaris, could you give us—and thank you for that, Emily. That was very lovely and such a—we're going to thank your linguistics professor. That's really just—we'll connect more on that offline. But I wanted to get Anjana in here as well just with some concrete examples and an understanding of human trafficking in the United States so that we can best understand when we talk about data sets and the use of technology applications and how complex this is, what is the—if you know this, Anjana, what's the average age of an individual in the United States who is human trafficked? What's the profile? And what is the size of the human trafficking groups that are in the United States? And are they sometimes run by foreign operators that are infiltrating our country or are they homegrown operations? And I could ask another question, but I'm going to stop there.

Ms. RAJAN. Thanks for the question. I think the most important thing to recognize is that trafficking is not a monolith. At Polaris, we cover all forms of trafficking, including sex and labor. A few years ago we put out a report looking at the topology of the types of human trafficking, and in our research we learned that there were over 25 types of human trafficking and that they came in different forms of how force, fraud, and coercion were applied to victims, the demographic of victims themselves, and how they were recruited. And I can certainly send you that report after the hearing if you'd like to see more information.

Ms. STEVENS. Great. Well, thank you. Mr. Chair, I'm out of time, OK. I'm going to do some questions for the record because there's a lot here. This has been amazing. Thank you all. Thank you for all—the testimonies have just been fabulous. Thank you guys. I'm yielding back.

Chairman FOSTER. If Members—I'd just say if Members are interested in hanging around for a second round of questioning, we'll evaluate that toward the end of the first round of whether that's a feasible possibility.

I now recognize Ranking Member Baird for 5 minutes.

Mr. BAIRD. Thank you, Mr. Chairman.

Ms. Kennedy, in your testimony you mentioned that your company has received support from the National Science Foundation both through the participation in I-Corps and the SBIR award. Can you tell us a little bit more about how the NSF has both helped advance your Traffic Jam software, as well as support your mission of AI for social good? And can you describe how invaluable it is for NSF to continue to support work like yours in the counteracting of human trafficking? Ms. Kennedy?

Ms. KENNEDY. Absolutely. Yes, thank you for the question. So we received the SBIR phase I, phase II, and phase IIB, about $1.4 million in funding total. A little note I like to mention is that we actually did not receive it the first time we applied. It was good vetting on their part, and they gave us feedback on how to improve and we got it the second time, so it taught us not to give up.

And it was amazing to help especially the I-Corps program, to help us learn as university researchers about customer discovery, commercialization of technology because myself, along with pretty much everyone else in my cohort, had been deep in research but had no idea about how to run a business, start a business, you know, understand the market, things like that. And it's a very different mindset from the researcher mindset. So I learned so much from the other students in the program. And, like I said, it was really invaluable to our success, not just the funding but also the training that came along with it.

So we were funded for the first couple awards to focus on de-obfuscation of sex trafficking on the public web, so basically finding patterns in the structured data where the criminals were trying to remain anonymous and kind of pulling out those patterns.

And then for phase II we're now expanding into the human services space, and so this involves mining unstructured data for insights from thousands of pages of social worker case notes to help them measure trends and progress, provide proactive insights, and generally, you know, in the context of this conversation, help them intervene and prevent children from falling into exploitation in the first place.

So we are really, really happy and honored to be involved with the NSF SBIR program. It's been game-changing for our company, and I think it allowed us that opportunity to learn how to commercialize research and also do the kind of high-risk, high-reward research and development that was needed in order to put out these tools. It's very difficult, particularly for socially impact-focused companies to have that research funding that they need to get off the ground because often that's needed before you can actually produce a product. So the SBIR program was very, very helpful for us, and we're honored to be involved.

Mr. BAIRD. Thank you very much. Well said. Mr. Chairman, I can't see the clock. How much time do I have left?

Chairman FOSTER. One minute and a half.

Mr. BAIRD. A minute and a half. So here's my question for the other three witnesses, and we've got a minute and a half, so that's 90 seconds, right? OK. Many times the things that we're responsible for in these two Committees involves basic research. Sometimes it's the areas that industry can't justify getting involved in but we can put some dollars there to do some of this basic research.

So my question to the other three members is what areas of basic research do you think would provide the most impact on expanding the use of emerging technologies to counter human trafficking? So I used about 20 seconds of that I'm assuming, so we've got about a minute left for the three of you.

Ms. DARNTON. I'd like to take a first response. I'll keep it brief. But something that Matthew mentioned earlier was measuring the impact of the use of these technology tools. And I think that there's

a lot of research needed. So often, the tools themselves, the deployment of technology is seen as the solution, but really it's contributing to part of the solution. It's not a solution in of itself. We still have to track what's happening, how it's supporting the field, and what additional support is needed, and I think that there could be a lot of research around that impact of technology.

Mr. BAIRD. Dr. Daggett?

Mr. DAGGETT. Well, I would agree with that. I do think, you know, grappling with the scope of the scale of the problem and understanding, you know, how we are actually making inroads against it is critical, and that's something that does happen at the basic level. And I also think there's a fair amount that is also needed to come at the next phase of research and more at the advanced level for some of the other science and technology directorates.

Mr. BAIRD. So, Mr. Chairman, have I got time for Ms. Darnton?

Chairman FOSTER. Yes, we'll—yes, briefly, very briefly.

Mr. BAIRD. Ms. Darnton?

Ms. DARNTON. Oh, sorry, I was the first one.

Chairman FOSTER. Yes.

Mr. BAIRD. Oh, Rajan, I'm sorry.

Ms. RAJAN. Sure, no problem. Yes, I think if we're going to think about funding and technology and development for this phase, I think there are four key principles we should keep in mind. I think, first, we need to ensure that the technologies are serving the overarching goal of ending trafficking. I think we most importantly need to center the needs and experiences of victims and survivors. We need to enable the correlated scaling up technologies that are evidenced-based. And then, finally, any support for new technology should be in addition to continued funding for key services to prevent trafficking and support victims and survivors.

Mr. BAIRD. I thank all of you very much, and I yield back.

Chairman FOSTER. Thank you. And we'll now recognize Representative Lipinski for 5 minutes.

Mr. LIPINSKI. Thank you, Mr. Chairman. And before I start on my questions, I just want to say, Ms. Kennedy, for the last eight and half years, as the Members of this Committee know, I've spent a lot of time talking about I-Corps and the importance of I-Corps, and you just did an excellent job there, your testimony about the benefits of I-Corps, and I'm very glad that it has been helpful to you and to your company.

I want to thank the Chairmen, Chairman Foster and also Chairwoman Stevens, for holding this hearing today. I think this is an issue that most people have no idea what a huge problem this is. They may hear about it, but they probably don't understand the scope of it.

And I was really struck—I remember I was listening to the radio a couple years ago, and I heard a statement, and I looked—I'm not sure if it came from Andrew Forrest, but I know that Andrew Forrest, who is the founder of the Walk Free Foundation, has stated, "We now have the largest number of slaves on earth that we've ever had in human history." And that really struck me, that this is going on, and there's so little that most people know about it.

So I thank all of you for the work that you are doing.

There's a lot of recommendations that we have heard from all of you, and I sit here and I wonder, you know, maybe this really should be an answer that—a question for us on the Members of the Committee, but I want to look to our witnesses, you know, why have we not done more about this problem from your perspective? You come to us with what we can do better, what the government can do better. Do you have a sense of why more has not been done? You know, specifically, this is about technology but on technology and other things that we can do to help combat human trafficking. So let's start with Ms. Rajan. I just—any ideas that you have.

Ms. RAJAN. I think, again, the most salient point here is that human trafficking is a systems problem and requires us to understand the data. I think a fact that's not well-known is that victims of human trafficking are the most likely party to be criminalized when prosecuting these cases. I think we need to really zoom out and think about what is a more systems-driven approach to solving these problems.

When we think about the criminal justice side of it, I think many law enforcement entities don't regularly pursue financial investigations on human trafficking cases and thus fail to penalize the most profitable traffickers. So I think one way we can really shift—restore balance—the balance of power back to survivors is looking to seek support, enable and pursue human trafficking-related prosecutions that disrupt the profitable, large, organized sex and labor trafficking enterprises because, one, I think the main thing here is that the financial crimes approach human trafficking can actually just put the pressure off of victims because they are not relied on to cooperate in these cases, which can be very traumatizing. And so I think there's—again, looking at one of the ways that we think about all of the things that not just result in trafficking but what are the conditions that actually drive survivors and victims into positions of being exploited in the first place?

Mr. LIPINSKI. Thank you. Mr. Daggett?

Mr. DAGGETT. Well, first, I'd like to agree with all that was just said. I think that it's, you know, right to the point.

That said, I do agree that we need a coordinated Federal strategy to really go after those high-impact quick wins first and then start to do the longer-term foundational funding and things that are going to take many years of effort year-to-year to get real solutions to.

I think, you know, in those regards it's just a—it's critical that we have both to go with the strategy, the increased level of funding and prioritization that shows when we take on initiatives across the different, you know, science and S&T organizations, where those pieces of the puzzle fit in the overall broader strategy. So I totally agree it is a systems problem. We have to think about it systematically and analyze it systematically.

Mr. LIPINSKI. Ms. Kennedy?

Ms. KENNEDY. To add to what's already been said, I think there's also just generally a public kind of lack of understanding around AI. And, again, I'm saying this as a generally non-technical person who can communicate about these things, either thinking that AI is too advanced or not advanced enough, maybe more advanced

than it really is, so I think just general understanding and education around what's really possible would be help.

And then to add to what Anjana said, I agree about going after the largest financially benefiting groups in this, and that's what our recent deployment in Traffic Jam earlier this year through a graph data base helps do. It actually pulls out largest groups in the data. And we're currently looking for Federal partners who want to pick up those investigations and prosecute them. And, you know, the technology also does help take the pressure off of victims like Anjana said, which is really important because we don't want the burden—full burden of proof of a case to be on the victim. And this is where the online evidence can really help.

Mr. LIPINSKI. Thanks. And, Ms. Darnton?

Ms. DARNTON. Yes. First, I'd just say I agree with all of the other panelists, and I'd say there seems to be thus far a need for enhanced collaboration. Right now, we're seeing a lot of highly distributed funding and lack of coordination. And I think to solve this problem we really need to bring in academia, consumers, companies, law enforcement, government, and create a space where everyone can work together rather than in a siloed approach.

There's no silver bullet to human trafficking, and so we need to increase the support for the infrastructure that will allow for technologies, especially innovative technologies, to be successful. And a lot of that groundwork needs to be built before they can actually be further used and developed.

I'd also say that simultaneously we need to address the key drivers of vulnerability, so a lack of economic opportunity, a lack of access to education can often drive people into situations of exploitation, and we need to think through how we can solve those while simultaneously looking at creative and new ways to deploy tech.

Mr. LIPINSKI. Thank you very much. Thank you, Mr. Chairman. I yield back.

Chairman FOSTER. Thank you. And Ranking Member Lucas will now be recognized for 5 minutes.

Mr. LUCAS. Thank you, Mr. Chairman. And I would say that not only the oral testimony today but the written testimony submitted by all of our panelists is very compelling.

And I'd like to focus for a moment, Ms. Rajan, on your written testimony. You make it very clear that trafficking is an inherently commercial enterprise, that financial intervention in human trafficking has the potential to increase the risk for traffickers, reduce the profit, and reduce the vulnerability to trafficking within particular communities.

Then you describe how Polaris has partnered with PayPal to create the first financial intelligence unit housed within an antitrafficking organization. I'd like to get your thoughts on how that partnership has worked between Polaris and PayPal. Is it working as you envisioned? And, if so, is it an effort that could be scaled to more broadly impact the financial side of illicit trafficking?

Ms. RAJAN. Thank you so much for your question. The work we're doing at PayPal is very cutting-edge because we're the first antitrafficking organization to house a financial intelligence unit in-house. And this work is actually quite nascent. And because I

lead our technology group, I'd love to connect you with our Director who actually runs that program.

But I think you're touching upon a broader question, just how can we scale these technologies in the fight against human trafficking? And I think one of the key problems that we're seeing is there are organizations that have deep subject matter expertise on human trafficking, and then there are tech companies with deep knowledge expertise on how the technologies work. And there are very few that are able to do both. And Polaris is unique in the sense that we do have our team that does understand deeply how human trafficking works. We have technologists and engineers and data scientists who understand the technology and, most importantly, we have survivors at our organization who understand what survivors and victims actually need. But that requires funding, and that requires investment to be able to bring these two disciplines together.

And I think it's really important and I just wanted to agree with what my fellow panelists have been saying, that what we've been seeing in this movement is just really an understanding of the problem, and now we need to continue to fund the creation of solutions, which requires support from the public and private sector.

Mr. LUCAS. Absolutely. Ms. Kennedy, in your written testimony you stated more research and development funds are needed to identify and combat illicit funding channels that sustain organized crime groups. Where could this funding come from, and what types of research and development should we be looking into? And is there space for technology to be developed to help detect and disrupt? That's a very open-ended question——

Ms. KENNEDY. Absolutely.

Mr. LUCAS [continuing]. But your insights are broad.

Ms. KENNEDY. Sure. Thank you for the question. So I can tell you a little bit about the types of cyber fraud that we're seeing, which I think is just one slice of what some of the other panelists are probably also seeing. So when we're looking at these online classified ads, we're seeing a recent increase in fraudulent postings, so this is, for example, where someone might copy and paste the same ad selling commercial sex across—and it's posted across every single city in the country, and it's posted at the same exact time on the same exact day. Now, that's likely not a real group that's offering, you know, typical services, and it may not even be a trafficking group that actually has a group of victims that they are exploiting. This is an example, we believe, of automated phishing and cyber fraud. So the idea is that potential buyers might contact that ad, give their payment information, and then someone on the other end will take the money and provide no services.

And the thing about this and why we think it matters is that it's automatable, and therefore, it's scalable. So these groups can actually take in a large amount of financial proceed at a large scale and, like I said, post it all across the country. And so we currently have the ability to pretty much tell the difference between quote/unquote real human activity and this kind of automated cyber fraud activity.

And as far as next steps, we're currently looking into Federal partners, probably State prosecutors perhaps, who want to turn

these leads into full-scale investigations because obviously that's not what we do.

And then I think as far as what research is needed, I think there's just more research needed to understand the problem so that we can prevent it because obviously right now we're talking about a reactive response. So I think there's more research to be done around the prevention side.

Mr. LUCAS. Absolutely. Thank you very much. And Mr. Chairman, my time is expired, and I yield back nothing.

Chairman FOSTER. Thank you. Representative McAdams, you're recognized for 5 minutes.

Mr. MCADAMS. Well, thank you, Mr. Chair, and I appreciate our Committee's attention to this really pressing issue of human trafficking, particularly the horrible new ways that perpetrators have found to target and to exploit children online.

I'm sure that most of the panelists here are familiar with The New York Times series that began reporting last year on the surge in online child sex abuse and materials, the first time that many in the general public I think became aware of the scope of this issue. And The Times reported that in 2018 there were a record 45 million reports of online child sex abuse materials to the National Center for Missing and Exploited Children. NCMEC reported that in 2019 reports to the cyber tip line surged to 69.1 million. The FBI reported also earlier this year that COVID–19 school closures and stay-at-home orders increased risk factors for child exploitation, kids spending more time on devices, kids not spending time with mandatory reporting adults like teachers or school nurses, and kids seeking connection and validation on social media. And, you know, parents can and should do what they're able to do to instill safe online practices in their kids, but that's not foolproof against sophisticated exploiters who are out there.

And with this increasing screen time, I as a lawmaker but also as a father of four young children, I want to be sure that we do everything to understand the issues that are facing our kids and empower law enforcement with technology and the data that they need to stop abuse.

So my question I guess first for Ms. Kennedy, traffickers and abusers use social media to identify, to recruit, and groom victims for exploitation, particularly young children. How are companies and artificial intelligence technologies such as Marinus Analytics and Traffic Jam disrupting this practice on social media? And also I guess related, what challenges do technologies, companies, and law enforcement face with the broader use of end-to-end encryption in messaging apps and others?

Ms. KENNEDY. Sure. Thank you for the question. So just to clarify, my company, we're not so much experts in child sexual abuse material or child porn, but I think that—and probably Ms. Rajan could speak to this more—that the increased use of encryption is challenging because we're seeing recently much of this—and not just the child sexual abuse material but also on our end of expertise, the sex trafficking material move onto the deep and dark web, so deep of course being behind pay walls or logins, and then the dark web being the dark web.

And so I think this is a challenge because if we can't see where this, you know, either abuse or recruiting is happening, how can we actually combat it or prevent it? So I think there's a lot more research needed in those areas, and I'll probably defer to the other panelists as well to answer your question.

Mr. MCADAMS. Yes, maybe, Ms. Rajan, do you want to add anything there?

Ms. RAJAN. Sure, thank you, Congressman, for the question.

As I mentioned, we cover all forms of sex—of trafficking, including sex and labor, and I do want to acknowledge some of our partners in the field at the National Center for Missing and Exploited Children who work specifically on this issue but also a company called Thorn that really focuses on how technology can be applied here. And I think they'd be fantastic partners to reach out to about this specific issue.

I want to take a moment and address the question around social media because at Polaris we do have a lot of data on how social media is both used to exploit victims and survivors but also how it could help. Over—in 2019 we saw that 847 likely victims of trafficking reported to the trafficking hotline that they were actually recruited into the sex or labor trafficking situation using online platforms, just dating sites, social media, and online chat rooms. And once they were in the trafficking situation, social media is actually used as a means of control. In fact, in one study that we conducted with survivors, Polaris found that 34 percent of respondents indicated that their traffickers restricted their social media use.

But having said all that, I think social media can also play a really important role in providing support and access to services. In that same survey, 19 percent of survivors stated that social media played a role in their exit, so certain features of social media can be particularly critical for survivors such as disappearing messages, location discovery, and as well as selecting subgroups and follower groups. I think social media companies can actually do a lot to help in the fight against human trafficking in terms of promoting resources like the human trafficking hotline. And I think Congress can play a huge role in incentivizing social media companies to take action, including through oversight.

Mr. MCADAMS. Thank you. In just my closing seconds I want to also mention legislation that I'm working on with Congressman Anthony Gonzalez, who I see on this call right now, to look at financial patterns and movement of money and how we might be able to identify patterns in illicit trafficking activities through examination of financial networks as well. So thank you, and I yield back.

Chairman FOSTER. Thank you. And the Chair will now recognize Representative Balderson for 5 minutes.

Mr. BALDERSON. Thank you, Chairman Foster and Chairman Stevens, for holding this hearing.

And my first question is for the whole panel. Anybody can jump in. Ohio has ranked as high as fifth across all States in human trafficking cases. This is an issue that we deal with every day in Ohio, and I'm committed to working with my colleagues to eradicate this despicable criminal behavior and help victims regain their freedom.

We already know that many victims are trafficked through our Nation's airports. As a Member of the T&I (Transportation and Infrastructure) Subcommittee on Aviation and the Science Subcommittee on Research and Technology, I want to know more about this problematic intersection between trafficking in persons and air travel. What more can we do to help catch traffickers misusing our Nation's air transportation system to move victims? And anyone may jump in that can answer that question on the panel.

Ms. DARNTON. I'm happy to start. This is Hannah Darnton. I think that one of the key things that we've seen through groups such as The Code and others is training for individuals working within—throughout the transportation industry, so being able to identify cases of human trafficking, of child exploitation is key to being able to flag them for further support and use of that data.

So I think looking at how we could provide overarching training within these industries would be key, and ensuring that it's specific to the types of transportation so that the employees that may be seeing these instances would be able to actually address them and call the relevant authorities.

Mr. BALDERSON. Thank you, Hannah. Would anybody else like to add anything?

Ms. RAJAN. I think you're hitting on a really important point, which is how do we educate corporate partners on what to look for and the warning signs. I want to acknowledge one of my colleagues at Polaris who spends time actually doing corporate trainings on human trafficking 101. And this, again, is something that really is important to explain to folks how human trafficking looks like, what it doesn't look like, and what are ways that they can contribute to solving this problem with us.

Mr. BALDERSON. Thank you. My follow-up question would be with law enforcement so close and onsite, are there any technologies your groups are working on that could be used to identify victims of human trafficking and help them while they are being transported via air? OK. Go ahead.

Mr. DAGGETT. I'll take a go at that. You know, there's—when you have travelers, you know, coming through the air system, there are, you know, key details that we know about individuals. There's probably, you know, information that could be correlated to learn a little bit more about those individuals. You know, we know there are strong indicators of people being associated with, say, like the foster care system and other types of things. So there probably could be some red flags that are done as, you know, a part of that type of investigation.

I think in general one of the challenges is is there's a gap between, you know, a lot of the tools that exist in technology that works on the open internet, and then once you get inside a government or a law enforcement or an investigative context when there's, you know, dramatically different data streams and data bases that don't talk to one another, and we've talked a little bit about information-sharing, but with our inability to correlate between those, we miss connecting some of the dots.

Mr. BALDERSON. OK. Thank you very much. Mr. Chairman, I can't see my time, but I will yield back my remaining time. Thank you.

Chairman FOSTER. You have one and half minutes if you're interested.

Mr. BALDERSON. Well, I do have one more question dealing with flight attendants. For anybody, again, is there any training out there for flight attendants and other airline personnel who might have, you know, more prolonged interaction with potential victims?

Ms. RAJAN. I'll comment on this. I think, again, one of the main points we believe at Polaris is that survivors and victims know what's best for them. And I think one of the most important things that folks can do is guide them to the National Human Trafficking Hotline where they can actually speak to hotline advocates who can help them navigate what the best option for them is and recognizing that there is not just one path to justice or to freedom and that we really need to think about this in a survivor-centered and victim-centered way.

Mr. BALDERSON. Thank you very much for your response. Madam—excuse me, Mr. Chairman, I yield back my remaining time. Thank you.

Chairman FOSTER. Thank you. And we'll now recognize Representative Gonzalez for 5 minutes.

Mr. GONZALEZ. Thank you, Mr. Chairman. And thank you, everybody, for your participation in this incredibly important hearing. This has actually been one of the few things that well, on this Committee it's not unusual for bipartisan work, but this is one area where I think we have done a good job. Obviously, there's much more to do, and I look forward to continuing to work with my colleagues on this issue.

Ms. Rajan, I want to start with you. You talked about how encryption can protect survivors. And I think that maybe runs counterintuitive to my own instincts, but I thought it was compelling. And in particular you talked about it in the crypto-space and how law enforcement can sort of map out an entire ring of traffickers. My question is in the traditional crypto-space, so the Bitcoin world, can we identify the traffickers? I know we can map it, but can we actually go in and say, OK, here's who's doing this and then law enforcement can go in and physically intercede?

Ms. RAJAN. Thank you, Congressman, for the question. You're absolutely right. This has been a puzzling debate for me because I think the argument has been posed as an either/or on how cryptography can actually help or harm survivors.

To go into the Bitcoin example, I think the—again, the important piece to recognize is because it's a currency that requires a way to legitimize it, these transactions are public. And while your wallet ID may be private, as some—in some situations I need to share that with you so that you can transfer me money. And because human trafficking is ultimately driven by profit, it is in the incentive of a trafficker to share that wallet ID.

And so, again, I want to acknowledge folks at the company Chainalysis that really are experts on this particular problem on how can you actually create an open data set and using this open source intelligence to really map out a suspect or a high-profile predator or illicit business that has been using cryptocurrency to facilitate these transactions. And I really—I can send you some of

the work that they've done that really actually shows how they've actually dismantled crime networks using this technology.

Mr. GONZALEZ. Yes, that would be really interesting. I would love it if you could submit that.

And then I guess a follow-up, would it be easier, harder, or indifferent to the law enforcement element of this if the cryptocurrency were a central bank cryptocurrency? So, you know, if the Fed got into this verses Bitcoin, or is it indifferent in your eyes?

Ms. RAJAN. I think that is a great example around our financial intelligence unit work at Polaris and one of the examples that I've written in my testimony around homomorphic encryption which, again, poses a separate question, which is how do we protect the privacy of banks and their customers and just citizens in general? And so I think regardless of whether it's centralized or not, these financial transactions are really important pieces of the criminal aspect of it because that is where essentially the evidence lies. It's in the transaction itself. And so I think really focusing on those pieces and trying to hold the perpetrators who are profiting off of this, rather than focusing on how we can criminalize the survivor and victim, is paramount for us in this fight. And I think it's really critical to understand how anti-money laundering systems work and the technologies that can do this in a really safe and private way.

Mr. GONZALEZ. Great. And then shifting to Mr. Daggett, so you describe how, you know, the "data are currently time-and human-intensive to analyze with limited purpose-built technology to assist, leading to missed connections and lost opportunities for interdiction and justice." I just read that from your written testimony. With respect to the existing tech suite that's available, what is the most extensive value add? Is it it cuts down the amount of time, or is it it connects dots that currently are being looked at in a manual way? Just sort of run me through how specifically the purpose-built technology that can assist here.

Mr. DAGGETT. Sure. You know, one great example is, you know, picking up on your last question about, you know, cryptocurrency and whether it should be, you know, centralized, you know, the lifeblood of an investigation and a prosecution is the ability to compel records—business records. The challenge there is that those records from all the different, you know, businesses and agencies come back in a multitude of different formats, and some of these can be scanned documents that are not searchable. Other ones can be large voluminous amounts of financial or telecommunication transactions, and so you have a lack of tooling to be able to read that data and analyze it. You also have a lack of training on individuals who are dealing with that, and then a lack of knowledge management in terms of figuring out what does an organization know and how do they connect those dots and how do they put them together?

I think it's one of the reasons you see that, particularly on State and Federal investigations, these investigations take multiple years to complete because it is so labor-intensive to work with the data because of its heterogeneity and [inaudible]. So there's a lot of capabilities that have been built in other sectors that could be tailored to some of these specific data and these specific connections

that would really make a difference for investigators and prosecutors.

Mr. GONZALEZ. Great. Thank you for that. Mr. Chairman, great hearing. Thank you for convening this. And I yield back.

Chairman FOSTER. Thank you. And, Representative Weber will be recognized for 5 minutes.

Mr. WEBER. Thank you, Mr. Chairman. Great hearing, I agree, and I'm going to start with, is it Anjana Rajan?

Ms. RAJAN. It's pronounced Anjana Rajan.

Mr. WEBER. OK. Thank you for that. When I was in the Texas legislature back in 2009 to 2012 I guess that's before I got demoted to Congress. We had House Bill 4009, which did a lot to help recognize human trafficking and to teach and train our law enforcement agencies exactly what to look for that all of these victims, especially the young girls weren't necessarily guilty of wanting to be, you know, prostitutes if you will.

So we realize Texas, you probably know this working with Polaris, has 25 percent of the Nation's human trafficking in the country. We're very focused on that, a lot that needs to be done. What Ranking Member Lucas said is incredibly correct. Your testimony is very compelling. You make a lot of good points in it. I've got probably 20 minutes worth of questions, Bill, so excuse me for that.

But one of the questions I have, and I've used that number 888–373–7888 I can't tell you how many times. It's easy to remember, a good number. You talked about the national traffic hotline. Are you able to track the data on where they got that number? That's a specific question for you first.

Ms. RAJAN. It sounds like you're asking do we know how people are referred to the hotline.

Mr. WEBER. Correct.

Ms. RAJAN. Yes, I think part of what we want to make sure is that we build technologies that are ubiquitous and easy to access. You know, I think part of what is really important when designing technologies for survivors is oftentimes—and I'm guilty of this myself as an engineer—overengineering rather than really thinking about what survivors want. I think it's really important to always start with user-centered design and really ask yourself what—where are survivors or users accessing this information, and where can they get it?

I would love to refer you to our Director of the National Human Trafficking Hotline who can give you a lot more detail on the types of data we capture on the hotline particularly, but I think you're bringing up a great point, which is how do we make sure that the tools and services we create actually get used by the people in need.

Mr. WEBER. Well, that's exactly correct. In your testimony you make the statement that it is common for survivors to choose to connect with a service provider for wraparound before deciding if they're going to go to law enforcement, which we understand that because one of our things on House Bill 4009 was to train and put together a coalition of NGOs, nongovernment organizations, providers if you will, and law enforcement for training that said just because you pick up a young girl or young boy, too, doesn't always

mean they're willfully there. In fact, we train them how to look for things.

You said in your testimony that the national began operating in 2007. 9,943 situations of trafficking have been shared with a hotline directly. How recent is that data? You don't say how recent it is. 9,943, you say it began in 2007, but how recent is that number?

Ms. RAJAN. So that statistic that I referenced in my testimony is a cumulative look at the data that we have since we've operated the National Human Trafficking Hotline. And I think the fact that you're—sorry, go ahead.

Mr. WEBER. OK. Well, thank you for that. And I'm getting a little short on my time. You also talk about cryptographic reporting, and then you go through four systems, threshold based, zero trust, human legal, firewall, multiple calibrated options. And under the human legal firewall you make the statement the record is unlocked by a person who can establish privilege and block this information. Who decides who that person is?

Ms. RAJAN. That's a great question. So in my testimony I reference a type of system that can help vulnerable communities. And while the system doesn't exist yet for human trafficking, I have seen—I have built systems in my past work for victims of sexual assault. I think the main point that we wanted to address was when a person is coming forward with vulnerable information about their sexual assault or their exploitation, there are many risks. The threat model is incredibly complex. And when you can create the technical systems that understand the broader system of why survivors need to get—access information before they come forward, you can really think through what that looks like.

Now, this obviously has to be applied very carefully in each situation, whether it's in the sexual assault space or combating domestic terrorism or looking at human trafficking, but, again, this was a hypothetical suggestion of how this might be applied similarly in human trafficking.

Mr. WEBER. Well, thank you for that. And quickly, Bill, before I yield back, that's a good point because we don't want to give any ammunition to those who say this is a violation of privacy. We want to be as safe and succinct as we can to protect [inaudible]. And, Mr. Chairman, thank you, and I yield back.

Chairman FOSTER. Thank you. And, Representative Beyer will now be recognized for 5 minutes.

Mr. BEYER. Mr. Chairman, thank you very much.

You know, one of the areas of acute interest to me is ethical AI and facial recognition technology. So earlier this year, I introduced the *Stop Biometric Surveillance by Law Enforcement Act*, which would prohibit Federal agencies from using police body cams with biometric data collection capabilities, including facial recognition. It would prevent States and localities from purchasing body cams with these capabilities using Federal dollars.

This bill introduction came after Amazon and other tech companies created temporary moratoria on police use of their facial recognition software because there are so many false positives. And this is giving the Congress time to regulate where needed.

But the moratorium had two exceptions, one of which was Marinus Analytics to use the service to help rescue human traf-

ficking victims. So, Ms. Kennedy, in your testimony you talked about developing AI for social impact. Have you incorporated ethical considerations of facial recognition technology into your platform also?

Ms. KENNEDY. Sure. Great question. So, you know, I think there's important—it's important that we think really carefully about not just facial recognition but all different types of AI and how they're used by our society, right? And we've talked about false dichotomies recently, and I think there's a similar one with facial recognition where when we talk about it in the public space, I feel like it's kind of—there's two extremes that are usually talked about. One is a total ban of all those technologies, and the other extreme is total unregulated use.

And I think that there is a really important middle ground for their use, particularly in intervention against—in violent crimes against women and children, which we're talking about today. But I think it's important that our lawmakers do put important legislative guardrails around the use so that we're not on either of those two extremes.

And obviously this is an ongoing conversation, but I think it's really important, you know, whether it's barriers to use or scripts, trainings, and punishment for misuse of technology or maybe a mix of both, but I think those are some of the things that we should consider.

Mr. BEYER. Great. And thank you for helping us point out the need for balance between a total banning and complete un-regulation. And we've been in the unregulated, so we're moving back in the right direction I think. And obviously, it's different from—to protect the victims than it is for picking up people in an airport.

Ms. KENNEDY. Absolutely.

Mr. BEYER. Yes. So, Ms. Rajan, first of all, I'm very impressed that you're a triathlete and you have your jersey on the wall behind you. But you talked about the unique properties of blockchain technologies and this whole notion that if you can know the wallet addresses, you can build the data set, you can literally decompose or deconstruct the entire criminal network. What does Congress need to do to make that happen?

Ms. RAJAN. Thank you, Congressman. I think they need to understand how the technology works. I think it's one of these examples of tech policy being a really important part of how we think about other policy issues. And so I think when we look at some of the debate that's happening on how we should regulate or not regulate cryptocurrency, again, I keep coming back to this false dichotomy, which is we are missing the power of how we can actually serve this mission when we understand how these technologies are used.

And so my—I think that what's really fantastic about hearings like this and Committees like yours is that we're taking the time to help legislators understand the real detail and implication of these technologies and how they can be best used.

Mr. BEYER. And, you know, if not now, if you can tell people like Chairman Foster and me what legislation we should write or what appropriations amendment we should do to help move that forward, that would be really exciting. I've been to Davos many times

in the last couple of years. Every time, every storefront along the main street of Davos is about blockchain, and so finding ways to use that in a constructive way would be terrific.

And then are you at all concerned about the current discussion on amending Section 230 of the *Communications Decency Act* and what risk that would pose to encryption mechanisms? Would that help or hurt the fight against human trafficking?

Ms. RAJAN. We could probably chat about this for hours, and I'd be happy to chat with you offline and kind of give you a more thoughtful answer on how we can think about this and other pieces of legislation.

Mr. BEYER. OK. Thanks. Well, we'll seek for that offline opportunity to talk about it because it is complicated, but it's important. And with that, Mr. Chairman, I yield back.

Chairman FOSTER. Well, thank you. And before we bring the hearing to a close, I wanted to thank our witnesses for testifying before the Committee today. I'm just checking to make sure I'm not in fact muted.

The record will remain open for 2 weeks for additional statements from the Members and for any additional questions the Committee may ask of the witnesses.

The witnesses are now excused, and the hearing is now adjourned.

[Whereupon, at 11:53 a.m., the Subcommittees were adjourned.]

Appendix I

Answers to Post-Hearing Questions

ANSWERS TO POST-HEARING QUESTIONS

Responses by Ms. Anjana Rajan

Polaris

Freedom happens now.

September 1, 2020

From: Ms. Anjana Rajan, Chief Technology Officer, Polaris

To: U.S. House of Representatives, Committee on Science Space, and Technology
Subcommittee on Investigations and Oversight
Subcommittee on Research and Technology

In response to the Question for the Record submitted by Congressman Michael Waltz:

> 1. Miami, Florida hosted the Super Bowl earlier this year. What technologies has Polaris identified as successful at preventing and identifying trafficking at global events like the Super Bowl and the Olympics? The reason for the question is the Daytona 500 is held in my district (FL-06). Additionally, FL-06 is connected to Orlando by Interstate 4, where large events are held frequently. Volusia County recently acquired a canine to detect electronic devices like hard drives and cell phones that traffickers use. Our local Law Enforcement is highly engaged in preventing trafficking but new technologies are always welcomed.

Response:
This is an important question and a complex topic that necessitates a number of considerations as cities devise strategies to address it. First, it is important to note that there is no data to suggest a significant increase in sex trafficking on the night of big events like the Super Bowl. The U.S. National Human Trafficking Hotline has not experienced a measurable increase in phone calls during Super Bowl weekend over what is already received on a daily basis. Had we recorded an uptick in calls during or around the game, it would be impossible to know whether there was actually more trafficking happening or - and we believe this is more likely - that there is simply more awareness and therefore more attention being paid. What the Trafficking Hotline data does show, however, is that sex and labor trafficking is a problem in every state, every day of the year.

That said, we know that sporting and other events where large groups of people descend on a specific region are a magnet for business of all kinds. Traffickers are savvy and go where the demand is. Again, to clarify, this is not to say that there is more sex trafficking happening in the United States because of these events; only that it may be that sex traffickers send or bring people under their control to such events because they believe there will be more opportunities to make money as there may be more buyers concentrated in one place than usual - including buyers who have not or would not buy sex in their own communities.

Unfortunately, the focus on these events as sex trafficking hotspots rarely targets buyers. Instead, it often results in practices and policies that target the wrong people - the victims. Law enforcement should never arrest people directly selling sex. Law enforcement sweeps during large events often lead to arrests of women and girls who are in prostitution, which further marginalizes and stigmatizes an already vulnerable populations and can result in a criminal record. Criminal records will deeply affect their ability to be

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hired, find stable housing, access credit, and rebuild their lives if they break free of their traffickers or leave prostitution.

Instead, communities can use the opportunity of large events to get service providers, law enforcement, and other stakeholders on the same page about anti-trafficking efforts and work together to build a collaborative model that will last well beyond the event itself, supporting victims and survivors year-round.

Strategies to combat labor trafficking must also be incorporated into this conversation. Cities should ensure that their procurement contracts have penalties and controls in place around labor trafficking. This is especially important ahead of a major event in industries like food service, landscaping, street beautification, and others that will be part of the efforts to prepare for the event.

Appendix II

Additional Material for the Record

STATEMENT SUBMITTED BY KAYSE LEE MAASS, PH.D.

NORTHEASTERN UNIVERSITY
Operations Research and Social Justice Laboratory

August 11, 2020

TO: The United States House of Representatives Committee on Science, Space, and Technology Subcommittee on Investigations & Oversight and Subcommittee on Research & Technology

FROM: Kayse Lee Maass, PhD, Assistant Professor of Industrial Engineering & Director of the Operations Research and Social Justice Laboratory, Northeastern University

SUBJECT: Summary Statement for the Congressional Hearing on *The Role of Technology in Countering Trafficking in Persons*

INTRODUCTION

Chairwoman Stevens, Chairman Foster, Ranking Members Baird and Norman, and members of the Subcommittees, thank you for the opportunity to submit this written statement regarding the role of technology in countering trafficking in persons and the opportunities for the field of Operations Research to facilitate that endeavor. My name is Kayse Lee Maass, and I am an Assistant Professor of Industrial Engineering and the Director of the Operations Research and Social Justice Lab at Northeastern University.

Defined as the recruitment, transportation, transfer, harboring or receipt of persons through force, fraud, coercion, or other objectionable means for the purpose of exploitation[1], human trafficking is increasingly recognized as a prevalent and malicious human rights problem worldwide, including in the United States. While numerous figures on the prevalence of trafficking have been suggested, such estimates vary widely; precise and accurate estimates are difficult to obtain due to the illicit nature of the crime, lack of a standard method of reporting trafficking cases, inconsistent definitions and interpretations (e.g., what constitutes "coercion"), lack of recognition by authorities, and the tendency of survivors to underreport. However, estimates agree that tens of millions of people worldwide are victims of human trafficking, exploited through forced labor, commercial sexual exploitation, and servitude, made vulnerable to these forms of exploitation by environments of poverty, conflict, natural disaster, unemployment, and desperation.

OPERATIONS RESEARCH AND HUMAN TRAFFICKING

Human trafficking is a complex, layered system that is interconnected with many additional complex systems, including systems of poverty, racism, criminal justice, homelessness, immigration, child welfare, and supply chains for the goods and services we use every day. Technology and solutions to address human trafficking must be cognizant of ways in which a disruption to one component of the human trafficking network may result in unintended negative consequences to human trafficking networks, operations, and survivors in other areas.

ACKNOWLEDGEMENT: This material is based in part upon work supported by the National Science Foundation under Grant No. CMMI-1838315, Grant No. CMMI-1935618, Grant No. CMMI-1935602, and Grant No. CMMI-1841893. Any opinions, findings, conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

[1] United Nations Office on Drugs and Crime. Protocol to Prevent, Suppress and Punish Trafficking in Persons Especially Women and Children, supplementing the United Nations Convention against Transnational Organized Crime. 2000.

Operations Research is a field focused on the application of mathematical methods to analyze problems involving complex systems for the purposes of better decision making. Operations Research is both facilitated by technology and used to advance technology. As such, Operations Research methodologies are uniquely positioned to disrupt human trafficking by their ability to represent complex systems, efficiently evaluate a plethora of decision alternatives, and provide quantitative, actionable insights into the resulting effects of interventions.

The *Operations Research and Social Justice Lab* at Northeastern University is an interdisciplinary research laboratory advancing social justice through Operations Research methodology with a particular focus on disrupting human trafficking through a systems perspective. Our research focuses on computational and technology facilitated methodologies that allow us to determine how to most effectively allocate limited resources to disrupt human trafficking networks, increase access to services for human trafficking survivors, and assess the efficacy of coordination among anti-human trafficking stakeholders.

Three examples of how Operations Research technologies are currently being used to combat human trafficking include the following:

Coordinating Efforts to Combat Human Trafficking

Many organizations and agencies are involved in anti-human trafficking efforts, yet limited communication and coordination occurs between these parties. Our work focuses on computational models to assess the impact of coordinating efforts among anti-human trafficking stakeholders. In the event that not all organizations and entities involved in anti-trafficking efforts are willing or able to coordinate, our models also serve as a basis for identifying which groups of decision makers are the most critical to creating impactful coordination. This facilitates a better understanding of the prevalence of human trafficking in jurisdictions with coordinated disruption plans verses decentralized decision makers, barriers to effective coordination, and which programs and policies should be prioritized.

Understanding Human Trafficking Network Operations and How They Adapt

Human trafficking networks are diverse, ranging from small operations involving one trafficker and one victim to highly organized hierarchical organizations involving hundreds of victims. The structure, function, sector of business, and relationships within the trafficking operation affect how the trafficking network operates and adapts over time. Due to these complexities, little is currently known about how trafficking networks operate beyond high-level typologies. Using Operations Research methodologies we are identifying and consolidating data related to individual human trafficking networks from multiple sources (e.g., law enforcement case files, social media, financial transactions, online advertisements) to create layered network models that provide insight into the varying ways in which traffickers operate and adapt on these networks. From these layered networks, we have developed network interdiction models which allow us to determine the most effective set of interventions to implement to disrupt the trafficking network. Importantly, the optimal disruption strategy is tailored to the network structure, acknowledging that a diverse set of strategies is necessary to combat the diverse nature of human trafficking.

While merging data sources provides a more robust understanding of trafficking than analyzing them independently, some network components will invariably be missing from these collective sources. By incorporating the expertise of human trafficking survivors, we are able to determine the likelihood that additional components of the human trafficking network exist that aren't present in the datasets. This allows us to use the network interdiction models to assess the impact and potential unintended consequences of making human trafficking intervention decisions based on partial information.

Additionally, traffickers are adaptive. Therefore, an intervention intended to disrupt trafficking may result in changes to the trafficker's network structure or operations, with implications for future interventions. By incorporating how traffickers adapt into our modelling approach, we increase the likelihood that interventions will truly disrupt human trafficking instead of just displacing it to another location or population. By understanding the diversity and nuanced nature of trafficking networks, we are able to identify which trafficking interventions will be most effective given any budget or resource constraints, where these interventions should be targeted, and how intervention strategies should change over time.

Increasing Access to Services

Rather than focusing solely on identifying victims and facilitating their exit from the trafficking environment, it is important that efforts to combat human trafficking address the needs of people vulnerable to trafficking. This includes supporting people before they are trafficked and supporting survivors to ensure they are not re-exploited. While these needs are diverse, access to safe and stable housing is widely agreed to be a pressing need. Research shows homeless, LGBTQIA+, and foster care youth and young adults are particularly vulnerable to trafficking due to a lack of safe and stable housing that meets their unique needs.

While the benefits of providing effective shelter services are well-documented, it is widely known that the shelter capacity in the U.S. is extremely limited and only partially meets the needs of those it seeks to serve. Through conversations with unstably housed youth and young adults, we are studying how the shelter system in the U.S. can be reimagined to meet the needs of youth and young adults and reduce their likelihood of being trafficked. Recognizing that the needs of this population are diverse, we use data science clustering methods to develop unique "needs profiles" which allows us to use stochastic programming models to determine how to tailor the size, services offered, and function of a set of shelters to best meet their needs, increase access, and minimize costs. Additionally, our models allow us to estimate the number of shelters needed to meet the collective demand, as well as an optimal phased roll-out plan suggesting how to best build capacity over time.

RECOMMENDATIONS

As the role of technology in combatting human trafficking advances, the following recommendations will help improve the effectiveness of these efforts:

- Ensure a diverse set of survivors and people with other lived experiences related to systems overlapping with human trafficking provides ongoing oversight and input into the technologies and strategies pursued.
- Recognize that human trafficking is a complex, multifaceted problem in a broad range of sectors and that its victims, survivors, and perpetrators are diverse. Thus, solutions must necessarily be nuanced, tailored, and diverse.
- Continuously seek to identify and mitigate any unintended negative consequences that may result from the creation and/or implementation of technology and policies related to combatting human trafficking. Traffickers are adaptive and solutions should take care not to disrupt trafficking in one area only to displace it to another area.
- Invest in collaborative, interdisciplinary research and technology to combat human trafficking; Siloing resources is not an efficient use of resources and will result in less effective solutions compared to interdisciplinary efforts.
- Improve coordination and collaboration among anti-human trafficking stakeholders.
- Measure the effectiveness of technologies, programs, and policies aimed at combatting human trafficking. Ensure assessments are through, supported financially, and used to improve future efforts

CONCLUSIONS

Human trafficking is a complex problem interconnected with many other complex systems and requires nuanced and tailored solutions. While the field of Operations Research has the potential to be a powerful tool in advancing technology to address the complexities of human trafficking, all technologies and interventions aimed at addressing human trafficking can lead to unintended negative consequences. It is imperative that the harms such technology can perpetuate are identified and mitigated prior to implementation. Technology that will be most successful in addressing human trafficking will be designed and implemented with substantial input from a diverse group of survivors of trafficking and people with other related lived experiences. Technology alone will not solve human trafficking; anti-trafficking efforts must be holistic and adopt a collaborative, multi-disciplinary approach to ensure that the root causes and systems that increase vulnerability to trafficking are addressed through prevention rather than only focusing on disrupting trafficking after it has already occurred.