EXPLORING THE USE OF UNMANNED AIRCRAFT SYSTEMS ACROSS THE DHS ENTERPRISE

JOINT HEARING

BEFORE THE

SUBCOMMITTEE ON BORDER SECURITY AND ENFORCEMENT

AND THE

SUBCOMMITTEE ON EMERGENCY MANAGEMENT AND TECHNOLOGY

OF THE

COMMITTEE ON HOMELAND SECURITY HOUSE OF REPRESENTATIVES

ONE HUNDRED NINETEENTH CONGRESS

FIRST SESSION

APRIL 1, 2025

Serial No. 119–11

Printed for the use of the Committee on Homeland Security

Available via the World Wide Web: http://www.govinfo.gov

U.S. GOVERNMENT PUBLISHING OFFICE

61–303 PDF WASHINGTON : 2025

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CONTENTS

EXPLORING THE USE OF UNMANNED AIRCRAFT SYSTEMS ACROSS THE DHS ENTERPRISE

Tuesday, April 1, 2025

U.S. HOUSE OF REPRESENTATIVES,
COMMITTEE ON HOMELAND SECURITY,
SUBCOMMITTEE ON BORDER SECURITY AND ENFORCEMENT, AND THE
SUBCOMMITTEE ON EMERGENCY MANAGEMENT AND TECHNOLOGY,
Washington, DC.

The subcommittee met, pursuant to notice, at 2:39 p.m., in room 310, Cannon House Office Building, Hon. Michael Guest (Chairman of the subcommittee) presiding.

Present: Representatives Guest, Strong, Biggs, Knott, Correa, Kennedy, and Ramirez.

Mr. GUEST. Good afternoon. The Committee on Homeland Security, Committee on Border Security and Enforcement and Subcommittee on Emergency Management and Technology will now come to order.

Without objection, the Chair is authorized to declare the committee in recess at any point.

The purpose of this hearing is to examine the Department of Homeland Security's use of unmanned aircraft systems across DHS's components to enhance situation awareness and increase capabilities across its mission.

I now recognize myself for an opening statement.

Today we convene to examine the expanding role of unmanned aircraft systems across the Department of Homeland Security. UAS technology, more commonly simply referred to as drones, play a critical role in border security, drug interdiction, disaster mitigation, and emergency response.

As the United States faces evolving security threats, drones have become an important tool, and serve as a force multiplier for both law enforcement and first responders. Drones can provide Federal law enforcement with faster response times and a tactical advantage to include surveillance, remote tracking, aid delivery, and intelligence collection.

Since 2005, the Department of Homeland Security has integrated unmanned aircraft systems into its border security mission. Drones have equipped Customs and Border Protection with the ability to locate and track threats in the air, while also increasing officer and agent safety on the ground. CBP operates several UAS programs,

including a small UAS program enabling rapid deployment of quadrocopters to provide United States Border Patrol agents with real-time situational awareness. Thanks to the integration of this drone technology, CBP seized approximately 2,800 pounds of illicit narcotics from fiscal year 2020 through fiscal year 2023.

CBP's air and marine operations oversee the agency's large unmanned aircraft fleet. The MQ–9s, a critical asset in border security and surveillance operation, has extended the eyes of agents in the land and maritime environments. Equipped with cutting-edge radar systems, these platforms operate covertly, significantly enhancing situational awareness, threat detection, and interdiction capabilities to strengthen our national security.

In addition to border security, drones are also deployed in response to natural disasters and national emergencies. In Mississippi, we have seen how these systems have proven invaluable to law enforcement and first responders assisting in search-and-rescue missions in the aftermath of hurricanes, tornadoes, floods, fires, and other disasters.

In this ever-evolving field, partnering with private industry and public institutions are critical to enhance law enforcement's capabilities. DHS partnerships like the one with Mississippi State University's Raspet Flight Research Laboratory have contributed to multiple advances in UAS applications.

Drones have undeniably strengthened DHS operations by increasing efficiency, reducing manpower requirements, and saving American lives. As technology continues to evolve, it is imperative that DHS further develop and define these capabilities.

I believe that Congress has a responsibility to ensure that DHS, along with its public and private partners, has the necessary resources to advance the critical technology in support of national security and public safety. I hope this hearing provides us with some concrete ideas on which this body can act in furthering this important mission on behalf of our fellow citizens.

Before I yield to the Ranking Member, I would like to take a moment to thank Supervisory Special Agent Larry Martino for his outstanding contributions to the committee. Over the past 18 months, Agent Martino has been detailed to the Border Security and Enforcement Subcommittee where he has provided invaluable expertise and guidance on critical border security matters. His deep knowledge, dedication, and commitment to strengthening our national security has been instrumental in shaping key policy discussions and legislative initiatives.

Next week, Agent Martino will return to his home agency, HSI, where he will continue to play a vital role in combating transnational crime, enforcing immigration law, and protecting our national security. I extend the committee's sincere gratitude for his service in safeguarding our great Nation.

At this time I would like to recognize the Ranking Member for the Subcommittee on Border Security and Enforcement, the gentleman from the great State of California, Mr. Correa, for his opening statement.

[The statement of Chairman Guest follows:]

STATEMENT OF CHAIRMAN MICHAEL GUEST

APRIL 1, 2025

Today, we convene to examine the expanding role of Unmanned Aircraft Systems across the Department of Homeland Security. UAS technology, more commonly referred to simply as "drones," play a critical role in border security, drug interdiction, disaster mitigation, and emergency response. As the United States faces evolving security threats, drones have become an important tool and serve as a force multiplier for both law enforcement and first responders. Drones can provide Federal law enforcement with faster response times and a tactical advantage, to include surveillance, reconnaissance, remote tracking, aid delivery, and intelligence collection.

Since 2005, the Department of Homeland Security has integrated unmanned aircraft systems into its border security mission. Drones have equipped Customs and Border Protection—CBP—with the ability to locate and track threats in the air, while also increasing officer and agent safety on the ground. CBP operates several UAS programs including a small-UAS program enabling rapid deployment of quadcopters to provide U.S. Border Patrol agents with real-time situational awareness. Thanks to the integration of this drone technology, CBP seized approximately 2,800 pounds of illicit narcotics from fiscal year 2020 through 2023.

CBP's Air and Marine Operations oversees the agency's large Unmanned Aircraft fleet. MQ–9s, a critical asset in border security and surveillance operations, has extended the eyes of agents in the land and maritime environments. Equipped with cutting-edge radar systems, these platforms operate covertly, significantly enhancing situational awareness, threat detection, and interdiction capabilities to strengthen our national security.

In addition to border security, drones are also deployed in response to natural disasters and national emergencies. In Mississippi, we have seen how these systems have proven invaluable to law enforcement and first responders, assisting in search-and-rescue missions in the aftermath of hurricanes, tornadoes, floods, and other disasters.

In this ever-evolving field, partnering with private industry and public institutions are critical to enhance law enforcement capabilities. DHS partnerships, like with Mississippi State University's Raspet Flight Research Laboratory, have contributed to multiple advancements in UAS applications.

Drones have undeniably strengthened DHS operations by increasing efficiency, reducing manpower requirements, and saving American lives. As technology continues to evolve, it is imperative that DHS further develop and refine these capabilities. I believe that Congress has a responsibility to ensure that DHS, along with its public and private partners, has the necessary resources to advance this critical technology in support of national security and public safety. I hope this hearing provides us with some concrete ideas on which this body can act in furthering this important mission on behalf of our fellow citizens.

Before I turn it over to the Ranking Member of the Border Security and Enforcement Subcommittee, Mr./Rep. Correa, I would like to take a moment to thank Supervisory Special Agent Larry Martino for his outstanding contributions to the committee. Over the past 18 months, Agent Martino has been detailed to the Border Security and Enforcement Subcommittee, where he has provided invaluable expertise and guidance on critical border security matters. His deep knowledge, dedication, and commitment to strengthening our Nation's security have been instrumental in shaping key policy discussions and legislative initiatives. Next week, Agent Martino will return to his home agency, Homeland Security Investigations, where he will continue to play a vital role in combating transnational crime, enforcing immigration laws, and protecting our national security. I extend the committee's sincere gratitude for his service in safeguarding our great country.

Mr. CORREA. Thank you, Chairman Guest and Chairman Strong, for holding this most important hearing today. I want to thank our guests today as well. Thank you very much.

Important hearing today on the use of unmanned aircraft systems across DHS. Today we're going to hear about how drones are used by the Department of Homeland Security to strengthen disaster response, border security, and keep Americans safe. It's important to hear from our partners in the field where the rubber meets the road, as well as those developing these critical technologies, about what we in Congress can do to support Federal,

State, and local partners in this effort. I believe we also need to continue to support research in new and emerging technologies, like drones.

With the terrible environmental disasters happening almost on a daily basis across the country, we must support our front-line partners with the tools that you need to do your jobs and keep our community safe. I must say that I am concerned to see the administration moving to dismantle FEMA and to reduce the resources available for disaster response.

Our partners in the field are facing greater challenges in delivering aid to those who need it the most in a timely basis. This hearing is timely as we continue to explore how we can better equip those in the front lines, especially as our resources continue to shrink under this administration.

From the California wildfires to hurricanes and flooding in Florida and North Carolina, drones can help front-line personnel respond quickly and effectively to these situations. For example, drones can help first responders find the quickest route to respond to a disaster and assist with search-and-rescue missions. As we saw during the terrible fires in Pasadena—at Pasadena earlier this year, they can also provide first responders and the public with real-time information. Once disasters are contained, they can also help with damage assessment in identifying safe routes.

Technologies such as drones not only help with disaster response, but they also keep our communities safe, and drones can enhance public safety by providing real-time situation awareness. They can also help law enforcement monitor and respond to illicit activities at the border, such as drug trafficking. As we can see, drones also have an important role in enhancing public safety. This is why I introduced the bipartisan legislation earlier this year, the DRONE Act of 2025, which would allow law enforcement to use Federal grants to purchase and operate drones.

In my discussions with law enforcement and emergency responders, it is clear that drones play a big and bigger role in saving lives. But as useful as the drones for law enforcement and first responders may be, we also need to prepare for those that use them against us. As Ranking Member of the Border Security and Enforcement Subcommittee, I've heard that cartels will use drones to carry drugs across the border and surveil men and women of DHS at the front lines.

Last year, the top general for U.S. Northern Command testified in the Senate Armed Services Committee that drone incursions along our Southern Border likely exceed 1,000 per month. The threats posed by drones at our border increase the need to understand how DHS uses drones and is it set up sufficiently well to encounter and stop these drones. I hope the committee will continue to do its good work so that our front-line officers can continue to be equipped to do the best job that they can protecting American citizens.

It's also vital that the Federal Government collaborate with research centers, the private sector, with venture capitalists to develop and adopt cost-effective innovative technologies such as drones and counter-drone systems to help confront the challenges that are essentially on top of us now.

We in Congress must continue to work together to create constructive opportunities for DHS, our State and local partners, to utilize new technologies to effectively respond to disasters, to save lives, to protect national security, to help trade, travel, and keep our community safe.

I look forward to this hearing today, look forward to taking notes from our witnesses about the recommendations you all may have regarding drones, countering drones, and protecting American lives.

Thank you, Mr. Chairman. With that, I yield back.

[The statement of Ranking Member Correa follows:]

STATEMENT OF RANKING MEMBER J. LUIS CORREA

APRIL 1, 2025

Today we'll hear about how Unmanned Aircraft Systems, specifically drones, are used by the Department of Homeland Security to strengthen disaster response, border security, and the safety of Americans. It is important to hear from our partners in the field, as well as those developing these critical technologies, about what we can do in Congress to support our Federal, State, and local partners. We also need to continue to support research in new and emerging technologies, like drones.

Particularly with the terrible environmental disasters devastating communities across the country in recent years, we must support our front-line partners with the tools needed to do their jobs and keep our communities safe. However, I am concerned to see the administration move to dismantle FEMA, and reduce the resources available for disaster response. Our partners in the field are facing greater challenges in delivering aid to those who need it most.

This hearing is timely as we continue to explore how we can better equip those on the front lines, especially as their resources shrink under the Trump administration. From the California wildfires to hurricanes and flooding in Florida and North Carolina, environmental disasters regularly create life-and-death situations.

Drones can help front-line personnel respond quickly and effectively to these situations. For example, drones can help first responders find the quickest route to respond to a disaster and assist with search-and-rescue operations. As we saw during the terrible fire in Pasadena earlier this year, they can also provide first responders and the public with information in real time.

Once the disaster is contained, they can also help with damage assessments and identifying safe routes. Technologies such as drones not only help with disaster response, but they also keep our communities safe. Drones can enhance public safety by providing real-time situational awareness to law enforcement during active crimes or hazardous material spills. They can also help law enforcement monitor and respond to illegal activities at the border such as drug trafficking.

As we can see, drones have an important role in enhancing public safety. This is why I introduced bipartisan legislation earlier this year—the Directing Resources for Officers Navigating Emergencies (DRONE) Act of 2025, which would allow law enforcement to use Federal grants to purchase and operate drones.

In my discussions with law enforcement and emergency responders, it's clear that drones play a big part in saving lives. And will continue to play an ever-growing role in protecting our communities and responding to emergencies. By continuing to unlock their potential, we can save taxpayers millions and make our streets safer. It's a win-win. But as useful as drones are for law enforcement and first responders, we also need to be prepared for adversaries to use them against us.

As Ranking Member of the Border Security and Enforcement Subcommittee, I've heard that cartels will use drones to carry drugs across the border and surveil the men and women of DHS on the front lines. Last year, the top general for U.S. Northern Command testified to the Senate Armed Services Committee that drone incursions along the Southern Border likely exceed 1,000 a month.

The threats posed by drones at our border increase the need to understand how DHS uses drones and also how they are set up to counter the drones. I hope the committee will continue its good work on that front in the future. It's also vital that the Federal Government collaborate with research centers, the private sector, and venture capital to develop and adopt cost-effective and innovative technologies such as drones and counter-drone systems to help confront the challenges we face.

We in Congress must continue to work together to create opportunities for DHS, and our State and local partners to utilize new technologies to effectively respond to disasters, save lives protect national security, facilitate trade and travel, and keep our communities safe.

I look forward to hearing from our witnesses about the recommendations they have regarding drones and counter-drone technology which can help secure our border and make our communities safer.

Mr. GUEST. Thank you, Ranking Member Correa.

I now recognize the Chairman for the Subcommittee on Emergency Management and Technology, the gentleman from Alabama, Mr. Strong, for his opening statement.

Mr. STRONG. Good afternoon. Thank you, my friend, Chairman Michael Guest of Mississippi, for leading this important discussion, and Ranking Member Correa, and to all Members for being here today. I want to also thank our witnesses for their time, for sharing their expertise.

Let me start by shining a light on my district, Alabama's Fifth, which I'm proud to say is well-represented on this panel today. As many of you know, Huntsville, Alabama, is renowned for its leadership in cutting-edge research and development. As home to Redstone Arsenal, the Nation's second-largest research park and several universities, Huntsville is a thriving hub for American innovation. I'm glad we have such an excellent panel here, and look forward to our discussion.

Today we're here to explore how our Homeland Security partners use unmanned aircraft systems, or UAS, and how this technology can be a force multiplier for law enforcement, first responders, CBP, and the DHS mission set. Emerging technologies like UAS are reshaping the way we respond to disasters. Drones enable the protection of emergency management personnel in high-risk situations, while at the same time increasing the effectiveness of the work that they do.

For example, small UAS with sophisticated cameras assist in monitoring critical infrastructure and assessing damage. When equipped with AI, these drones can spot potential flood zones or identify hot spots and wildfires. The data collected from this—these flights equip first responders with the tools to better allocate manpower, vehicles, and victim assistance.

Larger drones with heavier payload capacity and longer flight times are also critical tools in disaster management. Rapid deployment and agility enable UAS to access hazardous areas that first responders cannot reach, which proves especially useful when trying to locate survivors or deliver supplies.

In response to Hurricane Helene, the Ashville Police Department deployed drones for search and rescue, damage assessment, and overwatch for FEMA. Additionally, prepositioned UAS in western Florida quickly deployed in response to Hurricane Milton to track the storms and provide real-time data to law enforcement and first responders. Two hundred flight hours across 16 agencies were recorded, representing over 1,000 flights flown in the first days following the storm. This helped to create a common operating picture that enabled first responders to allocate much-needed resources. This technology helped save countless lives in the wake of these moments of the storm.

DHS has also utilized UAS to safeguard our borders. They leverage this technology to protect our homeland from illegal crossings and combat illicit activities, such as human and drug smuggling. CBP faces tremendous challenges from dangerous environments and a broadening mission set to adversaries that continue to evolve their tactics and capabilities. Drone technology decreases the workload on CBP agents and provided critical situation awareness to paint a comprehensive picture of the threats impacting our border.

Additionally, DHS's Science and Technology Directorate leads Government-wide UAS research to counter threats and improve response in recovery operations for disasters. For example, S&T's Air Domain Awareness program detects, tracks, and identifies aircraft to prevent and respond to criminal activities along the border. Also, S&T's National Urban Security Technology Laboratory manages the SAVER program. This initiative helps emergency responders and law enforcement make informed, cost-effective equipment purchases that meets national standards.

On top of these programs, S&T is leading critical development in counter-UAS ensuring operational components can defend against nefarious actors. This work is supported by universities and industry partners, reflecting a collaborative public-private partnership across all sectors.

As the use of these technologies become more commonplace, these partnerships are critical so that UAS can be safely utilized to their fullest potential. I look forward to today's conversation learning more about great work that our witnesses are doing in this space.

I'd also like to mention and recognize the CEO of COLSA Corporation, Francisco Collazo, who is not with us today. He's back home at the headquarters in Huntsville, Alabama. He's been a friend of mine for many years, and I know that this organization does a phenomenal job.

I also want to mention the University of Alabama Huntsville. I live within 5 minutes of the University of Alabama in Huntsville, and I can tell you today UAH is a critical part to national security; with our average ACT test score of a 28.5, a little less than 10,000 students, where 80 percent of them choose never to leave after graduation to work in national security.

Mr. Chairman, I yield back. It's an honor to be here, and I want to thank our guests for joining us.

[The statement of Chairman Strong follows:]

STATEMENT OF HONORABLE DALE W. STRONG

Good afternoon.

Thank you to my friend, Chairman Guest, for leading this important discussion and to all the Members for being here today.

I want to also thank our witnesses for their time and for sharing their expertise.

Let me start by shining a light on my district, Alabama's 5th, which I'm proud to say is well-represented on this panel today.

As many of you know, Huntsville, Alabama is renowned for its leadership in cutting-edge research and development.

As home to Redstone Arsenal, the Nation's second-largest research park, and several universities including UAH, Huntsville is a thriving hub for American innovation.

I am glad we have such an excellent panel here and look forward to our discussion.

Today we're here to explore how our homeland security partners use Unmanned Aircraft Systems, or UAS, and how this technology can be a force multiplier for law enforcement, first responders, CBP, and the DHS mission set.

Emerging technologies like UAS are reshaping the way we respond to disasters.

Drones enable visibility and capability—allowing for the protection of emergency management personnel in high-risk situations, while at the same time increasing the effectiveness of the work they do.

For example—small UAS with sophisticated cameras assist in monitoring critical infrastructure and assessing damage.

When equipped with AI, these drones can spot potential flood zones or identify hot spots in wildfires.

The data collected from these flights equips first responders with the tools to better allocate manpower, vehicles, and victim assistance.

Larger drones with heavier payload capacity and longer flight times are also critical tools in disaster management.

Rapid deployment and agility enable UAS to access hazardous areas that first responders cannot reach, which proves especially useful when trying to locate survivors or deliver supplies.

In response to Hurricane Helene, the Asheville Police Department deployed drones for search and rescue, damage assessment, and overwatch for FEMA.

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This technology has helped save countless lives in the wake of these storms.

DHS also utilizes UAS to safeguard our borders. They can leverage this technology to protect our homeland from illegal crossings and combat illicit activities such as human and drug smuggling.

The CBP faces tremendous challenges, from dangerous environments and a broadening mission set to adversaries that continue to evolve their tactics and capabilities.

Drone technology decreases the workload on CBP agents and provides critical situational awareness to paint a comprehensive picture of the threats impacting our border.

In addition to the use of drones to support operational efforts, DHS's Science and Technology Directorate also leads Government-wide UAS research to counter threats and improve response and recovery operations for disasters.

For example, S&T's Air Domain Awareness program detects, tracks, and identifies aircraft to prevent and respond to criminal activities along the border.

Also, S&T's National Urban Security Technology Laboratory manages the SAVER program.

This initiative helps emergency responders and law enforcement make informed, cost-effective equipment purchases that meet national standards.

On top of these programs, S&T is leading critical developments in counter-UAS, ensuring operational components can defend against nefarious actors.

This work is supported by universities and industry partners, reflecting a collaborative public-private partnership across all sectors.

As the use of these technologies becomes more commonplace, collaboration is critical so that these devices can be safely operated in a commercial environment and utilized to their full potential.

I look forward to today's conversation and learning more about the great work our witnesses are doing in this space.

Again, thank you all for being here today and I yield back.

Mr. GUEST. Thank you, Chairman Strong.

I now recognize the Ranking Member for the Subcommittee on Emergency Management and Technology, the gentleman from New York, Mr. Kennedy, for his opening statement.

Mr. KENNEDY. Thank you, Chairman, and also thanks to my fellow Ranking Members.

Good afternoon. Thank you to each and every one of you for being here today to discuss the use of unmanned aerial systems by the Department of Homeland Security. However, I want to begin

by discussing the alarming remarks and actions by the White House and the Department of Homeland Security Secretary Noem.

Just last week, Secretary Noem stated on national television that "we are going to eliminate FEMA". This, disturbingly, received immediate praise from President Trump.

Reportedly, Secretary Noem is active discuss—is in active discussions with FEMA leadership about dismantling the agency by October 1, a reckless move that could leave millions of Americans vulnerable to the impacts of natural disasters, like hurricanes, tornadoes, winter storms, wildfires, and floods, without any Federal assistance.

It's deeply concerning that today's hearing isn't solely focused on holding this administration accountable for its plans to dismantle the only Federal agency solely dedicated to assisting Americans in the aftermath of disasters. I encourage my Republican colleagues, many of whom have had disasters in their districts, to take action to prevent this administration from doing irreparable harm to the American people by dismantling FEMA.

While today's hearing is about drones, the unfortunate reality is that the Trump White House continues to create obstacles that jeopardize the very programs that we're discussing.

The Department of Homeland Security Science and Technology Directorate has played a crucial role in integrating unmanned aerial systems in the national security and emergency response efforts. However, the reckless mass firings by Elon Musk and President Trump have hindered S&T's work force in its capacity to innovate and lead. At the same time, the administration's freeze on Federal grants, which is being carried out in violation of court orders, has left communities and first responders unable to secure the vital funding needed for acquiring and deploying drone technology.

Grant funding from the Department of Homeland Security has been instrumental in funding local law enforcement seeking to adopt drone technology. However, under Republican House leadership, we've seen a 10 percent reduction in DHS grant programs in fiscal year 2024, followed by similarly inadequate funding levels in fiscal year 2025. This has significantly hampered local agencies' ability to acquire critical technology like drones.

This is especially impactful for western New Yorkers, the people I represent, where emergency services, law enforcement, fire departments, and other agencies rely on Federal grant funding to deploy drone technologies and disaster response.

I can name many different examples of this, but first responders are oftentimes utilizing drone technology in critical missions in my community. For instance, late last year, Buffalo police used drones during extremely cold temperatures to locate and rescue a man who had become disoriented in the snow, bringing him to safety. Without adequate funding, local agencies may be unable to respond to future emergencies as effectively as they otherwise could.

Ensuring our local agencies are equipped and funded is not just a matter of policy, but a commitment to the safety and resilience of our communities. I look forward to discussing today how we can promote responsible law enforcement use of drones to equip our

first responders with the tools they need to protect and serve effectively.

I thank you all for your testimony and your service, and look forward to hearing from you.

With that, I yield back. Thank you, Chairman.

[The statement of Ranking Member Kennedy follows:]

STATEMENT OF RANKING MEMBER TIMOTHY M. KENNEDY

APRIL 1, 2025

Just last week, Secretary Noem stated on national television that "We are going to eliminate FEMA." This, disturbingly, received immediate praise from President Trump.

Reportedly, Secretary Noem is in active discussions with FEMA leadership about dismantling the agency by October 1—a reckless move that could leave millions of Americans vulnerable to the impacts of natural disasters like hurricanes, winter storms, wildfires, tornadoes, and floods—and without any Federal assistance.

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While today's hearing is about drones, the unfortunate reality is that the Trump White House continues to create obstacles that jeopardize the very programs we are discussing. The Department of Homeland Security's Science and Technology Directorate (S&T) has played a crucial role in integrating unmanned aerial systems into national security and emergency response efforts. However, the reckless mass firings by Elon Musk and President Trump have hindered S&T's workforce and its capacity to innovate and lead.

At the same time, the administration's freeze on Federal grants, which is being carried out in violation of court orders, has left communities and first responders unable to secure the vital funding needed for acquiring and deploying drone technology.

Grant funding from the Department of Homeland Security has been instrumental in funding local law enforcement seeking to adopt drone technology. However, under Republican House leadership, we have seen a 10 percent reduction in DHS grant programs in fiscal year 2024, followed by similarly inadequate funding levels in fiscal year 2025.

This has significantly hampered local agencies' ability to acquire critical technologies like drones. This is especially impactful for western New Yorkers, where emergency services—law enforcement, fire departments, and other agencies—rely on Federal grant funding to deploy drone technologies in disaster response.

First responders in my community rely on drones for critical missions. For instance, late last year, Buffalo Police used drones during extremely cold temperatures to locate and rescue a man who had become disoriented in the snow, bringing him to safety. Without adequate funding, local agencies may be unable to respond to future emergencies like this one as effectively as they could. Ensuring our local agencies are equipped and funded is not just a matter of policy but a commitment to the safety and resilience of our communities.

I look forward to discussing today how we can promote responsible law enforcement use of drones to equip our first responders with the tools they need to protect and serve effectively.

Mr. GUEST. Thank you, Ranking Member Kennedy.

Other Members of the committee are reminded opening statements may be submitted for the record.

[The statement of Ranking Member Thompson follows:]

STATEMENT OF RANKING MEMBER BENNIE G. THOMPSON

APRIL 1, 2025

Drones are invaluable tools for law enforcement and fire departments. They assist with aerial surveillance, damage assessments, search-and-rescue operations, and

monitoring large-scale wildfires—tasks once handled by crewed aircraft. DHS components like Customs and Border Protection, Homeland Security Investigations, Secret Service, the Science and Technology Directorate (S&T), and FEMA use drones for critical operations.

In my home State of Mississippi, drones have played a vital role in assessing the damage caused by the devastating tornadoes that hit my district in 2023, which claimed the lives of at least 21 people.

However, as we discuss the use of drones today, President Trump and Elon Musk are relentlessly attacking the very agencies working to secure the homeland.

Just last week, Secretary Noem and other Trump-Musk administration officials discussed dismantling the one agency dedicated to serving Americans after a disaster: FEMA. Secretary Noem is proud of this misguided effort, saying "we're going to eliminate FEMA." News outlets are reporting that FEMA may be abolished by October.

The Trump administration's reckless push to eliminate FEMA is dangerous and a betrayal of Americans in need of support during the most vulnerable moments of their lives—when disasters strike. FEMA is not just an agency; it's the lifeline that provides critical aid to communities before, during, and after disasters.

By attempting to dismantle FEMA, the administration is weakening the very infrastructure designed to keep Americans safe. With hurricane and tornado seasons just around the corner, this move will leave our communities even more vulnerable. Unfortunately, my colleagues across the aisle remain silent—complicit in this dangerous erosion of our homeland security.

FEMA also administers vital homeland security grant programs that defend us against the very real threat of terrorism. Many of these grant programs have been unlawfully paused by the Trump administration. Grants also fund the use of drones by first responders in our communities. Yet these critical grant programs have been either gutted, put on hold, or slowed down by the Trump-Musk administration. Again, my Republican colleagues remain silent.

Mr. Chairman, by failing to protect FEMA's programs that support each of our districts. The Majority should be bringing administration officials here to testify about their actions and plans and make sure they preserve FEMA and critical homeland security grants programs. Instead, committee Republicans have abdicated their oversight obligations and our Nation's homeland security will suffer as a result.

Mr. GUEST. I'm pleased to welcome our panel of witnesses. At this time I would ask our witnesses to please rise and to please raise your right hand. I will now issue the oath.

[Witnesses sworn.]

Mr. GUEST. Let the record reflect that the witnesses have answered in the affirmative.

Thank you, and please be seated.

I would now like to briefly formally introduce our witnesses.

The first witness is Mr. Bryan Farrell. Bryan is the interim director of the Mississippi State University's Raspet Flight Research Laboratory, which is one of the leading academic research centers dedicated to the advancement of aviation. Mr. Farrell previously led the university's international research partnership and professional development efforts at his international institution.

Our second witness is Dr. Michael Ledbetter. Dr. Ledbetter is the executive vice president and chief operating officer at COLSA Corporation, where he oversees strategic operations. Previously, he served as senior vice president for COLSA's Cyber/Information Warfare and Data Science Program. Before joining COLSA, Dr. Ledbetter served for 28 years as a United States Marine officer.

Our third witness is Mr. Jerry Hendrix. Mr. Hendrix is the director of the UAS program at the University of Alabama in Huntsville, leading all UAS research and testing support, both commercial, military, and Government customers. Mr. Hendrix has many years of experience in the aerospace industry.

Our final witness is Chief Kevin Fetterman. Chief Fetterman currently serves as the division chief for the Orange County Fire Authority, where he leads fire, rescue, and other emergency services. Chief Fetterman is the emerging technology liaison for Orange County and all the—for Orange County and the all-hazard incident management team program manager. He has over 29 years of fire and emergency services experience.

I would like to thank all our witnesses for being here today. The witnesses' full testimony will appear in the record. I would now recognize Mr. Farrell for 5 minutes to summarize his opening statement.

STATEMENT OF BRYAN FARRELL, INTERIM DIRECTOR, RASPET FLIGHT RESEARCH LABORATORY, MISSISSIPPI STATE UNIVERSITY

Mr. FARRELL. Thank you.

Good day, Chairman Guest, Chairman Strong, Ranking Members Correa and Kennedy, and the honorable Members of the subcommittees. I want to thank you and your staff for welcoming me here today to talk about UAS as it pertains to the needs of the Department of Homeland Security and, more broadly, our domestic security and resiliency.

My name is Bryan Farrell. I'm the interim director of the Raspet Flight Research Lab at Mississippi State University and the lead for Project JUSTICE. This program is housed within DHS S&T, under the Air, Land, and Ports of Entry Program. The primary mission is to serve the operational entities within DHS through research, development, testing, integration, and evaluation of UAS and related technologies.

Raspet has a proud 75-year history in aerospace research, with a keen focus the last 15 years on the newest frontier of aviation, UAS. Raspet maintains a fleet of UAS and manned aircraft, including the largest UAS in academic use, the Navmar Teros. Raspet leverages MSU property and external partnerships to operate at a myriad of test locations, to include restricted air space as well as over 75,000 square miles of FAA-authorized air space.

We are also the house of the ASSURE Center of Excellence for UAS for the FAA, where we work with 32 other universities and test sites to integrate UAS into the national air space system. Through our designations and expertise, we serve industry, Government partners to advance UAS technologies for their missions.

In the spirit of today's hearing, I hope to provide insights not only into the benefits and use cases of UAS, but also an understanding of the considerations and efforts that support the integration of this technology. UAS are common in daily operations across industry and Government alike. These aircraft augment and enhance capabilities and provide perspectives that operational units may not always be able to access.

Drones provide situational awareness paramount to individual safety and security, whether that be in the execution of high-risk law enforcement activity or in the aftermath of a disaster where life-saving operations are under way. DHS component missions require integration of different UAS platforms, sensors, and operational parameters.

Even within a single DHS component such as CBP, you see a vast different usage of UAS types. For example, broad area border surveillance requires a platform capable of the necessary endurance and operational distance, while an agent engaged in tactical operations may need to carry a small UAS that can be deployed in confined environments.

Beyond the UAS selected, the components also need to establish protocols and flight authorizations. They need to understand sensors and sensor availabilities for the platforms and how that data will be viewed, stored, and distributed. They need to make decisions based on the costs and maintenance of the aircraft, and all of these considerations exist within a policy backdrop and legal constraints about where the device is made and the critical components come from. These are just some of the variables that underpin how UAS get employed within the DHS enterprise.

Why UAS get deployed comes down to efficiency and safety. Looking at the last 2 examples, traditional broad area surveillance requires expensive, crude aircraft, a network of sensors, or something like a satellite feed. These options can be expensive and can oftentimes be unreliable. A UAS, by contrast, efficiently integrates into ground operations at a lower initial and operational cost point, while potentially having greater endurance and a higher-quality data feed.

The tactical community is a great example of enhanced safety. Portability and maneuverability are paramount when these teams are executing high risk of operations. A manned portable small UAS can be rapidly deployed to provide situational awareness crucial for informed decision making.

Shifting gears from law enforcement to emergency management, this past hurricane season provided countless examples of UAS being utilized for response and recovery. Raspet's own operations supported Region 4 UAS/remote sensing coordinator and other stakeholders in leveraging our largest UAS, the Teros, for disaster response, where in the aftermath we broadcast live video and live tiled imagery to a myriad of stakeholders, including the White House. This facilitated faster response, faster recovery, and significantly improved the damage assessments.

Raspet is quite fortunate to engage deeply in all aspects of UAS, including the technical and regulatory complexities required to operationalize. It provides us with a good vantage point to understand those pesky "it depends" scenarios that often arise around UAS.

I look forward to engaging more deeply about our work at Mississippi State University and providing greater insights into the benefits of UAS for DHS and the needs associated with integrating this technology. Thank you.

[The prepared statement of Mr. Farrell follows:]

PREPARED STATEMENT OF BRYAN FARRELL

APRIL 1, 2025

Good day Chairman Guest, Chairman Strong, Ranking Members Correa and Kennedy, and the honorable Members of the Subcommittee on Border Security and Enforcement and the Subcommittee on Emergency Management and Technology.

I want to thank you and your staff for welcoming me here today to discuss UAS, or drone technology, as it pertains to needs for the Department of Homeland Security and more broadly our domestic security and resiliency.

My name is Bryan Farrell, and I am the interim director for the Raspet Flight Research Laboratory at Mississippi State University. I am also the principal investigator for Project JUSTICE or the Joint Unmanned Systems Testing in a Collaborative Environment. Project JUSTICE is a program housed within DHS Science and Technology under the Air, Land, and Ports of Entry portfolio. The primary mission of JUSTICE is to serve the operational entities within DHS through research, development, testing, integration, and evaluation of UAS and related technologies. Mississippi State University is also the chair of the Federal Aviation Administration's Center of Excellence for UAS known as the Alliance for System Safety of UAS through Research Excellence, or ASSURE, where Raspet collaborates with 32 other universities and many UAS test sites to execute the research necessary for integration of UAS into the national air space system (NAS) as well as develop and deliver first responder UAS training. Raspet has a proud 75-year history in Aerospace research and development with keen focus these last 15 years on the newest frontier of aviation, UAS. Raspet maintains a fleet of UAS and manned aircraft including the largest UAS in academic use, the NASC Teros. Raspet leverages MSU property and external partnerships to operate at a myriad of test locations to include restricted air space and 75,000 square miles of COA air space. Through our designations and expertise, we serve industry and Government partners to advance UAS technologies for their mission.

In the spirit of today's hearing titled "Exploring the Use of Unmanned Aircraft Systems Across the DHS Enterprise" I hope to be able to provide insights into not only the benefits and use-cases of UAS as a tool, but also an understanding of the considerations and efforts that support the integration of this technology. UAS have become a ubiquitous feature in daily operations across many industries and certainly within the DHS mission set. These aircraft augment and enhance capabilities and provide perspectives that operational units may not always be able to access. UAS also provide situational awareness paramount to individual safety and security, whether that be in the execution of a high-risk law enforcement activity or in the aftermath of a disaster where life-saving operations are under way.

DHS being a complex organization, components will utilize drones in very different ways. The component's mission will require integration of different UAS platforms, sensors, and operational parameters. Even within a single DHS component such as Customs and Border Protection you could see vastly different UAS types and uses. As an example, a platform capable of the necessary endurance and operational distance required for broad area border surveillance in remote regions would not be a UAS platform beneficial for something like tactical operations where an agent may need to physically carry the UAS and deploy into confined environments. In addition to the UAS selected for the mission, the component may need to establish protocols or authorizations for integration of the aircraft into the national air space system, understand the types of sensors available for that platform and how the data will be viewed, stored, or distributed as well as make a decision based on the costs associated with procurement and maintenance of the aircraft versus other platforms or processes. All these considerations exist within a backdrop of policy and legal constraints around where the device, or critical components within the device, are manufactured.

These are just some of the variables that underpin the conversation about how UAS get employed within the DHS enterprise. Why UAS get deployed comes down to efficiency and safety. Let us take the 2 examples above to highlight where efficiencies and safety exist. Traditional broad area surveillance may require expensive manned aircraft operations, a network of sensors that are costly to deploy and potentially come with their own technical risk and challenges, or advanced geospatial solutions that are not always available. A UAS by contrast can integrate into the operational envelope of the agents on the ground at a lower initial and operational cost point while potentially having greater endurance and a higher-quality data feed. As an example of enhanced safety let's examine the needs of the tactical community where portability and maneuverability are paramount when executing things like high-risk warrants or attempting to bring peaceful resolution to hostage situations. A small UAS with the ability to be carried and deployed inside a structure to provide situational awareness is crucial for informed decision making.

During this past hurricane season there were countless examples of UAS utilized for response and recovery efforts. In the Federal Emergency Management Agency's (FEMA) Region 4 where MSU and Raspet are located, we have worked with the Region 4 UAS/Remote Sensing Coordinator and other stakeholders to explore the usage and integration of large UAS for disaster response. Raspet's largest aircraft,

the Teros, has the capacity to operate all day with distributed video and imagery to stakeholders. This was the first time that in the immediate aftermath of a large disaster, FEMA and other stakeholders were able to view live aerial imagery and communicate mission assignments with the aircraft in mid-flight. This live broadcast, facilitated by Project JUSTICE, was disseminated to an extensive network of stakeholders. We were notified that the White House was observing the live coverage of the damage, significantly expediting the damage assessment evaluation process. Beyond Raspet operations, first responders and other government agencies leveraged UAS for search and rescue, damage assessment, ingress/egress, critical infrastructure assessments, medical or supply delivery, and multiple other uses. It is in situations such as this that UAS showcase, very publicly, their value to the American people. The disaster response use-cases do not stop at natural disasters either. There are many examples where a first responder may want to leverage a UAS during situations that are man-made. If we look at Chemical, Biological, Radiological, and Nuclear (CBRN)-type events, the advantage of a stand-off distance as well as complex sensors can minimize risk to the first responder while increasing situational awareness and provide decisions such as triage or evacuation planning. These examples of use-cases and technological innovations highlight only a few of the many uses of UAS within DHS.

Raspet is quite fortunate to engage deeply in all aspects of UAS. The complexities associated with operationalizing the technology from both a regulatory and technical perspective provide us with a good vantage point to understand those pesky "it depends" scenarios that often arise around UAS. I look forward to engaging more deeply about our work at Mississippi State University and providing greater insights into the benefits of UAS for DHS and the needs associated with integration of this technology.

Mr. GUEST. Thank you, Mr. Farrell.

I now recognize Dr. Ledbetter for 5 minutes to summarize his opening statement.

STATEMENT OF MICHAEL LEDBETTER, EXECUTIVE VICE PRESIDENT AND CHIEF OPERATING OFFICER, COLSA CORPORATION

Mr. LEDBETTER. Good afternoon, Chairman Strong and Guest, Ranking Members Kennedy and Correa, and Members of the subcommittee. I'm Mike Ledbetter, chief operating officer for COLSA Corporation, a Huntsville-based—Huntsville, Alabama-based engineering services firm and drone manufacturer.

On behalf of our founder and chairman, 30-year Army veteran, Mr. Frank Collazo, I'm pleased to testify before your subcommittees today to discuss the importance of promoting innovation and security in the unmanned aircraft systems industry.

COLSA began designing, developing, and manufacturing small UASes in 2019. Since then, we've manufactured and delivered over 1,400 UASes to the Army, developed software to swarm large numbers of UASes, and recently developed a line of commercially-available UASes.

The concept for COLSA's original work was developed as lower-cost systems with increasing capability began flooding the commercial market. At the same time, the threat from swarms of UASes was becoming better understood. Some of these risks include saturating air defense systems, electronic warfare capabilities able to jam communications, disrupt radars, or spoof the location of enemy systems. COLSA is now a leading provider of low-cost, nondevelopmental, deployable group 1 and group 2 swarm UASes. These systems support unit training and operations and aid in testing counter UAS technologies. The program also provides soldiers with a low-workload, easy-to-use command-and-control system, enabling

a single operator to control the swarm up to 100 UASes simultaneously.

In 2023, COLSA invested in an internal research and development, IR&D program, to leverage our extensive domain expertise and talent pool to develop UAS designs that are better suited for commercial and civil agency applications, with an array of sensors and payloads to address several emergency response and border security use cases, such as delivering medical and humanitarian supplies, search and rescue, disaster assessment, and communications resiliency.

One of the challenges the industry faces is balancing the availability of new UASes, components, and features that address genuine needs with the ability to obtain independent third-party compliance assessments. As the committee is aware, Federal Government agencies are restricted from procuring or operating UASes or UAS components manufactured by foreign entities. The dilemma, however, is that there are very few certifying bodies that can assess UASes and ensure they meet the strict security and compliance standards. Further, the organizations that do exist operate with resources too limited to maintain the pace with UAS innovation.

For example, the Defense Innovation Unit, DIU, held a Blue UAS Refresh Challenge with the purpose of verifying the submitted systems compliance with the supply chain restrictions and cybersecurity best practices. There were 369 submissions that participated in this once-a-year refresh challenge. However, there were only enough resources to accept 23 platforms and 14 other components. These rates do not match the pace that American drone manufacturers are producing new systems or developing advanced technologies that could support emergency management or border security use cases.

The impact is that Federal and State agencies who had previously invested in fleets of UASes manufactured in restricted nations now have very few and increasingly expensive options for bringing their UAS operations into compliance. COLSA is well-positioned—well-structured to do business with these Government agencies at very low risk. However, there's a challenging process to be evaluated and certified for sales to either defense or civil agencies.

For UASes to be able to reach their potential in the use cases mentioned, several technologies need to be developed and matured to include but not limited to beyond visual line of sight, BVLOS, operations that require long-range communications over a variety of networks with reliable data links for real-time data transmission. Artificial intelligence and on-board processing must progress so that UASes can detect and avoid obstacles, self-determine route planning, and make mission-driven decisions during BVLOS operations.

Battery technology struggles to provide the necessary power for extended flight times. Currently, China still manufactures 70 to 80 percent of the world's lithium-ion batteries. We thank Congress for securing the UAS technology supply chain as it is an essential step to shore up vulnerabilities from foreign exploitation.

To maintain capacity and allow for greater competition in the market, we must open the aperture in approving compliant UAS technologies and platforms for both defense and civil agency use. This could be achieved through streamlined evaluations, additional certifying bodies, and automation.

Finally, we hope you will support research and development in the technology areas that support BVLOS operations, improve domestic production capacity, and improve battery technology.

I greatly appreciate the opportunity to address this committee and would happily take your questions. Thank you.

[The prepared statement of Mr. Ledbetter follows:]

STATEMENT OF MICHAEL LEDBETTER

TUESDAY, APRIL 1, 2025

INTRODUCTION

Good morning, Chairs Strong and Guest, Ranking Members Kennedy and Correa, and Members of the subcommittee. I am Mike Ledbetter, chief operating officer for COLSA Corporation, a Huntsville, AL-based engineering services firm and drone manufacturer. On behalf of our sole proprietor and 30-year Army veteran, Mr. Frank Collazo, I am pleased to testify before your subcommittees today to discuss the importance of promoting innovation and security in the unmanned aircraft systems (UAS) industry. COLSA began designing, developing, and manufacturing small UAS in 2019 was awarded an Other Transaction Authority (OTA) through the Vertical Lift Consortium (VLC) of the Aviation & Missile Technology Consortium (AMTC). Since then, we have manufactured and delivered over 1,400 UAS to the Army, developed software to swarm large numbers of UAS, and recently developed a line of commercially-available UAS.

LESSONS FROM ASSESSING THE THREAT

The concept for COLSA's original OTA was developed as lower-cost systems with increasing capability began flooding the commercial market. At the same time, the threat from swarms of UAS was becoming better understood. Some of these risks include:

- Saturating air defense systems causing the use of expensive interceptor missiles on inexpensive drones,
- Coordinated attacks at multiple sensitive sites simultaneously,
- Distributed and redundant operations that can withstand losses of individual drones without disruption of the attack mission,
- Electronic warfare capabilities, able to jam communications, disrupt radars, or spoof the location of enemy systems.

Following the successful completion of the OTA, COLSA was awarded a contract that transitioned into a Program of Record pathway. Through these contracts, COLSA has designed and developed highly-reliable and -resilient UAS, and manufactured thousands of units currently deployed worldwide. We also developed software to coordinate UAS swarming. COLSA is now a leading provider of low-cost, non-developmental, deployable Group 1 and Group 2 Swarm UAS. As the Prime contractor, the primary objective of drone program is to provide realistic responses to emerging battlespace threats from UAS by rapidly designing, manufacturing, producing, and delivering representative threat capabilities. These systems support unit training and operations at Combat Training Centers (CTCs) and aid in testing Counter-UAS (C–UAS) technologies at Army Test and Evaluation Command (ATEC) ranges. The program also provides soldiers with a low workload, easy-to-use command-and-control system, enabling a single operator to control a swarm of up to 100 UAS simultaneously. This capability significantly reduces personnel workload, acts as a force multiplier for UAS operations, and enhances coverage and persistence (time-over-target).

In 2023, COLSA invested in an Internal Research and Development (IR&D) program to leverage our extensive domain expertise and talent pool to develop UAS designs that are better suited for commercial and civil agency applications such as disaster response, search and rescue, law enforcement and security, surveillance, infrastructure inspection, precision agriculture, surveying and mapping, utility and transportation monitoring, insurance assessments, and construction. We are now po-

sitioning our systems and services for commercial sales and for contracts with civil agencies in addition to our continued support of Department of Defense (DoD) clients.

In fact, we have designed our commercial systems to address a number of emergency response and border security use cases such as:

- *Delivering Medical and Humanitarian Supplies*.—UAS are able access difficult terrain and dangerous areas with greater speed and less risk to first responders.
- *Search and Rescue*.—Our systems can carry advanced thermal sensors to find missing people, fugitives in hiding, or illegal migrants in low-visibility conditions.
- *Disaster Assessment*.—UAS can carry LiDAR sensors to derive high-resolution 3D mapping of the environment following natural disasters.
- *Communications Resiliency*.—UAS can carry equipment to create temporary mobile networks when infrastructure is damaged.
- *Ports of Entry Security*.—Swarms of UAS using AI can patrol and react to threats at land, air, and maritime ports.
- *Nighttime Operations*.—UAS can deploy high-output lighting to illuminate nighttime rescue operations from overhead.

INNOVATION IS OUTPACING LEGISLATION

One of the challenges the industry faces is balancing the availability of new UAS, components, and features that address genuine needs with the ability to obtain independent third-party compliance assessments. As the committee is aware, Federal Government agencies are restricted from procuring or operating UAS or UAS components manufactured by covered foreign entities. The dilemma however is that there are very few certifying bodies that can assess UAS and ensure they meet the strict security and compliance standards, including those outlined in the National Defense Authorization Acts (NDAA) and American Security Drone Act (ASDA). Further, the organizations that do exist operate with resources too limited to maintain pace with UAS innovation.

In August 2024, the Defense Innovation Unit (DIU) held a Blue UAS Refresh Challenge with the purpose of verifying the submitted systems compliance with the supply chain restrictions and cybersecurity best practices. There were 369 submissions to participate in this once-a-year Refresh Challenge but only enough resources to accept 23 platforms and 14 other components (DIU Updates Blue UAS List, Framework With 23 Drones & 14 UAS, February 18, 2025). The Association for Uncrewed Vehicle Systems International (AUVSI) launched the Green UAS program in 2023 to address non-Department of Defense (DoD) needs. However, in 2 years there have only been 7 platforms cleared for Green UAS certification (IAW the AUVSI website, 24 March 2025). These rates do not match the pace that American drone manufacturers are producing new systems or developing advanced technologies that could support emergency management or border security use cases. The U.S. Customs and Border Protection, law enforcement agencies, and State and Federal emergency management agencies are all examples that would benefit from reliable solutions in these areas.

The impact is that Federal and State agencies who had previously invested in fleets of UAS manufactured in restricted nations now have very few and increasingly expensive options for bringing their UAS operations into compliance. COLSA and other companies like ours are well-structured to do business with these Government agencies. A company of our size with a successful track record in Federal contracts makes the support to these agencies low risk. However, there is a challenging process to be evaluated and certified for sales to either defense or civil agencies.

EVOLUTION OF INDUSTRY TECHNOLOGY

In the coming years, major areas of technological enhancement will certainly focus on the concept of empowering autonomous mission execution. For UAS to be able to reach their potential to seek injured persons after a natural disaster, for example, technologies that support Beyond Visual Line of Sight (BVLOS) operations must mature. BVLOS requires long-range communication links to maintain control of the UAS over extended distances, potentially using cellular networks, satellite links, or high-frequency radio signals. Reliable data links are necessary for real-time data transmission, including video feeds, sensor data, and control commands to the ground station.

BVLOS relies on autonomous navigation capabilities, allowing drones to follow pre-programmed routes or respond to real-time commands without constant human oversight. To accomplish this, resilient Global Navigation Satellite System (GNSS)

or alternative navigation methods, resistant to jamming, are crucial for accurate positioning and tracking.

Finally, Artificial Intelligence and on-board processing must progress so that UAS can detect and avoid obstacles, self-determine route planning, and make mission-driven decisions during BVLOS operations.

Battery technology has come a long way, but this area must also evolve. Current battery technology struggles to provide the necessary power for extended flight times without being excessively heavy. Research into new battery chemistries and materials is crucial to increasing the amount of energy that can be stored in a given volume and weight. Every ounce of weight affects flight time. More sophisticated sensors are likely to increase the overall power draw, too. China still manufactures 70–80 percent of the world's lithium-ion batteries. Developing faster recharging systems and batteries that maintain optimal performance across a wider temperature range are also important areas of improvement in battery technology.

CONCLUSION

We thank Congress for securing the UAS technology supply chain through the ASDA and other NDAA provisions. We believe it is an essential step to shore up vulnerabilities from foreign exploitation. We also acknowledge the work of DIU and AUVSI to create certification pathways by vetting UAS platforms and technologies. These actions enable agency confidence when procuring systems and enhance the domestic UAS and component manufacturing base.

To maintain capacity and allow for greater competition in the market, we must open the aperture in approving compliant UAS technologies and platforms for both defense and civil agency use. This could be achieved through streamlined evaluations, additional certifying bodies, and automation.

Finally, we hope you will support research and development in the technology areas that support BVLOS operations, improve domestic production capacity, and improve battery technology.

I greatly appreciate the opportunity to address this committee and would be happy to take questions.

Mr. GUEST. Thank you, Dr. Ledbetter.

I now recognize Mr. Hendrix for 5 minutes to summarize his opening statement.

STATEMENT OF JERRY H. HENDRIX, EXECUTIVE DIRECTOR, ROTORCRAFT SYSTEMS ENGINEERING AND SIMULATION CENTER, UNIVERSITY OF ALABAMA IN HUNTSVILLE

Mr. HENDRIX. Good afternoon, Chairman Guest and Strong and Ranking Members Correa and Kennedy and the subcommittees. On behalf of myself, Jerry Hendrix, and our 130 Center employees, all of who are U.S. citizens and are cleared, the University of Alabama brings you greetings from Alabama.

Thank you for inviting us up today to testify. Thank you for you and your staff's service to the American people. We really appreciate that.

UAH ranks sixth in federally funding in aeronautical and aerospace research. Our center specializes in autonomous research focusing on unmanned aircraft systems and counter-unmanned aircraft systems.

Our disaster response research has been recognized nationally by the Commercial Drone Alliance in testimony before Congress in 2023. UAH's research with exercises across natural and human-made disasters was identified as one of the top 8 UAS programs to bring benefit to the American people.

Over the past 20 years, I've been involved in over 4,000 development operations, training, and policy development programs, and separate incidents in testing, exercise, and disaster response. Some of our Center's research capabilities includes UAS use in disaster exercises, more operations and real disasters, world-wide un-

manned aircraft systems threat analysis, development of unmanned aircraft systems as threat replicas and also role play, and development of unmanned aircraft systems in use by the DOD. Our center also supports FAA UAS research and trains DOJ agents in UAS use.

Drone technology is advancing and evolving and offers great benefit to the DHS enterprise. We need 3 things: DHS-focused innovations, clear and controllable air space, and special provisions for training exercise and operations.

UAH research has resulted in many operations. Here's just a few.

Of concern, operational disciplines across the UAS domain, especially when it comes to operational procedures compliance and controlling the operational environment for unwanted UAS operators. Some responders noted to us that the air responses are really the "Wild West."

Consistent operation procedures with checklists, checklists, and even more checklists must be used for any safe operation and response. The training and credentialing of our operators to a standard set of minimal operation proficiency standards is a must. Research, training, and exercises in operations are overburdened by regulations and processes imposed by multiple agents. We must be able to research and train as we respond and conduct missions.

Responders and agents must be able to protect our own assets and our transportation infrastructure from unwanted sometimes nefarious UAS incursions. Therefore, counter UAS systems must be tested and validated against certified threats by independent agents, and the surrounding environment is supposed to be characterized for possible impacts.

Today most UAS systems are becoming just too expensive. Introducing new technologies and innovations are needed. Regulatory restrictions, process, and documentation cannot force unnecessary technological constraints that drive cost.

New technology for controlling the air space via the automated Air Boss, use of autonomy, swarming artificial intelligence/machine learning, beyond visual line-of-sight operations, and technologies offer the ability to respond more rapidly and effectively.

Research is needed to incorporate these 2 technologies and must be adjusted to allow safe introduction. Such technology insertion research could be part of a DHS innovation program to identify novel UAS technology that is simple, low cost, highly productive to mission needs, and rapidly reconfigurable to adjust to the mission as it adjusts. The results would be a DHS meeting need instead of UAS that is being made and manufactured in America.

We should allow a realistic use of national air space in the location of UAS and test UAS ranges like, for example, at the Huntsville International Airport with appropriate waivers.

Additionally, cooperative threat analysis across multiple agents is needed. For the border's UAS open-source threat analysis that we just ran shows the following: Cartels are using UAS for surveillance; fiber optic control UAS are at the border; drones dropping bombs and incendiary devices are also there. This capability came from the Ukraine-Russian war and is now available to be purchased on-line making it easily available. We have seen multiple

drone carriers as well from manned aircraft and morphing structures.

In conclusion, support is needed for more effective and efficient responses. I ask for the committee's assistance in allowing DHS enterprise more leeway and freedom to research, test, and conduct exercises. Changing regulations for this support and allocating more resources for more research in supporting technology will allow a more effective, efficient, and real-world life response. We need to train and exercise as we operate.

We need the innovation program that would generate UAS technology specified by DHS that is DHS-focused, simply used, low cost, reconfigurable, and highly developed to mission needs.

Thank you for your attention and consideration. I look forward to continuing discussion, and I want to assure that UAH will continue to support and research to protect our citizenry, assist our soldiers and agents, get disaster victims on the road to recovery faster, and save lives.

Thank you.

[The prepared statement of Mr. Hendrix follows:]

PREPARED STATEMENT OF JERRY H. HENDRIX

APRIL 1, 2025

INTRODUCTION

Good morning Chairmen Guest and Strong and the Ranking Members and Members of the Border Security and Enforcement and Emergency Management and Technology Subcommittees. On behalf of myself, our 130 center employees who are all cleared and U.S. Citizens, and the University of Alabama in Huntsville, I bring you greeting from Alabama. Thank you for inviting me to testify today April 1, 2025 on "Exploring the Use of Unmanned Aircraft Systems Across the DHS Enterprise".

My name is Jerry Hendrix and I serve as the executive director of one of our 17 University research centers focused on performing autonomous aerospace research at the University of Alabama in Huntsville (UAH). Our center is part of a tier 1 research university that ranks 6th in Federal investment in aeronautical and aerospace engineering research. The center specializes in autonomous research focusing on uncrewed systems and counter-uncrewed systems. Our unmanned aircraft system (UAS) disaster research has been recognized nationally by the Commercial Drone Alliance in testimony to the House Space, Science, and Technology Committee in 2023. UAH's research was specified as the one of the top 8 UAS programs to "bring benefit to the American People." That research was focused on "UAS Use in Natural and Human Disasters".

Over the past 20 years, I have been involved in UAS development, operations, training, and policy development. I have been involved in over 4,000 separate UAS operations in testing, exercises, and disaster responses working across several academic institutions and Government agencies. While at Texas A&M University, I served as the Air Wing 1 Commander for the State of Texas and the Federal Emergency Management Agency (FEMA) Texas Task Force 1 for disaster response while also serving as the executive director of the Texas Federal Aviation Administration (FAA)-designated UAS Test Site. While at UAH, I recently completed my term as president of Huntsville's Pathfinder Chapter of the Association of Uncrewed Vehicle Systems International (AUVSI) and led our UAS research at UAH. That research includes UAS use in disasters research and exercises, deployment of UAS to real border operations and real disasters, uncrewed threat analyses, development of uncrewed systems as threat replicas, and development of uncrewed systems used by the DOD. Our center has supported the Department of Homeland Security (DHS) in evaluating and using UAS as a viable technology and evaluations of counter-insurgency systems. The university holds a Cooperative Research Agreement with NOAA for UAS use in disasters. A majority of our center's staff are currently FEMA-trained for disaster response.

AN OVERVIEW OF RESEARCH/OPERATIONS RESULTS

Applied research focused on the DHS domains has resulted in many observations documented within this testimonial statement. The broad base of our experience researching and operating UAS is with FEMA, DHS Science and Technology, CBP, and in some cases supporting critical infrastructure protection. In UAS, our center trains DOJ agents in UAS operations, develops UAS for DOD including threat replicas, performs multiagency threat analyses and supports the FAA and the National Oceanic and Atmospheric Administration (NOAA) research applications. This testimony will focus on these areas based on lessons learned supporting the DHS enterprise.

There are several primary areas of concern with UAS Operations in the DHS Enterprise:

1. Operational discipline across the UAS domain especially when it comes to operational procedures compliance and controlling the operational environment;
2. Overburden of regulations and processes imposed by multiple agencies in training and operations;
3. Protection of our own assets and infrastructure from unwanted and sometime nefarious UAS incursions;
4. The cost of systems at large based on the industrial complex costing models;
5. The challenges of introducing new technology and capabilities that are mission-focused, low cost, and expendable or maintainable.

LESSONS LEARNED FROM THE USE OF UAS ACROSS THE DHS ENTERPRISE

For the next couple of minutes, I would like to discuss the lesson learned from over 4,000 UAS missions and operations of which a large number relate to the DHS mission set.

TECHNOLOGY AND COMMON OPERATIONAL CHALLENGES

- Our research found that the current status is referred to by existing UAS operators as the "Wild West". This is because of the presence of untrained UAS operators and non-cooperative UAS operators who appear during operations supporting disasters or missions.
- Operational discipline is extremely important. Consistent operational procedures including checklists, checklists, and even more checklists must be used for any operation and response. This will ensure a safe and effective operation. The training and credentialing of operators to a standard set of Minimal Operational Proficiency Standards (MOPS) would be extremely valuable. The following 7 areas of proficiency are highly recommended:
  1. Communications—Understanding terminology and its appropriate use for command operations;
  2. Pilot Dexterity and Skills—Proficiency in the skill, precision, and finesse of flying;
  3. Visual Acuity—Competence in using UAS for area scan searches using different techniques;
  4. Air space Operations—Understanding regulatory frameworks (Federal, State, and local) and limitations;
  5. Understanding Command Operations—How to operate with an Air Boss and FEMA's established Incident Command Structure (ICS);
  6. Performance of Safety and Risk Analysis—Institutionalized safety practices and an identification process for risks and mitigation strategies;
  7. Knowledge of UAS, Sensors, and Data Products—Understanding which UAS and sensor sets best fit the mission need and which data products are needed immediately and to be stored for possible future actions.
- UAS development and fielding costs should continue to go down over time as technology evolves unless regulatory restrictions force unnecessary constraints. Autonomy, swarming (multi-aircraft operations), Artificial Intelligence/Machine Learning (AI /ML), Beyond Visual Line of Sight (BVLOS) operations, special purpose solutions and other technology uses offer the ability to respond more rapidly and effectively. Research is needed to incorporate these technologies while regulations must be adjusted to safely allow their introduction. Such technology insertion research could be a part of a National Security and Technology Innovation Program to identify novel UAS technology that is simple, low cost, highly productive to mission needs and rapidly reconfigurable to adjust as the mission adjusts and Made and Manufactured in America! The result would be highly-capable, low-cost UAS, mission-focused solutions.

- Regulations are most necessary for UAS operations but hinder UAS for both disaster response exercises and DHS training and operational exercises. We need to train and plan as we operate! Federal agencies might violate a law if they do any detection or mitigation against a drone without specific authorization. Those authorizations should be streamlined. I have provided those regulations in my references.
- Overall, the use of mechanisms to control the air space (such as an Automated Air Boss when DHS is operating) would prohibit unwanted UAS operations for hobbyists or non-cooperative entities.
- Fleet control and an understanding all communications systems and operational frequencies must be known by the incident command structure and Air Boss.
- One of my concerns is the vulnerability of our Nation's airports, highways, maritime transportation systems, railways and mass transit, and pipeline systems to an unwanted UAS drone attack. If we recall the total paralysis that the Nation experienced after 9/11, it's not hard to imagine the impact of a successful UAS attack on any major airport or transportation system in the country. Consider the possibility of an attack on the Mississippi River systems. Our transportation network could be brought to its knees by a single strike. Therefore, the effectiveness of counter uncrewed and UAS systems is of the extreme importance. Counter UAS systems need to be tested and validated against certified threats by independent agents. The testing methods and standards should be established by the independent agents and paid for by equipment vendors.

FIRST RESPONDER CHALLENGES

- It is critical to offer appropriate assistance in the event as agreed to and tasked by Incident Command. Those tasking may include collecting data for the tax assessor or assisting FEMA evaluators to determine storm surge or even assisting in active search-and-rescue events. The right UAS strike team, technology (UAS and Sensors) are critical to success.
- Exercises and training should include the integration of UAS Strike Teams within the response organizations reporting to Incident Command as documented in the FEMA ICS construct.
- First responders can gain efficiency if they can exercise realistically by employing BVLOS operations, Special Government Interests (SGIs) and Temporary Flight Restrictions (TFRs) just as they would in a real disaster or emergency response. This is not currently allowed.
- Rapid field data assessment is needed in a concise and consistent manner.
- Authority to approve special emergency Certificates of Authorization or Waiver (ECOAs) or UAS Disaster Operations should be allocated to Incident structures using Pre-approved TFR training and processes as opposed to using the FAA's System Operations Support Center (SOSC) which may take days.
- Air space approvals must be done in a timely manner and approved operations with limited interference must be done more efficiently. Refer to findings based on research, interviews, and exercises in the Alliance for System Safety of UAS through Research Excellence (ASSURE) A52 FAA Final Report, Reference 2.
- Technology like electromagnetic systems must control the response areas keeping unwanted incursions from happening. Operations must gain approved spectrum usage and air space operational limits. Incidents of UAS operations around manned aviation has been seen in fire and flooding responses.
- Although Standard Operating Procedures (SOPs) are helpful, MOPS would greatly improve response. However, funding is lacking to institutionalize MOPS across all first responders.
- Operations in extreme temperatures may impact the reliability of UAS and Sensor operations and certainly impacts operator's ability to respond effectively. Research is needed in this area of disaster-focused UAS.
- Utilization of tools like mobile internet, social media, signal chat, and Android Team Awareness Kit (ATAK) are beneficial in performing air space deconfliction and resource management in disparate response areas like in the North Carolina Mountains.
- The ability to conduct BVLOS operations is a must for first responders. This can be accomplished through the use of a global network, such as an Automated Air Boss, which overlays the disaster area with the locations, altitudes, speed and direction of aircraft and drones.
- Our research led us to build a Beyond Part 107 for First Responders booklet to help first responders interpret the Part 107 law.

BORDER CHALLENGES

- Border operations would be better executed if allowed to exercise realistically using national air space training locations like the UAS and CUAS Test Range at Huntsville International Airport (HSV) with appropriate approvals/waivers from the FAA, Federal Communications Commission (FCC), and Department of Justice (DOJ).
- Technological advances like automated Air Boss using AI/ML overlaid onto existing solutions like ATAK would expedite emergency responses and provide air space control to "non-cooperatives".
- UAH operates an open-source threat analysis for several Federal organizations. We produced an open-source threat report on the Southern and Northern Borders and augmented it with UAS use on the border. Some of the results are as follows:
  - Fiber Optic-controlled UAS sometimes referred to as "tethered drones or Dark Drones" use fiber optic communications. These UAS are not susceptible to jamming with radio signals and can only be destroyed by blinding the fiber or cutting the tether. Some are small in size but have control fibers thousands of kilometers long. The process originated in the Ukraine-Russia war and now is available on-line. Terrorist organizations have begun or will begin to use this technology shortly.
  - Another technique now being employed by cartels also came from the Ukraine-Russia war and that is the ability for small, agile UAS known as weaponized drones to drop bombs and other incendiary devices.
  - In addition, cartels and drug lords are using their own drones for surveillance of border agent movements and cargo deliveries

CONCLUSION—SUPPORT IS NEEDED FOR MORE EFFECTIVE AND EFFICIENT RESPONSES

In conclusion, I ask for these committees' assistance in allowing our DHS enterprise including our agents, first responders, and supporting partners more leeway and freedom to research, test, and conduct of exercises. Changing regulations for this support and allocating resources for more research into supporting technology will allow more effective and efficient responses.

Agents and responders could benefit from a MOPS-like program to establish and standardize consistent, safe, and effective UAS operations that is focused on mission objectives.

I also want to point out that establishing a National Security and Technology Innovation program that may mimic what has transpired in the DOD would generate technology specified by DHS. This program would be laser-focused on applications that are simple, low cost, highly productive to mission needs and rapidly reconfigurable and Made and Manufactured in America!

And last, I would like to offer the concept of testing of any counter systems by using certified developed threats that replicate the threats we see today across peer nations and adversaries.

Thank you for your attention and consideration. I look forward to continued discussions and want to assure you that UAH will continue to support research to protect our citizenry, assist our soldiers and agents, get disaster victims on the road to recovery, and save lives.

Please note my references and resources as documented.

REFERENCES & RESOURCES

(1) FAA Memorandum dated February 29, 2024: "Updated FAA Priorities—New Test Plan for A11L.UAS.090, Evaluation of Unmanned Aircraft Systems (UAS) Integration Safety and Security Technologies in the National Airspace System (NAS) Program (A60)", Matt Novak and Tricia Fantinato.

(2) UAH FAA A52 Final Report, "ASSURE A52: Phase II—Preparation for Disaster Preparedness and Response using UAS in the NAS with Coordination Across First Responders", October 2024. *chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://assureuas.com/wp-content/uploads/2021/-06/A52-Final-Report-V13__FINAL.pdf.*

(3) UAH FAA A62 Final Report, "ASSURE A11L.UAS. 68__*A62: Disaster Preparedness and Emergency Response Phase III", March 2025 chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.assureuas.org/wp-content/-uploads/2022/03/ASSURE__A11L.UAS__.68__A62__Final__Report__v3.pdf.*

(4) NewsNation Report March 21, 2025 "US Unprepared for Dark Drone".

(5) "How the U.S. is confronting the threat posed by drones swarming sensitive national security sites", CBS News, "60 Minutes," originally broadcast 3/16/25.

https://www.cbsnews.com/news/drone-swarms-national-security-60-minutes-transcript/.

(6) Detection: The Pen/Trap Statute, 18 U.S.C. §§ 3121–3127, criminalizes the "use" or "installation" of a "device" or "process" that "records," "decodes," or "captures" non-content information like dialing, routing, addressing, or signaling ("DRAS") information. See Interagency (DOJ, DOT, FCC, DHS) "Advisory on the Application of Federal Laws to the Acquisition and Use of Technology to Detect and Mitigate Unmanned Aircraft Systems" dated August 2020.

(7) Detection: The Wiretap Act (also known as Title III), 18 U.S.C. §§ 2510 et seq., prohibits, among other things, "intentionally intercept[ing]" the content of "any . . . electronic communication[,]" unless it is conducted pursuant to a court order or a statutory exception applies. See Interagency (DOJ, DOT, FCC, DHS) "Advisory on the Application of Federal Laws to the Acquisition and Use of Technology to Detect and Mitigate Unmanned Aircraft Systems" dated August 2020.

(8) Mitigation: 18 U.S.C. § 31(a)(1), The use of non-kinetic or kinetic solutions may implicate Federal criminal prohibitions against, among other things, intercepting and interfering with communications, damaging a "protected computer," and damaging an "aircraft." The term "aircraft" refers to "a civil, military, or public contrivance invented, used, or designed to navigate, fly, or travel in the air." See Interagency (DOJ, DOT, FCC, DHS) "Advisory on the Application of Federal Laws to the Acquisition and Use of Technology to Detect and Mitigate Unmanned Aircraft Systems" dated August 2020.

Mr. GUEST. Thank you, Mr. Hendrix.

I now recognize Chief Fetterman for 5 minutes to summarize his opening statement.

STATEMENT OF KEVIN FETTERMAN, FIRE DIVISION CHIEF, DIVISION 4, ORANGE COUNTY FIRE AUTHORITY, ON BEHALF OF THE INTERNATIONAL ASSOCIATION OF FIRE CHIEFS

Chief FETTERMAN. Good afternoon, Chairman Guest, Ranking Member Correa, Chairman Strong, and Ranking Member Kennedy. I'm Division 4 Chief Kevin Fetterman of the Orange County Fire Authority. Today I'm representing the International Association of Fire Chiefs. I appreciate the opportunity to discuss UAS and the role they play in the Department of Homeland Security's enterprise.

Fire and EMS departments across the Nation are beginning to deploy UAS during emergency operations. UAS provides a number of capabilities to improve emergency response operations and reduce life and property loss. From the perspective of an incident commander, it is key to gain situational awareness at the beginning and maintain it throughout an incident.

UAS provides real-time data about the incident scene through aerial high-resolution imagery plus videos. Thermal imaging by UAS can determine the spread of a fire or the potential hot spots outside the line of a wildland fire. The LIDAR capabilities of a UAS can be used to assess landslides and mud and debris flows. UAS can also be used to identify subjects during search-and-rescue missions and for operational missions, like delivering supplies or conducting firing operations during wildland fires.

The September 2024 airport fire demonstrated the utility of public safety UAS. The OCFA deployed its UAS early to gain necessary situational awareness. During the incident, we used local and Federal UAS with infrared cameras to track the fire and determine the extent of the remaining hot spots. While the fire covered 23,519 acres and burned more than 160 structures, it still provided a great

example of how interagency collaboration can manage an incident successfully in a high-complexity environment.

During wildland fires and other major incidents, it is important to integrate operations of multiple emergency response aircraft. In California, the fire traffic areas are established to provide coordination between helicopters, fixed-wing air tankers, command-and-control aircraft, UAS, and other aircraft. The FAA also institutes temporary flight restrictions, also known as TFRs, to ensure the safety of first responders as they engage in emergency operations.

The January 2025 L.A. fires demonstrated the advantages and risks of UAS use. For example, public safety UAS provided real-time information and data on the fires in Pacific Palisades and other localities. However, public recreational UAS incursions create a great risk to our operations. Between January 7 and January 25, there were more than 700 incursions by more than 400 different UAS. One UAS flight was recorded at a level of 20,000 feet, and in another, a public UAS operator lost track of his aircraft and it hit a Canadian Super Scooper. It put a hole about this size in the wing. This accident endangered the lives of the crew, endangered the lives of first responders on the ground, and grounded the aircraft.

We ask Congress and the Federal Government to take action to protect emergency operations from these UAS incursions. Specifically, we recommend passing legislation that would thwart pilots of UAS incursions into fire traffic areas and TFRs. Legal protections should be in place to maximize the ability of first responders to save lives.

Formulating and implementing clear UAS mitigation procedures. Identifying Federal law enforcement personnel and processes for eliminating threats to public safety operations.

Enhancing remote ID requirements and reducing remote ID bypasses.

Establishing formal coordination plans with all relevant local, State, and Federal stakeholders.

Implementing effective public awareness campaigns and developing continuing education for the public about the safe operations of UAS.

Last, encouraging UAS manufacturers to develop solutions that universally support the emergency operations of American first responders.

In closing, thank you for the opportunity to testify at today's hearing. Fire and emergency—EMS departments are embracing the various benefits that UAS can provide for their emergency response operations. By coordinating the use of Federal, State, and local UAS, the incident commanders can get a better understanding of emergency incidents and even identify and provide resources to victims. However, we must work to make the air space safer for our emergency responders. The Federal Government needs to be more aggressive in developing and enforcing restrictions on public UAS incursions into TFRs. As we tell the public in California, if you fly, we can't.

I look forward to answering any questions that you may have. Thank you, and I appreciate the opportunity.

[The prepared statement of Chief Fetterman follows:]

PREPARED STATEMENT OF KEVIN FETTERMAN

APRIL 1, 2025

Good afternoon, Chairman Guest; Ranking Member Correa; Chairman Strong; and Ranking Member Kennedy. My name is Kevin Fetterman. I am the Division 4 chief with the Orange County Fire Authority (OCFA) in Orange County, California. I oversee the delivery of Fire and Emergency Services in the communities of Tustin, Villa Park, and Yorba Linda. I appreciate the opportunity today to discuss Unmanned Aircraft Systems (UAS) and the role they play across the Department of Homeland Security (DHS) enterprise.

Today I am testifying on behalf of the International Association of Fire Chiefs (IAFC). The IAFC represents the leadership of over 1.1 million firefighters and emergency responders. IAFC members are the world's leading experts in firefighting, emergency medical services, terrorism response, hazardous materials (hazmat) incidents, wildland fire suppression, natural disasters, search and rescue, and public-safety policy. Since 1873, the IAFC has provided a forum for its members to exchange ideas, develop best practices, participate in executive training, and discover diverse products and services available to first responders.

America's fire and emergency service is an all-hazards response force that is locally situated, staffed, trained, and equipped to respond to all types of emergencies. There are approximately 1.1 million men and women in the fire and emergency service—consisting of approximately 300,000 career firefighters and 800,000 volunteer firefighters—serving in over 30,000 fire departments around the Nation. They are trained to respond to all hazards ranging from earthquakes, hurricanes, tornadoes, and floods to acts of terrorism, hazardous materials incidents, technical rescues, fires, and medical emergencies. We usually are the first at the scene of a disaster and the last to leave.

I also would like to extend my gratitude to Orange County Fire Chief Brian Fennessy, Deputy Chief TJ McGovern, and Assistant Chief Baryic Hunter for supporting my testimony here today. As you may know, Orange County is the third-most populous county in California and the sixth-most populous in the United States. The population is larger than 21 States, and the county is the second-most-densely populated in California. The OCFA is an all-hazard regional fire service organization. Over 1,500 career firefighters and staff serve 23 cities in the county and all unincorporated areas in a 586-square-mile coverage area. The OCFA protects nearly 2 million residents from its 78 fire stations, covers over 188,817 acres of wildland, and 658,659 dwellings. The OCFA responded to nearly 183,900 incidents in 2024.

SITUATIONAL AWARENESS

From the perspective of an incident commander, it is key to establish and maintain situational awareness at the beginning—and through the duration—of an incident. Situational awareness can be defined as the understanding of an environment, its elements, and how it changes over time or in response to other factors. As local fire departments purchase UAS and incorporate them into their operations, the UAS are becoming a significant asset in improving situational awareness on the incident scene.

For example, UAS can provide real-time data of the incident scene by providing high-resolution aerial images and videos to the incident management team to better coordinate operations. Thermal imaging by UAS can determine the spread of a fire and potential hot spots in a wildland fire. The use of LIDAR (light detection and ranging) capabilities on UAS can be used to assess landslides and mud and debris flows. UAS also can be used in search-and-rescue incidents to both identify victims and provide overwatch during operations. By using a commercial common platform, incident commanders can analyze the data from UAS and make critical time-sensitive decisions to keep their personnel safe.

The UAS also can take response roles during incidents. They can be used to provide medical resources and food to responders or civilians in the field. They also can be used as Plastic Sphere Dispensers to assist with firing operations during active fire areas. In many cases, UAS can be used in dangerous or technically challenging situations instead of endangering fire service personnel.

FIRE TRAFFIC AREAS

In order to successfully utilize UAS on incident scenes, they must be integrated with Fire Traffic Areas (FTA). The FTAs were established as interagency air space management tools for standard communication protocols. In California, it is the

interagency standard for aerial firefighting. The FTA can be further defined as air space with a 5-nautical-mile radius from an incident during suppression operations.

FTAs are a layered approach to aeronautical management. Within FTAs, coordination takes place with helicopters, fixed-wing tanker aircraft, command-and-control aircraft, intelligence-gathering aircraft, as well as UAS used by public safety. When recreational or non-public safety UAS encroach upon FTAs or areas covered by the Federal Aviation Administration's (FAA) Temporary Flight Restrictions (TFR), they create a significant danger for the fire service aircraft and personnel.

THE SEPTEMBER 2024 AIRPORT FIRE

These lessons and the validation of the benefits of public safety UAS were clearly proven on the Airport Fire in early September 2024. I was one of the Unified Incident Commanders for the 23,519-acre Airport Fire in Orange County. It burned aggressively between both Orange and Riverside counties, with, unfortunately, more than 160 structures being lost. It also coincided with the Lines Fire in San Bernardino County and the Bridge Fire in Los Angeles County.

At the beginning of this incident, we were able to deploy OFCA's fleet of UAS to establish situational awareness as a first step to the response. During the incident, we were able to use Federal, county, and local UAS with infrared sensors to determine the extent of the remaining hotspots. This incident provided a great example of how Federal, State, and local interagency collaboration can successfully manage a dangerous incident. The OCFA is continuing to use its UAS fleet in collaboration with local academia to monitor for mud and debris flows in these same fire areas.

2025 SOUTHERN CALIFORNIA WILDFIRES AND THE IMPORTANCE OF UAS

The beginning of 2025 brought some of the most challenging environmental conditions we have ever seen in Southern California. On January 7, the devastating wildfires that we saw in cities like Malibu, Altadena, Pasadena, and other localities impacted the lives of hundreds of thousands of people. The 2025 Southern California wildfires will have a lasting impact for us all.

For many Californians, the 2025 Southern California wildfires were the first time they recognized that UAS could play a role in wildland fire response. Due to extensive media coverage of this event, citizens watched as UAS assisted first responders in their efforts to manage the incident. The UAS were able to provide up-to-date data and information in real time, including through thermal imaging. The combination of UAS and common UAS operation platforms provided the capability for first responders to save more lives.

Proper procedures, such as FTAs and FAA TFRs, went into effect as the incident got under way. These safety procedures were put into place to mitigate the risk of recreational UAS interfering with the work of first responders. Unfortunately, many Southern Californians were either not aware of the FTA/TFRs or they simply chose to ignore them.

RECREATIONAL UAS INCURSIONS

In the State of California, we say "if you fly, we can't." Two of the pillars that ensure successful UAS operations are communications and coordination. Often the response to a wildland fire can be chaotic. When the non-public safety UAS encroach upon the air space, it can create dangerous situations and accidents.

The beginning of 2025 brought some of the worst air space deconfliction issues we have seen. There were more than 700 UAS intrusions into the Palisades Fire TFR/FTA by more than 400 different UAS between January 7 and 25. The highest UAS flight was even noted as high as 20,000 feet.

In one instance, a California resident used his personal UAS to survey the fire damage during an active TFR. He launched the UAS from a parking garage in Santa Monica. After flying the UAS more than a mile away from his location, he lost track of the UAS' position. It crashed into a Canadair CL–145 fixed-wing, Canadian Super Scooper, which was engaged in fire suppression operations. It was 1 of the 2 Canadian Super Scoopers deployed to the fires.

SOLUTIONS TO DISCOURAGE RECREATIONAL UAS INCURSIONS DURING EMERGENCY EVENTS

This challenge of UAS incursions creates an extreme risk factor in situations such as fires, disasters, or at the border. There are many steps that can be taken to reduce/eliminate UAS incursions from incidents such as wildfires. These following suggestions are ways in which UAS operations can be strengthened for first responders:

- Develop and enact legislation that would thwart pilots of UAS incursions into FTAs/TFRs. Legal protections should be in place to maximize the ability of first responders to save lives
- Formulate and implement clear UAS mitigation procedures. Identifying Federal law enforcement personnel and processes for eliminating threats to public safety UAS operations.
- Enhance Remote ID Requirements and reducing Remote ID bypasses.
- Establish formal coordination plans with all relevant local, State, and Federal stakeholders.
- Implement effective public awareness campaigns and develop continuing education for the public about the safe operation of UAS.
- Encourage UAS manufacturers to develop solutions that universally support the emergency operations of American first responders.

CONCLUSION

In closing, I would like to express my sincere appreciation for the opportunity to testify about the use of UAS across the DHS enterprise. A greater number of fire and EMS departments are deploying UAS to assist with their emergency operations. They are finding that UAS can improve situational awareness, deliver resources, and provide specialized capabilities for search-and-rescue and other specialized missions. However, the public must use UAS in a responsible manner and not be allowed to interfere with emergency operations or endanger the lives of the public or first responders. The IAFC looks forward to working with the committee to incentivize the available use of UAS for local public safety agencies, while also ensuring their safe operation by the public.

Mr. GUEST. Thank you, Chief Fetterman.

Members will be recognized by order of seniority for their 5 minutes of questioning. An additional round of questioning may be called after all Members have been recognized. I now recognize myself for 5 minutes of questioning.

Director Farrell, thank you for being here today. We have seen that recent concerns over privacy, public safety, and national security have led to restrictions on drones from certain foreign manufacturers. Given these concerns and these restrictions, how is the industry affected by requirements imposed by the National Defense Authorization Act?

Mr. FARRELL. Thank you, Chairman Guest. So I believe that the United States industry is playing catch-up. I think that the commercial market and first responders have had access to cheaper Chinese technology, in particular, for quite a while. I think that we had heard testimony around the program that DIU has that has certainly led to advancements and investment in U.S. manufacturing. I think that the CHIPS Act and other efforts in order to bring the technology back here to invest in the critical components, the auto pilots, the camera systems have made a lot of headway.

If you had asked me this question several years ago, I think I would have said we're pretty far away, but recent investments, recent technology is really showing vast improvements.

The work that we're doing through program jus-—or Project JUSTICE—is meant to support DHS components in their procurement processes. You heard about the bottleneck at DIU. One way that we're trying to support industry here is to give them an alternative pathway for DHS procurement processes where we do our own vetting, we do our own cyber vulnerability assessments as well as critical component analysis, and that opens the door for DHS components as they choose to request and look at different technologies to be able to give other manufacturers an opportunity to

sell and to ensure that the components have a safe product at the end of the day.

So all that to say is the NDAA requirements have truly caused some bottlenecks, but we are working rapidly to try to alleviate those and enhance the American product and as well as ensure the safe operations.

Mr. GUEST. Director Farrell, you mentioned project JUSTICE, a partnership between DHS S&T and the Raspet Flight Center there located at Mississippi State University. Could, No. 1, you just give us kind-of a brief overview of Project JUSTICE, and then you mentioned just a moment ago, but maybe go into a little bit more detail the work being done to support the Department of Homeland Security?

Mr. FARRELL. Absolutely. So Project JUSTICE was started as the common UAS test site back in 2016. We exist now in our current iteration as Justice NextGen as the joint unmanned systems testing in a collaborative environment program under the Air, Land, and Ports of Entry portfolio. As a part of this work, we support all of the components for their UAS testing, as well as research and development needs as it relates to UAS, as well as other associated technologies.

So as DHS gets a gap within the UAS world, they'll reach out to us to be able to analyze that. This can take many different forms. It can be looking at the landscape of commercial available products. It can be examining what exists within our research portfolio to understand what can fit that space. It can also be custom UAS development. We've developed UAS that the market wasn't providing for HSI, an entry-level drone that had some really great capabilities. It can also be items where—like air domain awareness. We just delivered a tool for DHS that provides air domain awareness leveraging beyond visual line-of-sight capabilities that remote ID are meant to provide. Then also a broadcast or an ATAK system to give situational awareness, and we demoed that actually at the university's campus around a football game scenario.

We've also leveraged the program to support FEMA Region 4, so we actually flew the Teros in support for Helene as well as Debby, and that was a really great showcase of a 44-foot wingspan aircraft, 24 hours of endurance that can distribute live video and tiled imagery.

Those are just some of the things we're doing. But truly, I think that the portfolio, given the partnerships, given the collaborations with our ASSURE Center of Excellence as well as the other industry partners, really opens the gamut for what we can provide to DHS.

Mr. GUEST. Thank you, Director Farrell. My time has now expired.

I would like to recognize Ranking Member Correa for 5 minutes for any questions he may have.

Mr. CORREA. Thank you, Mr. Chairman.

Mr. Fetterman, you oversee the command and emergency planning division of the largest fire agency in Orange County. Nearly 2 million residents across 78 fire stations. You have a lot of experience with search-and-rescue and planning missions.

How do emerging technologies like drone technology help keep Orange County residents safe?

Chief FETTERMAN. Ranking Member Correa, thank you for the question. I appreciate the opportunity to answer it.

Orange County Fire is fortunate, under the leadership of Fire Chief Brian Fennessy, to lean fairly in to emerging technology. We see it as an important aspect, that being meeting the threats that we face. We utilize every opportunity to engage in emerging technology, such as AI cameras for fire detection. As you pointed out, we utilize a significant fleet of drones.

Utilizing on the fire line to determine and look for hot spots, especially outside of the line, those are areas of the fire that you might not be able to see from the ground, but using the aerial observation and gaining that situational awareness, you can find spots that could turn into a significant fire later, especially if there's spots in between the fire line and——

Mr. CORREA. So identifying those spots before they flare up saves countless lives, millions, if not billions, of dollars in damage. You mentioned 150 structures recently burned in Orange County. Boy, when those fires go, they really go quickly. Technology, emerging technology, private sector, public sector.

Recently, Elon Musk attempted to fire 400 employees of DHS. Some of those employees were at the Department of Science and Technology Directorate, which is really in charge of R&D, figuring out better ways keeping Americans safe. They were developing, testing, and evaluating tools that help firefighters navigate in dark, smoke-filled buildings; how to rescue trapped civilians; communicate with firefighters, first responders.

Can you speak to the importance of making sure that kind of research and development is developed as quickly as possible?

Chief FETTERMAN. Yes. So, certainly, I would say that the DHS science and technology is a critical aspect. We utilize that technology. We're leaning into firefighter tracking and identifying where our personnel are, and that's not an easy task. We have to leverage all available technology to do that. So emerging technology and even the bigger support of FEMA programs, like the National Fire Academy and the U.S. Fire Administration, those are all critical to the fire service. Those are the backbones of our leadership programs and our ability to educate and teach our new and upcoming fire service leaders.

Mr. CORREA. Mr. Fetterman, we're talking about the affirmative use of drones. What about the defensive side in emerging technologies?

You just talked about what I would consider a knucklehead, a drone flying in an active emergency situation. I'd say these people have no common sense. I don't care how criminal you make it. They are going to do dumb things.

So I would imagine the emerging technologies that we can come up with to clear the field, so to speak, so you can do work is also an important part of the emerging technology.

Chief FETTERMAN. Yes, sir. So seeing the report of the number of drone incursions on the fires in Los Angeles was, frankly, shocking. To see that number of drone incursions into a fire traffic area, and what that is, is you're talking about multiple aircrafts, 30 heli-

copters, 6 to 8 fixed-wing air tankers, and so—all operating to extinguish and mitigate the fire. So when you have drone incursions in there, we need to do—we and ideally this committee and Congress all together needs to take swift action to mitigate those incursions into our fire traffic areas, and specifically the TFRs. It's an incredibly dangerous situation.

Mr. CORREA. Chief, in my last 35 seconds, we've established that drone technology, emerging technology, very important, very useful, also very dangerous. How can we in Congress help you do your job better?

Chief FETTERMAN. Well, certainly the emerging technology is critically important to us. Leaning into that, supporting legislation that protects the first responders. As I mentioned, the National Fire Academy is our leadership backbone. That's where all of our leaders that bring that vision to engage into emerging technology come from. They're coming out of programs like the Executive Fire Officer Program. Certainly the support of all the grant programs—AFG, SAFER, HSGP, UASI—those are the types of programs that help the first responders at the boots on the ground, boots in the dirt level, to continue to evolve. So I'd encourage this group to continue to support those programs.

Mr. CORREA. Chief Fetterman, thank you for joining us today, and look forward to continuing working with you. Thank you, sir.

Mr. Chairman, I'm out of time, but before I do turn over my time, I'd like unanimous consent to insert into the record an article from the DHS Science and Tech Directorate dated November 6 of 2023, titled, "Picturing the Future of Firefighters," which describes how science and technology serves a crucial role in R&D and testing technologies alongside the private sector to help our firefighters and other first responders to respond safely to emergencies and save lives.

Mr. GUEST. Without objection.

[The information follows:]

FEATURE ARTICLE: PICTURING THE FUTURE OF FIREFIGHTING

Release Date: November 6, 2023

https://www.dhs.gov/science-and-technology/news/2023/11/06/feature-article-picturing-future-firefighting

Trying to find your way through an unfamiliar building filled with dark, dense smoke while lives are on the line is not an ideal work environment, but for countless firefighters, it's the reality. These types of low-visibility situations are unavoidable—and can be extremely hazardous. Responders can become disoriented during emergency operations when every second counts. Rescuing trapped or incapacitated civilians, keeping tabs on fellow responders, communicating with the command center, and locating exit routes—all while navigating through flames and debris—is an enormously daunting task. The Science and Technology Directorate (S&T) has been working with an innovative private industry partner and first responder evaluators to design a technology that will guide firefighters through low-visibility environments and get them safely back home to their families.

SEEING THROUGH THE SMOKE

C–THRU is a real-time, indoor visualization system currently in development with San Francisco-based startup Qwake Technologies, Inc. S&T is supporting this research and development effort with funding as well as expert oversight every step of the way. "The main objectives of the project are to provide effective navigation in obscured environments, enable safe and coordinated situational awareness in chaotic conditions, and support rapid decisionmaking in high stress situations," said

S&T Program Manager Maua Karen Johnson. "The bottom line is C–THRU will save lives."

The C–THRU system will deliver a hands-free, augmented reality visual overlay, powered by a micro-computer safely housed inside an easily wearable device that attaches to a standard firefighter helmet. C–THRU consists of two components: the Navigator (worn on the helmet) and the Visual Command (a tablet used by incident commanders to see what their crew members are seeing). The display is meant to minimize confusion and disorientation, using advanced thermal imaging to identify surfaces and objects in the vicinity, such as stairs and people.

According to Qwake CEO Sam Cossman, "One of the most important features of C–THRU is to take that raw thermal image . . . and kind of draw lines around all the objects in the frame. An outline around a human body or the geometry of a building is rapidly shown through the heads-up display. So, you can very quickly say, 'Am I in a small closet or a big warehouse? Is there a victim on the ground? Is there a staircase to an egress?' This capability is referred to as edge detection and it leverages artificial intelligence and machine learning to help firefighters rapidly make sense of their environment.

In addition to the edge extraction capability Cossman described, Qwake is working on developing a backtracking function that provides turn-by-turn guidance, allowing a responder to follow the path they took into the building back out to safety. It is all too easy to get turned around in an unfamiliar, low visibility environment. The ability to automatically locate a safe exit route addresses the very real concern of firefighters losing their way during a response because they are naturally focused on other issues. C–THRU eliminates the need to form a mental map of one's surroundings, allowing them to focus their attention to the mission at hand.

The personal navigation is further enhanced with a simple, nonverbal two-way communication capability. Incident commanders can request personnel accountability reports through the Visual Command tablet to ensure that crew members are not in distress. Responders wearing C–THRU can send a "thumbs-up" reply, confirming their status or, if needed, issue a mayday to request help.

There is also the opportunity to gain post-operation insight via the Visual Command tablet to support continuous improvement.

INNOVATIONS UPON INNOVATIONS

The heart of the C–THRU device is the Navigator heads-up display. A small piece of abrasion-resistant glass flips down within the user's field of vision and images are projected onto this piece of glass. A reflective coating known as a dichroic filter splits the beam of light that's projecting the images, bouncing certain wavelengths of light back to the viewer's eye while also allowing them to still see through the glass. The glass features advanced hydrophilic coating materials designed to help reduce fogging and power consumption.

C–THRU is designed to be attached to a firefighter's existing helmet during smoke investigations, structural firefighting, and general rescue operations. Three interlinked modules spread functionality and weight across the helmet, while reducing impact risk and snag hazard. The center of mass is strategically located toward the back of the head rather than the front to reduce forward tipping and improve comfort. The adjustable mechanical hinge boasts a breakaway safety feature, should the device become caught on something during a response.

The technology was also designed to be able to take the heat. A major obstacle for any firefighters' gear, extreme temperatures were addressed up front with conscientious enclosure design and physical packaging. C–THRU has a rubberized surface with hard plastic beneath that protects the printed circuit boards and enables the software to properly function despite extreme temperature. Thermal survivability stress testing isn't limited to what the system—or the user—will encounter during a firefighting response, it also involves the function of the system itself. Developers needed to determine how much power the system uses with all peripherals connected and ensure the central processing unit and graphics processing unit could remain operational without overheating. S&T and Qwake created a full spectrum of simulated user stress levels to assess performance and optimize the C–THRU device for use in any situation a firefighter may face.

S&T PRIORITIZED EASE OF USE

Every aspect of the product has been designed with user experience in mind, including ergonomic, well-placed buttons. In fact, a whole lot of thought has gone into refining the placement and function of the buttons to provide an intuitive tactile experience. Rather than simply pressing down from above onto a flat surface, like a computer keyboard, the architecture of C–THRU's buttons have a tilted angle and

are each divided by elevated ridges so the user will be able to comfortably align their fingers and recognize which buttons are activated without seeing them. The development of the button geometry and configuration has incorporated invaluable feedback from firefighters in S&T's First Responder Resource Group who shared the need for large buttons that can accommodate their large gloves.

"I've been involved for quite a few years now, so I've seen the prototype evolve to where we're at right now . . . it's come a very, very long way. And I'm impressed," said Walter Vidosh, Menlo Park Fire Protection District Captain.

The control menu is similarly intuitive and well-tested. C–THRU's three features of navigation, vision, and communication are accessed via an interactive flow that employs user experience/user interface best practices. The system is designed to minimize the number of selections necessary to arrive at a desired result and never leave the user in a digital dead end. Key communications features and functions include critical alerts such as emergency evacuation and mayday distress signal, incident notifications related to various stages of a response, and system status information, for example, battery charge levels.

PUTTING THE TECH TO THE TEST

S&T officials, representatives from Qwake, and firefighter evaluators recently convened at the San Diego Fire-Rescue Training Facility in California at the end of August for an operational field assessment to test the capabilities of this innovative equipment enhancement. The assessment included both the Navigator helmet accessory and Visual Command tablet. S&T's National Urban Security Technology Laboratory (NUSTL) oversaw the event, designing three different scenarios that subjected this technology to the punishing realities of firefighting.

Kris Dooley, NUSTL Program Analyst, explained, "NUSTL will consolidate the data received from the responders, develop a report that will be published for the responder community, and that information goes to Qwake for potential inclusion, to enhance the products prior to commercialization."

Firefighters were outfitted with C–THRU Navigator prior to entering a heated, dark, smoke-filled space. The scenarios allowed them to assess operational aspects such as comfort, usability and compatibility with personal protective equipment as well as the edge detection thermal imagining, and incident command communication functions. The feedback from the responders will help further refine the product for successful commercialization in 2024.

As Captain Justin Quarisa, of the Cosumnes Fire Department in Elk Grove, California, put it, "The wow factor is just the incredible technology. Obviously, we have thermal imagers, but putting that on your helmet with a heads-up display and then the firefighter tracking is something that everybody's been trying to solve. So just having those capabilities and then the AI component where it enhances what you're seeing with the green image or you can, you know, take it off if you don't like it, but it really just gives you a lot better picture of a room, almost like you're watching a video game."

You can learn more about C–THRU by listening to our Tech Speak minisode of the Technologically Speaking podcast, "Almost Like You're Watching a Video Game" on Apple or Google podcasts or on our website.

Mr. CORREA. Thank you.

Mr. GUEST. I now recognize Chairman Strong for 5 minutes.

Mr. STRONG. To effectively counter emerging threats, it's important to understand enemy capabilities and the technologies that are evolving in this space. Dr. Ledbetter, I know COLSA designs and produces swarming threat represented drones for the Army, but can this technology be used for other purposes?

Mr. LEDBETTER. Absolutely. We've used swarming drones to create a symmetry on the battlefield. That can be used in a positive manner as well. For a couple of things, No. 1, we use multiple transmission methods that creates resiliency. When communications go down in a humanitarian assistance disaster recovery-type situation, that can provide resilience and communication. So that's one aspect it can be used.

The second aspect could be coverage. So with swarms, you're just going to get more coverage instead of just 1 drone. You mentioned in one of the opening statements about MQ–9. It's 1 drone. It's a

very powerful drone. However, we can provide a swarm up to 100 from a single laptop. That can provide more coverage with more sensors that can do a lot of—essentially, 100 different missions. So yes, it could absolutely be repurposed.

Mr. STRONG. While on the topic of drone technology, we also hear a lot about technological advancement in drones as they relate to AI decision making. Dr. Ledbetter, what role do you see for these technologies within the DHS and first responder mission spaces? What advancements are likely on the horizon?

Mr. LEDBETTER. Well, so we'll start with just AI. You know, we use that term a lot. Drone-to-drone communication using large language models to incorporate artificial intelligence/machine learning into the swarms helps them automate not only their flight path but automate response. We've heard about drone in a box where you have drones prepositioned, and without anybody actually controlling the drone, you can use AI to respond to some incident or, you know, a variety of incidents, whether it be a lost person at night or whether it be, you know, an accident on the interstate.

Mr. STRONG. Thank you.

Everyone here understands the essential role that colleges, universities, and other academic institutions play in supporting the research, testing, and evaluation of new and emerging technologies. Mr. Hendrix, your program at the University of Alabama in Huntsville has advanced both Government and industry use of aerospace and autonomous engineering solutions. Could you expand on the value that UAH and other academic institutions offer that differ from industry and why this is advantageous to DHS?

Mr. HENDRIX. Yes, sir. Thank you for the question, Chairman Strong. We appreciate that.

So part of the research that we're doing in autonomy includes looking at advanced algorithms and development relative to artificial intelligence or machine learning, looking at things that are known as leader follower on multi-application operations. We are having the ability to operate in close proximity at the university and also on the university to test out those certain kinds of paradigms. It gives us the ability to look at those algorithms and refine those developments in a more of a research standpoint so we can come up with a solution that an organization like COLSA could develop and then produce.

One of the things we would originally do at the DOD side is a customer brought to us a very specialized requirement. I need you to build the capability to do X, Y, Z. I need you to have it built in a modular sense. Can you do it in 6 months? We did, and we developed that and that is now ready for production.

Mr. STRONG. Very impressive.

Given the increasing importance of UAS in rapid response scenarios, it raises an important question about how our regulations and processes are evolving to keep pace. Mr. Hendrix, in your opinion, with the increased use and capability of drones, are there any UAS regulations or processes that need to be adjusted?

Mr. HENDRIX. Yes, sir, absolutely. If you look at the counter-UAS side, for example, we deal with economic—mentioned these in the testimony—the different types of regulations that need to be adjusted to allow us to do a full set of testing in the counter-UAS

area where there would also be detection or mitigation. We're working with DHS on that, but we've been unable to, because of regulation, to be able to do full testing. Again, we test and we need to be able to test as we operate.

Mr. STRONG. Those partnerships are very valuable.

Mr. HENDRIX. Yes, sir.

Mr. STRONG. In the previous administration, for every drone flown by Border Patrol, the Mexican cartel flew 17, many times entering U.S. air space, to land and offload pounds of fentanyl in an attempt to kill a generation of Americans. What is most interesting, in Huntsville, Alabama, we have the proven technology to neutralize that drone threat. We can intercept and do forensics. We can block their flight or we can drop and destroy them. Our time is now.

I thank each of you for being here today. Your information is very valuable. Again, thank you each for being here.

Mr. GUEST. Thank you, Chairman Strong.

I now recognize the gentleman from New York, Ranking Member Kennedy, for his 5 minutes of questioning.

Mr. KENNEDY. Thank you, Chairman. Again, thanks to each of you for your testimony.

Also, Dr. Ledbetter, thank you for your 30 years of service in the United States Marine Corps. Extremely impressive.

So I represent a Congressional district, Buffalo Niagara region in western New York, and we have our own fair share of extreme weather, and oftentimes it's extreme winter weather. We average over 90 inches of snowfall each winter. A few years back, Christmas weekend, over 48 hours there was over 50 inches of snow that dropped, along with blinding wind and below zero temperatures. It was a blizzard, Winter Storm Elliot, breaking record numbers. Forty-seven people perished in my community, just to give you an idea of the impact of this storm.

I mentioned earlier in my opening remarks how local law enforcement used drone technology to find an individual that had been lost in a wooded area using infrared technology. Of course, Chief Fetterman, you're speaking to the impact of drone technology during wildfires, all of these natural disasters that are occurring with more ferociousness and certainly more often.

Chief Fetterman, can you describe the importance of testing and piloting drones in emergencies that are caused by these extreme weather events?

Chief FETTERMAN. Yes, sir. Ranking Member Kennedy, thank you for the question.

So certainly the last time you want to put a drone up is the first time. So what we want to ensure is that our personnel, when they're using drones for life safety, is to ensure they have plenty of opportunities to be prepared and they're well-trained. So we can leverage the technology, example IR technology, in a remote rescue environment safely, professionally and, most importantly, quickly. You know, time is life in our business. So having that preparation in blue sky days is most important, that way our folks are ready and prepared to go to work when the time is right.

Mr. KENNEDY. Thank you. Are there ways the Federal Government can help with these test cases?

Chief FETTERMAN. So certainly, as I stated, the support of grants that can assist with the testing process and the training process. For example, recently we used UASI grants for an incident management team training that revolved around drone swarms and aircraft and what would occur. So our personnel—and that was an operational, area-wide, county-wide program. Test and training is making us better prepared to respond.

Mr. KENNEDY. Thank you. Chief Fetterman, can you speak to how the Federal agencies support fire response? I'm personally extremely concerned about the impacts on local first responders at the cuts to FEMA and NOAA will have. Can you speak to the agency's support?

Chief FETTERMAN. Sure. So certainly there are impacts to the fire service. Specifically under FEMA, U.S. Fire Administration is an essential element for fire service leadership and the American fire service. As I stated, the National Fire Academy is the backbone of our leadership. It's analogous to the Navy War College. It is important to our fire service leadership to be educated. Certainly, the grants, as I think as we mentioned, the funding opportunities to leverage to get those tools into the hands of the local first responders that are responding on Federal responsibility area land.

Last, our fire department and many fire departments and police departments across this Nation participate in the National Urban Search and Rescue System. That is a system that I have personally deployed with in a handful of States and supported local first responders.

The National Urban Search and Rescue System and its 28 national task forces is a critical element of FEMA and it responds on every national disaster. For example, every hurricane, mud and debris flow, flooding, the Surfside building collapse in Florida, those are elements in areas that those task forces respond and support all the local entities. I can't say enough about how well and what a cost-effective resource those are. Because those aren't Federal responders all the time; those are hosted by the home agencies. So it's a great program.

Mr. KENNEDY. I have more questions, but I'm out of time. I yield back. Thank you.

Mr. GUEST. Thank you.

I now recognize the gentlelady from South Carolina for her 5 minutes of questioning, Mrs. Biggs.

Mrs. BIGGS. Thank you, Chairman Guest. I want to thank you for holding this hearing today, especially considering the recent wildfires that have impacted my own district. My thoughts and prayers are with the families and the first responders and the entire communities impacted by these fires.

I have been on the ground alongside State and local leadership, and I want to be as helpful as possible. I have been inspired by the way our community has come together. That's the spirit of South Carolina and that's something to be proud of.

Earlier today, I received a message that so far in my district, 12,652 acres have burned, with 30 percent containment. That was a little earlier today. This is the second record-setting natural disaster that my constituents have faced in the last 6 months. The Upstate is resilient and it will rebuild.

So my question is to Mr. Farrell. Can you describe the coordination between your organization, Federal and local entities as you engaged in the response to Hurricane Helene? The second question on that is, what capabilities do you foresee drones being equipped with in future disaster responses, and how might this expand the future missions of drones in emergency response situations?

Mr. FARRELL. Thank you, Congresswoman.

So the coordination is one where, especially in Region 4, we're very fortunate on the remote sensing side to have a collaborative collection plan that's really a model that doesn't exist in any of the other regions currently. So our partnership with Region 4 stemmed out of work that's gone back about 8 years with NOAA to assess flood mapping and monitoring missions through our NOAA cooperative, the Northern Gulf Institute, and our Geosystems Research Institute.

The FEMA Region 4 took notice of the large UAS operations and reached out through that Federal collaboration to begin investigating the opportunity for a large UAS to engage in these kinds of disasters, given the broad-area-type surveillance that we can be able to provide and that endurance.

So we begin doing blue sky exercises through Project JUSTICE to really illustrate that integration into the FEMA operation. So when a storm, especially around hurricanes, begins posing its threat to our region, the collaborative collection plan is put in place. The region coordinates with all of the stakeholders, including the State and local emergency management agencies, to understand what their needs are.

FEMA will reach out to us, and then we will preposition as best as possible to be able to respond. As we get in, we on daily calls talk about areas and targets and interests for ingress, egress, damage assessment, search and rescue. Then we will get mission assigned and broadcast out as we collect the information necessary. Because we're doing this in a live fashion—we're actually doing it through a distributed Teams call with our pilots—they can reassign us as needed while we're in the air.

As far as capabilities and the future for this mission, I think that—you know, we had the conversation about autonomy—autonomy is going to play a large role, whether that's thrown in the box or greater capabilities around sensors, greater capabilities around platforms, more ubiquitous-type platforms in this type of disaster response.

One of the things we're doing is doing assured safe training to actually train first responders in these kinds of missions; understand the air space management that exists and do the training for air space managers, your Air Boss, if you will. Then what we also want to do is work with our State and locals to be able to enhance their preparedness and understand what the constructs are and what contracts and what kind of needs need to be in place so that, at least in Mississippi on our land grant mission, we can prepare our community for response from kind-of a grassroots perspective.

Mrs. BIGGS. Thank you.

I'm just going to finish up with Chief Fetterman. It's clear that drones will play a pivotal role in assisting disaster responses. What strategies have been used on the West Coast to integrate drones

into wildfire responses, and how have they improved coordination between the Federal, State, and local responders?

Chief FETTERMAN. Well, certainly creating situational awareness integrates information flow between local, State, and Federal responders and certainly on incident management teams. So drones provide that increased situational awareness, and they're a great tool to utilize on those kinds of events. Certainly, air space deconfliction is a priority to us. Drones and helicopters can't operate in the same space and time. So we're looking forward to additional AI technology that will allow that to better manage the air space.

Mrs. BIGGS. Thank you so much. Thank you all for being here today.

Mr. GUEST. I'll now recognize the gentlelady from Illinois, Mrs. Ramirez, for her 5 minutes of questioning.

Mrs. RAMIREZ. Thank you, Chairs and Ranking Members.

I'm not sure if the title of these hearings are purposefully ironic or simply unfortunate coincidence from my Republican colleagues' boss. Unmanned is at the heart of President Musk's technologically-driven future world vision. Given his devotees in the room, it makes sense that we're not talking about the human casualties in DOGE's mass firings but the bots he wants to take their place.

Don't get me wrong. I recognize that drones and other innovative technologies are critical tools to assist in disaster and emergency response, but I can't ignore the elephant in the room. Innovative technology should be assistive, supporting the work of emergency responders.

Another place President Musk and I disagree is that bots assist humans, they don't replace them. People, both emergency responders and FEMA professionals, they're at the heart of our disaster response work across the country. But we know that President Musk doesn't believe people are at the heart of our disaster response work. He actually believes that machines can work better without the human messiness of debate, of oversight, of history, of reasoning, you know, some of the same building blocks that create democracy, I might point out.

So it's deeply frustrating for me to see my colleagues go along with Musk's unmanned world view, robbing first responders of the basic resources they need to do their jobs, dismantling FEMA, and also allowing DHS to withhold the funds that this House appropriated which, by the way, is a violation of Federal law, and a clear failure of the Majority to provide appropriate oversight, the job that we have in this committee. But here we are.

So I want to get into the questions. Chief Fetterman, yes or no, is it helpful to first responders, like our firefighters, when Federal agencies like FEMA cannot provide grants for local cities, counties, and other communities to prepare for and attend to natural disasters? Yes or no?

Chief FETTERMAN. Congresswoman Ramirez, no, it is not helpful.

Mrs. RAMIREZ. Thank you. Chief Fetterman, I have another question for you. Yes or no, does it help firefighters when the Federal Government guts initiatives for research and new technologies that assist first responders in doing their job safer and more effectively?

Chief FETTERMAN. No, it is not, ma'am.

Mrs. RAMIREZ. Thank you. Pivoting slightly. We know that some of these new technologies and bots that Elon loves so much has some bias and some privacy problems, just like him. In 2024, the Government Accountability Office, GAO, found drones can support law enforcement. However, the use of those technologies in public spaces where a warrant is not necessarily required prior to use has led us with concerns about how law enforcement is ensuring that we're protecting civil rights, civil liberties, and privacy.

Given that President Musk and Trump and his loyal follower Noem have gutted the Civil Rights and Civil Liberties, CRCL, Division at DHS which was tasked with preventing civil rights and liberty violations in the agency's work, I want to ask all of our witnesses here, how do your programs either offer capabilities or take steps to protect sensitive information acquired by the use of drones? I'll start with Mr. Farrell.

Mr. FARRELL. Yes, thank you. So I think when we develop these technologies, we definitely want to make sure that the information is safeguarded. I think, moreover, one step that we're taking specifically at Raspet is coordinating with the Ole Miss law program. So there's a Drone and Space Law program. I had an opportunity to guest lecture last Tuesday. One of the key initiatives that we were discussing was drone privacy, drone usage, admissibility in courts, as well as the safeguarding on that data.

So one thing that we are really focused on is not only the enabling capability, the mitigating on the countering the threat, but also, how do you employ it in a way that's best to protect civil liberties for those operators?

Mrs. RAMIREZ. Thank you for all that, Mr. Farrell.

I want to get to the rest of you, so you have like 5 or 7 seconds, but Dr. Ledbetter.

Mr. LEDBETTER. Yes, ma'am, thank you. The Army is our customer. We're bound by their cybersecurity and data requirements, and we're in compliance with them.

Mrs. RAMIREZ. Thank you. Mr. Hendrix.

Mr. HENDRIX. Yes. No social media location revealed and existing data, once a determination is made—[inaudible] for research to continue—I mean for search-and-rescue to continue, it's eliminated.

Mrs. RAMIREZ. Thank you. Chief Fetterman.

Chief FETTERMAN. The fire service goes to great lengths to protect private information, but our priority is life safety. We focus on life safety and saving lives and property.

Mrs. RAMIREZ. Thank you. With that, I yield back.

Mr. GUEST. Thank you.

The Chair now recognizes the gentleman from North Carolina, Mr. Knott, for his 5 minutes of questioning.

Mr. KNOTT. Thank you, Mr. Chairman. Thank you to the witnesses who are here.

I will say that I am a little bit miffed whenever I hear grievances about the current President and the funding that seems to be at issue. When you look at sanctuary cities, sanctuary States, and the amount of tax dollars that are going to illegal immigrants and States just like Illinois, New York City, California, et cetera, where illegals, we now know, were getting free health care, free education, free transportation, these allocations in dollars far exceed

the total budget of FEMA. So I find it a little bit disingenuous that we're railing on money that should otherwise be reappropriated or reallocated.

Mrs. RAMIREZ. Mr. Knott, will the gentleman yield?

Mr. KNOTT. No, ma'am.

When we have had 4 years of draining billions and billions and billions of dollars to people who are not here illegally, crocodile tears over FEMA not having enough money seems to be somewhat disingenuous.

In regards to the issue at hand that we should be discussing, I would love to ask you, Mr. Hendrix, as a former Federal prosecutor, drones are being used to a very effective extent to undermine law enforcement and, truly, our national security, whether it's the cartels, whether it's local transnational gangs, whether it's the Chinese Communist Party, whoever it may be, drones are a force multiplier. One of my greatest frustrations, whether it was the Bureau of Prisons, whether it was Federal law enforcement along the border, whether it was counter-surveillance measures that were being executed, what are technologies that we can implement and we can provide or promote that would stop criminals from using drones so effectively?

Mr. HENDRIX. There are some technologies that allow us to establish right world operations to eliminate aircraft from operating in the area. Of course, the threat has evolved so that now they're just flying aircraft on fiber optic cables, right. So it's hard to do that.

Another thing I think is important from our standpoint is to look at what things we can do to enforce our capabilities so that they're not vulnerable to these technologies. Our counter-UAS systems, for example, should be tested to certify threats by an independent agent based on a particular scenario that you're trying to protect.

Mr. KNOTT. OK. Can you explain just briefly how that would work in the field? How would that technology be best implemented?

Mr. HENDRIX. So the right world technologies, for example, as you identify your particular aircraft that's going to be operating, you could look at it as comparable to, roughly, comparably remote ID or to UAS traffic management. You identify those aircraft that are operating in the area of any other aircraft that's reported or detected by radar, so certainly uncooperatives.

Mr. KNOTT. OK. Thank you, sir.

Dr. Ledbetter, I want to talk to you. In regards to the components that go into many drones that we use in a law enforcement capacity and a first responder capacity, it's my understanding that many of those components are made in other countries, whether it's China, whether it's other nation-states. Are you familiar with the basic percentage of our components that are put into American drones that are made in China or other countries?

Mr. LEDBETTER. I'm not familiar with that number, sir.

Mr. KNOTT. Are you familiar—is it a problem that you're aware of?

Mr. LEDBETTER. It is a problem, yes, sir.

Mr. KNOTT. How would you quantify—briefly, we've got a minute-and-a-half—from your expertise, how can we assist bring-

ing some of those jobs and technologies back to the United States for manufacturing?

Mr. LEDBETTER. Well, it's absolutely critical. I find that most, whether it's first responders, military members, whatever, they want to get the job done and they'll get the job done. Right now the cheapest, most available resource out there is going to be a DJI, which is a Chinese product. We need to comply with NDAA and bring those parts back into the United States and build a compliant American-made drone.

Did I answer your question?

Mr. KNOTT. It did, but in regards, I guess—to follow up, in regards to what we can do in this committee, are there certain regulations, rules, laws that make it more costly for drone manufacturers to operate or to produce their materials here as opposed to overseas, that you're aware of?

Mr. LEDBETTER. Absolutely. Supply chain is—you know, we're hamstrung by the supply chain to get parts. Availability is another issue, and then price. We're looking at anywhere from 3 to 5 times the cost per part to make an American-made drone versus a DJI, or a Chinese part.

Mr. KNOTT. In regards to the technology as you understand it, how are American companies, how are American innovators fairing as it relates to international competitors?

Mr. LEDBETTER. I don't really have that data. I know as far as we're concerned, it takes significantly more money and more resources and more time to build a compliant drone versus a noncompliant drone.

Mr. KNOTT. One more question. When you say compliant drone, just so we understand, what are you referring to?

Mr. LEDBETTER. NDAA compliance.

Mr. KNOTT. OK. Thank you, sir.

Mr. Chairman, I yield back.

Mr. GUEST. Thank you.

In closing, I would like to thank all of our witnesses for their valuable testimony. I would like to thank Chairman Strong, Ranking Member Correa, Ranking Member Kennedy, and all of the Members for their participation in today's hearing.

The Members of the subcommittees may have additional questions for the witnesses and we would ask the witnesses to respond to these questions in writing.

Pursuant to committee rule VII(E), the hearing record will be held open for 10 days.

Without objection, the subcommittees stand adjourned.

[Whereupon, at 4:03 p.m., the subcommittees adjourned.]