October 17, 2023

Chairman Mike Gallagher
Ranking Member Ro Khanna
Committee on Armed Services
Subcommittee on Cyber, Information Technologies, and Innovation
United States House of Representatives

RE: Hearing: "Can it Work? Outside Perspectives on DOD's Replicator Program"

Chairman Gallagher and Ranking Member Khanna,

As an organization that represents the uncrewed systems and autonomy industry, and the defense industrial base, the Association for Uncrewed Vehicle Systems International (AUVSI) welcomes the opportunity to provide written testimony in advance of the Subcommittee's hearing on the Department of Defense's Replicator Program.

First, to answer the question the hearing title asks, "Can it Work?" Yes, the Department of Defense's (DoD) Replicator Program can work, and in fact must succeed. We are confident that it will work if DoD properly taps into the significant subject matter expertise AUVSI and our members have and takes feedback from industry on how to ensure the program keeps up with their technological pace.

AUVSI strongly supports the announced goals of Replicator to overcome acquisition challenges and swiftly field capable, advanced autonomy tools. We know that the program can succeed; however, to accomplish the goal of rapidly integrating many thousands of uncrewed and autonomous systems in support of the warfighter in the next 18-24 months, and then sustain and grow those supply lines, much work must be done to support the domestic manufacturing base. We have attached our recently released white paper from our Partnership for Drone Competitiveness effort (Appendix A), which is a coalition of drone manufacturers and component suppliers urging the federal government to adopt policies to level the playing field against subsidized foreign competition, largely from the People's Republic of China. Our effort also urges the federal government to take immediate, resolute action and invest in our domestic drone manufacturing industry to help level the playing field. The national security and economic challenges articulated in the paper, and the policy solutions we advocate for, are focused on the Uncrewed Aerial Systems (UAS) industry; however, they are not unique to the aerial domain. The very same concerns, as the paper calls out, can be extrapolated to other areas of autonomy in the ground and maritime domains. AUVSI supports the Replicator initiative for an additional reason as it will serve to provide a DoD strategy and expectation for the Services to aggressively pursue full scale integration through the budget.

Accordingly, there are two primary areas of focus we wish to comment on 1) the value uncrewed systems provide in defense missions, and 2) the need to strengthen domestic manufacturing to support the warfighter technology demands of 21st Century warfare and to ensure the success of the Replicator Program, and beyond.

The DoD faces an urgent need to integrate unmanned systems rapidly and at scale in the new era of strategic global competition.

As we have watched around the world, including on the battlefields of Ukraine and Israel, the role of uncrewed systems – ranging from sophisticated platforms designed for warfighting to commercial off-the-shelf platforms modified for Intelligence, Surveillance, and Reconnaissance (ISR), targeting, or strike missions – has changed the nature of warfare in the air, on the ground, and in the water. Consequently, DoD leaders need to rethink the tools in our warfighters' toolboxes. Low cost, attritable unmanned platforms in the air, maritime, and ground domains are playing an important role in present-day warfare and can play a much larger role in our national policy of strategic deterrence. The U.S. has taken some steps in the right direction. Task Force 59 in U.S. Central Command (CENTCOM) and more recently Task Force 49 in U.S. Southern Command (SOUTHCOM) have demonstrated that there is a path towards rapid integration and operationalization of proven, capable tools. Compared to the evolving pace of technology maturation, and the required agility operational demands place on the warfighter to meet emerging threats on the battlefield, however, it is clear much more needs to be done to expand the acquisition and integration of uncrewed and autonomous stems.

Accordingly, the United States must quickly adapt our own approach to acquisition, procurement, integration, and tactics, training, and procedures. No longer is the traditional model of building exquisite platforms that costs many tens of millions or billions of dollars on a long lead time with a multi-year budgeting process the only solution that works for all our current challenges. Instead, DoD leaders must leverage existing authorities and tools – like the Defense Innovation Unit (DIU), Other Transaction Authority (OTA), and the Joint Rapid Acquisition Cell (JRAC) – to bring advanced technologies to the warfighter faster.

Further, having a robust manufacturing and production capability with depth and surge capacity hinges on clear DoD direction, such as multi-year block buy contracts, and an identifiable and stable portfolio funding. When industry has that type of guaranteed stability, its risk calculus for leaning forward with capital investments will change dramatically, allowing for enhanced domestic manufacturing capacity to meet the growing DoD demand.

Currently, as many DoD senior leaders have acknowledged, the DoD has struggled to find a meaningful path toward integration of uncrewed systems at scale. The Replicator Program has the potential to help close this gap, overcome acquisition challenges, and enhance the ability of the Combatant Commands to meet the demands of their ever-evolving missions. AUVSI welcomes DoD's stated Replicator goal to greatly increase the number of uncrewed and autonomous systems and swiftly integrate them into the force. If implemented effectively, this would be a real paradigm shift for the DoD and will boost the ability of the U.S. to arm our allies and enhance our own warfighters capacity to meet the demands of 21st Century missions.

For Replicator to succeed, and to maintain and grow the program, Congress has a strategic imperative to strengthen the domestic industrial base and rebuild a domestic component supply chain.

The United States has lost the advantage in our industrial base to China. Presently, with significant demands to assist in the arming of allied partners, including Taiwan, Ukraine, and Israel, it is no secret that supply lines are overwhelmed and our manufacturing capacity lags behind requirements. Further, and far more disconcerting, as multiple unclassified war games have demonstrated, the U.S. lacks the ability today to field the volume of platforms and weapons

required to compete in the South China Sea; nor is our industrial base robust enough to support rapid rearming. Meanwhile, from small drones to highly capable warships, China is building at a pace that is not only leaving the U.S. behind but is putting us at such an alarming disadvantage that it requires immediate national attention and a whole-of-government effort to address. Their ability to undercut U.S. competitors due to their heavily subsidized nature must be stopped. The current uncrewed systems industrial base is not sustainable with only prototyping and subscale experimentation that seems to be the norm in DoD. The Department must move swiftly toward choosing scaled production of specific systems and companies in order to build out and preserve industrial capacity and capability.

This challenge is perhaps most acute in the drone industry. China – through its Made in China 2025 policies – has strategically supported their drone industry with subsidies and flooded the U.S. with subsidized drones and drone components to the detriment of U.S. drone manufacturers and the domestic component supply chain. The PRC's strategic investments have developed a robust internal industry for drone manufacturing in China and have also allowed the PRC to project their influence abroad and use their monopolistic position to put U.S. manufacturers at a near impossible disadvantage by flooding the global market with subsidized drones. This has resulted in an emerging series of threats to the United States — including threats to national security, to the nation's position as a global leader in aviation, to its aviation workforce, and to its democratic values and fundamental principles of human rights. For the purposes of this hearing, however, the most salient point is that the U.S. may currently lack the domestic industrial base to entirely meet the goals of the Replicator Program. It may be possible, with significant effort, to rapidly integrate many thousands of uncrewed and autonomous systems in the next 18-24 months; however, maintaining that pace, scaling production levels to increase the velocity, and backfilling the loss of attritable systems will require significantly greater attention and policy changes.

AUVSI accordingly challenges the U.S. government to take resolute action to level the playing field for U.S. uncrewed system manufacturers and their component suppliers, and specific recommended actions can be found in the white paper in Appendix A, including manufacturing tax incentives, loan guarantees, and firm demand signals, like the Replicator program. Additionally, we urge the U.S. government to work with its partners/allied nations to ensure they consider similar aid to support their domestic manufacturers and component suppliers to generate a stronger, more secure global supply chain.

The success of our policy of strategic deterrence and our agility, and success, on the battlefield is predicated on the rebuilding of our industrial manufacturing capacity. Replicator can galvanize progress in U.S. military innovation and technological integration. Replicator must succeed. The stakes are too high for the program to fail. AUVSI and our member companies are working diligently to ensure that the uncrewed and autonomous systems industry is doing everything it can to meet the goals or the program; however, success requires government actions to build the industrial base we currently lack.

AUVSI encourages the Committee conduct oversight on the following topics:

- We are 8 weeks into Secretary Hicks's announced 18-24 month timeline. When will DoD provide a detailed plan to Congress, industry, and other stakeholders?
- How will Replicator engage the Defense Innovation Unit to field and invest in dual-use commercial and defense systems?

- How will DoD ensure that funding spent on Replicator does not deplete funding available to other uncrewed systems programs?
- Uncrewed systems by their nature are low-cost and attritable. Accordingly, backfilling systems lost in battle (or even in training) is as important as fielding initial capabilities. What is the plan for ensuring the long-term success of Replicator, as simply fielding initial systems is not sufficient to meet mission success.

Thank you for the opportunity to submit comments and to work with the Committee in support of programs that deliver the benefits of autonomy to warfighters.

Very Respectfully,

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Appendix A: Partnership for Drone Competitiveness White Paper

Whitepaper: AUVSI Partnership for Drone Competitiveness

For 120 years, since December 17, 1903, when Orville and Wilbur Wright launched the first crewed flight on a hill in Kitty Hawk, North Carolina, the United States has been the world leader in aviation.[1] The U.S. leads in commercial, business, and general aviation manufacturing and has a total aviation workforce of more than half a million people.[2] But there is one segment of the aviation industry that the United States does not lead: uncrewed aircraft systems (UAS) and domestic drone manufacturing and operations. While the U.S. has been content to maintain leadership of traditional segments in the aviation industry, China understood the tremendous economic and national security implications of uncrewed aviation and took aggressive measures to dominate the global UAS manufacturing and technology market.

In 2015, China launched "Made in China 2025," a ten-year whole-of-society effort to invest in key industries, primarily in the technology area, to ensure China's world leadership and market dominance.[3] In a distinct role reversal with high-tech capitalist economies in the West, China has removed red tape to development while enabling sophisticated market mechanisms to spur rapid growth. While much of the discussion on Chinese government involvement in the industry has centered around direct subsidization, the scope of their support is far greater. No Chinese company or investment firm is free of Chinese Communist Party (CCP) involvement. The CCP has used its influence to:[4]

- Direct investment firms to invest heavily in drones and component parts;[5]
- Direct banks to provide low-interest loans to industry participants;
- Direct companies to build Chinese domestic supply chains;
- Direct companies to buy domestically to meet domestic market share targets;
- Direct companies to spend a high percentage of their revenue on research and development;
- Direct companies to partner with high-tech industry to ensure an end-market; and
- Direct state-owned companies to acquire and transfer western technology.[6]

While this infrastructure has developed a robust internal industry for uncrewed systems in China, it has also allowed them to project their influence abroad and use their monopolistic position to put U.S. manufacturers at a disadvantage by flooding the global market with subsidized drones.

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[1] 1903-The First Flight - Wright Brothers National Memorial (U.S. National Park Service) (nps.gov)
[2] https://datausa.io/profile/naics/aircraft-parts-manufacturing

[3] https://www.csis.org/analysis/made-china-2025
[4] Made-in-China-Backgrounder.pdf (isdp.eu)
[5] https://www.washingtonpost.com/national-security/2022/02/01/china-funding-drones-dji-us-regulators/
[6] China Bought Italian Military-Drone Maker Without Authorities' Knowledge - WSJ

This is an illegal trade practice the U.S. Department of Commerce (DOC) labels as "dumping."[7] In 2019, the U.S. Undersecretary for Defense, Ellen Lord, highlighted this challenge, noting, "We don't have much of a small UAS industrial base because DJI dumped so many low-price quadcopters on the market, and we then became dependent on them."[8] More recently, former Secretary of Homeland Security, Chad Wolf, wrote that, "Chinese drone dumping presents a challenge not only to U.S. competitiveness, but more importantly, to our national security."[9] This monopolistic position has also created barriers to the development of U.S. supply chains for the autonomous industry by effectively excluding them from the largest markets. The results of Chinese drone dumping have been devastating to the U.S. drone manufacturing industry. Chinese drones account for more than 90% of the consumer market,[10] 70% of the enterprise market (drones used as industrial tools),[11] and 92% of the first responder market.[12]

From the perspective of U.S. competitiveness and security, incentivizing U.S. leadership in the drone industry represents a strategic imperative in a market long characterized by state-subsidized companies based in China that have access to virtually unlimited, free to low-cost capital. As this paper will lay out, China has used its monopolistic position to flood the U.S. with subsidized drones, distorting the marketplace in favor of Chinese drones, stifling competition, and inhibiting new entrants. Further, by preventing access of U.S. component manufacturers into industry supply chains, China is able to stifle U.S. development of critical technology in autonomous systems. This has resulted in an emerging series of threats to the United States — including threats to national security, to the nation's position as a global leader in aviation, to its aviation workforce, and to its democratic values and fundamental principles of human rights.

AUVSI accordingly challenges the U.S. government to take resolute action to level the playing field for U.S. drone manufacturers and their component suppliers. Additionally, we urge the U.S. government to work with its partners/allied nations to ensure they consider similar aid to support their domestic drone manufacturers and component suppliers. Together, the United States and its allied nations can effectively level the international playing field and spur robust competition with certain companies that are tied to our collective foreign adversaries. This paper sets forth the case for action and offers concrete policies to ensure U.S. companies can compete and win in the marketplace. Many of the suggestions in this paper would apply to small UAS, but the same lessons learned can be applied to larger UAS as well.

Further, the policies will enable change for markets beyond drones, including other autonomous and uncrewed vehicles, as well as other emerging technologies, which often use many of the same components and technology stacks. Lastly, consistent with AUVSI's standing as an international

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[7] https://www.trade.gov/us-antidumping-and-countervailing-duties: Unfair foreign pricing and government subsidies distort the free flow of goods and adversely affect American business in the global marketplace. Enforcement and Compliance, within the International Trade Administration of the Department of Commerce, enforces laws and agreements to protect U.S. businesses from unfair competition within the United States, resulting from unfair pricing by foreign companies and unfair subsidies to foreign companies by their governments.

[8] https://foreignpolicy.com/2019/08/27/pentagon-seeks-to-counter-chinas-drone-edge/
[9] https://www.foxnews.com/opinion/next-front-china-economic-war-out-this-world
[10] https://www.reuters.com/article/us-usa-china-tech-dji-insight/game-of-drones-chinese-giant-dji-hit-by-u-s-tensions-staff-defections-idUSKBN2AZ0PV
[11] Ibid
[12] https://www.droneresponders.org/2019-chinese-uas-technology

organization, the recommendations in this paper will open supply chains for electronic components and rare earth materials that can be utilized by other international drone and electronics markets outside the United States that are also struggling to compete with subsidized Chinese competition and its dominance of the global electronics supply chain. AUVSI encourages the U.S. government to coordinate these activities with allied and partner nations, consistent with Washington's approach to semiconductor reshoring, to generate a "stronger, more secure supply chain."[13]

THE CHALLENGE

China Flooding the U.S. Market with Subsidized Drones

As noted, the flood of inexpensive drones into the U.S. has resulted in Chinese drones accounting for more than 90% of the consumer market, 70% of the industrial drone market, and 92% of the first responder market. These figures account for all Chinese drones in the United States; however, one drone company in particular dominates the U.S. and global market. Shenzhen-based Da Jiang Innovations, or DJI as it is commonly known, has been a major beneficiary of the "Made in China 2025" policy and the resulting subsidies. Accordingly, DJI is the world's largest drone manufacturer, and has a dominant share of the U.S. and global drone market. According to a 2020 report from the Center for the Study of the Drone at Bard College, in 2020 DJI alone accounted for 77% of the U.S. hobby drone market and 90% of the commercial drone service provider market.[14]

In a February 2022 report, *The Washington Post* found that DJI's investors included at least four Chinese investment firms with close ties to the government of the People's Republic of China (PRC).[15] The company's investors include "China Chengtong Holdings Group, which is directly administered by Beijing's State-owned Assets Supervision and Administration Commission, a ministerial-level organization tasked by China's State Council to manage the country's state-owned enterprises."[16] According to the *Post* report, "Other funds that list DJI as an investment include the Shanghai Venture Capital Guidance Fund, which is administered under the Shanghai Municipal Government. Guidance funds in China mix state assets with private funds to advance Beijing's industrial development goals in emerging industries. A Chinese-language S&P global report released in March 2021 says that state-run Guangdong Hengjian Investment Holding invested in DJI alongside SenseTime, which was also added to a U.S. sanctions list in December 2021 by the Biden administration over alleged human rights abuses in Xinjiang.[17] SDIC Unity Capital, a fund administered by the State Development & Investment Corporation, a state-owned investment holding company approved by China's State Council, also lists DJI as an investment on its website."[18]

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[13] https://www.foreignaffairs.com/united-states/industrial-policy-china-perils

[14] https://dronecenter.bard.edu/files/2020/03/CSD-Public-Safety-Drones-3rd-Edition-Web.pdf
[15] https://www.washingtonpost.com/national-security/2022/02/01/china-funding-drones-dji-us-regulators/
[16] Ibid
[17] https://www.washingtonpost.com/technology/2021/12/10/us-investment-ban-sensetime/
[18] https://www.washingtonpost.com/national-security/2022/02/01/china-funding-drones-dji-us-regulators/

Threat to U.S. National Security

In testimony before Congress, the Alliance for American Manufacturing (AAM) testified that "The United States reliance on China, in particular, for critical supply chains is a significant danger for our economic and national security."[19] China's dominance of the global drone market poses multiple challenges for the United States; accordingly, the Partnership for Drone Competitiveness concurs with the threat assessment by the AAM and lays out the details below.

Supply Chain Control

In addition to controlling much of the world's drone production, China similarly controls much of the component supply chain as well. The U.S.-China Economic and Security Review Commission warns of the risk this reliance on China poses for U.S companies, noting that companies should build more resilient technology supply chains.[20] A recent article in *Foreign Affairs* about the semiconductor industry observed that "the United States' reliance on foreign sources that are vulnerable to global rivals for semiconductors and other critical goods carries significant national security risks."[21] That logic applies equally to drones – a sector that, like semiconductors, has "become overly concentrated in China or in countries that are vulnerable to Chinese influence."[22] This supply chain control is not a theoretical challenge; this poses a massive threat to U.S. national security now. As AAM observed in Congressional testimony, "We should no longer question whether China will weaponize its supply chains and our reliance upon them to its advantage."[23] A *War on the Rocks* post wrote, "Supply chain interdiction in the open market can achieve desired outcomes without kinetic action or politically fraught sanctions."[24] The post goes on to note that, "The Department of Defense should view supply chain interdiction within the open marketplace as an effective weapon of war."[25] *Lawfare* observes, "A foreign adversary dominating the world market could deny the U.S. effective drone support in warfighting or potentially disable U.S. drones in a conflict."[26]

This supply chain threat as it relates to drones is not theoretical; this is happening in real time in the ongoing war in Ukraine. As the New York Times recently noted, "More than any conflict in human history, the fighting in Ukraine is a war of drones. That means a growing reliance on suppliers of the flying vehicles — specifically, China."[27] The article goes on to state that this reliance "has given China a hidden influence in a war that is waged partly with consumer electronics."[28] The Department of Defense (DoD) has recognized this problem, noting that the

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[19] Testimony of Scott N. Paul, President, Alliance for American Manufacturing Before the Energy and Commerce Subcommittee on Innovation, Data, and Commerce, Hearing Entitled "Mapping America's Supply Chains: Solutions to Unleash Innovation, Boost Economic Resilience, and Beat China" September 20, 2023:
https://d1dth6e84htgma.cloudfront.net/Scott_Paul_Testimony_IDC_Hearing_Supply_Chains_2023_09_20_1_6b75d3cfee.pdf

[20] https://www.wsj.com/articles/congressional-u-s-china-commissioner-warns-of-global-tech-supply-chain-risk-ae49ad2d?mod

[21] https://www.foreignaffairs.com/united-states/industrial-policy-china-perils

[22] Ibid

[23] https://d1dth6e84htgma.cloudfront.net/Scott_Paul_Testimony_IDC_Hearing_Supply_Chains_2023_09_20_1_6b75d3cfee.pdf

[24] https://warontherocks.com/2023/05/the-art-of-supply-chain-interdiction-to-win-without-fighting/

[25] Ibid

[26] https://www.lawfareblog.com/us-reliance-chinese-drones-sector-next-chips-act

[27] https://www.nytimes.com/2023/09/30/technology/ukraine-russia-war-drones-china.html

[28] Ibid

"replenishment rates for unmanned aerial delivery vehicles are neither capable of meeting surge demand nor achieving affordable mass."[29] Former U.S. Secretary of Homeland Security Chad Wolf was more blunt in his assessment of the current situation, noting: "This Chinese drone dumping is a threat to national security."[30]

PRC National Security Laws

The U.S. government has raised multiple security concerns associated with Chinese drone companies, which are obligated to comply with China's national security laws.[31] As the former Director of Operations at U.S. Indo-Pacific Command, Rear Admiral Mark Montgomery, observed recently, "this National Intelligence Law of 2017 obliges PRC drone companies to provide whatever information they gather. This could include flight logs, users' sensitive data, and drone operators' geolocation."[32] Further, PRC policies require Chinese companies to install backdoors, or what the Chinese Community Party refers to as "reserved interfaces," in software to allow the government access to data collected.[33]

A 2017 Homeland Security Intelligence Bulletin noted that "since 2015, DJI has targeted a number of U.S. companies in the critical infrastructure and law enforcement sectors to market its UAS" and "the Chinese government is likely using information acquired from DJI systems as a way to target assets."[34] In 2019, the Cybersecurity and Infrastructure Security Agency (CISA) released a memo reinforcing the serious security risk associated with PRC drones. The memo stated:

> "The United States government has strong concerns about any technology product that takes American data into the territory of an authoritarian state that permits its intelligence services to have unfettered access to that data or otherwise abuses that access. Those concerns apply with equal force to certain Chinese-made UAS-connected devices capable of collecting and transferring potentially revealing data about their operations and the individuals and entities operating them, as China imposes unusually stringent obligations on its citizens to support national intelligence activities. Security professionals should mitigate these risks in the same manner that they would any other connected technology."[35]

Montgomery added additional context noting, "Numerous PRC-made drones have been detected in restricted U.S. airspace, including over Washington, D.C., despite DJI's claim that their drone design includes geofencing restrictions to avoid sensitive locations. Drones made by Autel Robotics, another prominent manufacturer, do not even have geofence restrictions."[36]

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[29] https://www.diu.mil/work-with-us/submit-solution/PROJ00507

[30] https://www.foxnews.com/opinion/next-front-china-economic-war-out-this-world

[31] https://www.wsj.com/articles/china-adopts-sweeping-national-security-law-1435757589 / Article 7 of National Security Law of China states "All organizations and citizens shall support, assist, and cooperate with national intelligence efforts in accordance with law, and shall protect national intelligence work secrets they are aware of."

[32] https://www.defenseone.com/ideas/2023/08/extend-pentagons-ban-chinas-consumer-drones/389363/

[33] https://www.pointebello.com/insights/reserved-interfaces

[34] https://info.publicintelligence.net/ICE-DJI-China.pdf

[35] https://content.govdelivery.com/attachments/USDHS/2020/06/03/file_attachments/1465486/Industry%20Alert%20-%20Chinese%20Manufactured%20UAS%20%2820%20May%202019%29.pdf

[36] https://www.defenseone.com/ideas/2023/08/extend-pentagons-ban-chinas-consumer-drones/389363/

In 2019, the United States Congress prohibited the DoD from purchasing drones made by companies based in China in Section 848 of the Fiscal Year 2020 National Defense Authorization Act (NDAA).[37] In 2022, in Section 817 of the Fiscal Year 2023 NDAA, Congress expanded Section 848 to prohibit private companies working with the DoD from using insecure drones in the performance of federal contracts.[38] In the same legislation, Congress directed the U.S. Coast Guard to transition their drone fleet to secure systems within 90 days.[39] Congress is also considering legislation to mandate the Federal Communications Commission (FCC) to list DJI on the List of Equipment and Services Covered by Section 2 of The Secure Networks Act, which consists of companies deemed to pose an unacceptable risk to the national security of the United States.[40] That action is supported publicly by at least one FCC Commissioner. [41]

In addition to Congressional action, the administrations of both President Trump and President Biden have taken actions to address security concerns from Chinese drones. President Biden has continued implementation of Executive Order 13981, initially issued by President Trump, which makes it U.S. policy to "prohibit the use of taxpayer dollars to procure UAS that present unacceptable risks and are manufactured by…foreign adversaries, and to encourage the use of domestically produced UAS."[42] In October 2020, the U.S. Department of Justice (DOJ) banned the use of agency grants for purchasing Chinese drones, citing national security concerns, noting the drones are "subject to or vulnerable to extrajudicial direction from a foreign government."[43] Also in 2020, the Department of Interior (DOI) grounded all Chinese drones in its fleet, noting cybersecurity risks.[44]

Specific to DJI, in July 2021, the DoD labeled the company as posing "potential threats to national security" in a statement dedicated to the Pentagon's concerns about DJI.[45] In October 2022, the DoD identified DJI as a "Chinese military company" operating in the U.S. under Section 1260H of the Fiscal Year 2021 NDAA.[46] The Section 1260H list catalogs companies that the DoD believes contribute to the modernization goals of the People's Liberation Army, ensuring its access to advanced technologies as part of China's military-civil fusion strategy.

Support to Russia

Further highlighting the threat to national security is China's decision to supply Russia with DJI drones, as well as drones from other Chinese manufacturers, to aid Russia's illegal invasion of Ukraine. *The New York Times* noted, "In the year since Russia's invasion of Ukraine, China has sold more than $12 million in drones and drone parts to the country, according to official Russian

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[37] https://www.congress.gov/bill/116th-congress/senate-bill/1790/text

[38] https://www.congress.gov/bill/117th-congress/house-bill/7776/text

[39] Ibid

[40] https://www.rubio.senate.gov/public/index.cfm/2022/2/rubio-scott-cotton-stefanik-introduce-legislation-to-counter-chinese-drones & https://gallagher.house.gov/media/press-releases/gallagher-calls-us-take-swift-action-against-chinese-drone-maker-dji

[41] https://www.fcc.gov/document/carr-calls-review-dji-citing-national-security-risks

[42] https://www.federalregister.gov/documents/2021/01/22/2021-01646/protecting-the-united-states-from-certain-unmanned-aircraft-systems

[43] https://www.ojp.gov/sites/g/files/xyckuh241/files/media/document/ojporderfundingdrones.pdf

[44] https://www.doi.gov/sites/doi.gov/files/signed-so-3379-uas-updated-10.6.2020-508.pdf

[45] https://www.defense.gov/News/Releases/Release/Article/2706082/department-statement-on-dji-systems/

[46] https://www.defense.gov/News/Releases/Release/Article/3180636/dod-releases-list-of-peoples-republic-of-china-prc-military-companies-in-accord/

customs data from a third-party data provider."[47] The *Times* highlighted that these sales include "a mix of products from DJI, the world's best-known drone maker, and an array of smaller companies."[48] Showcasing the broader supply chain complications, the *Times* wrote, "American efforts to isolate Russia from much-needed technology and cash have been complicated by China's dominance of the global electronics supply chain. The United States has sought to undercut some Chinese companies through export controls in recent years, but the world remains heavily reliant on China's city-size assembly plants and clusters of specialized component makers."[49] Another *Times* article reported that "Direct drone shipments by Chinese companies to Ukraine totaled just over $200,000 this year through June, according to trade data. In that same period, Russia received at least $14.5 million in direct drone shipments from Chinese trading companies."[50]

China's dominance of the electronics supply chain, including drones, is harming U.S. national security interests, domestically and in Ukraine, and exposes the risk of relying on a strategic competitor for a key supply chain. The United States government — the White House, DoD, DOJ, and Congress — have all deemed Chinese-made drones as a whole, and DJI specifically, as a threat to national security. Accordingly, action must be taken for the U.S. drone market to compete on a level playing field and grow to meet the demand of the U.S. military and commercial industries.

Threat to U.S. Aviation Leadership & Workforce

The U.S. must recognize that, in addition to national security concerns, China's subsidized drone market is harming the U.S. workforce, and ultimately our standing as the global leader in aviation. Drones are already playing an important role in the economy, and that role will continue to grow as drones become indispensable tools used for industrial inspection, lifesaving operations by first responders, and the delivery of products and services. Drones are also critically important to U.S. leadership in a new era of aviation defined by uncrewed and autonomous systems. The drones of today — relatively small systems that fly relatively close to the ground to inspect industrial sites and deliver goods — increasingly employ advanced autonomy technology that, once perfected, will enable much larger uncrewed systems to carry people and cargo. The future of aviation is in advanced automation and autonomy, and the United States must invest in building the knowledge base, workforce, and manufacturing capacity to lead. If we cede leadership in drones and autonomy to other nations, specifically China, we are posturing ourselves poorly on the world stage and opening the door for even greater national security risks.

American drone manufacturers face multiple challenges when competing against subsidized foreign competition. Critical components, rare earth materials, and supply chains outside of China can be difficult to access, and often, if available at all, come at a significantly higher cost due to Chinese subsidization artificially lowering the price of Chinese components. Moreover, with the ability to flood the U.S. with subsidized Chinese-made drones, China has artificially lowered the price of drones, making it challenging for U.S. manufacturers, who compete in the commercial

[47] https://www.nytimes.com/2023/03/21/business/russia-china-drones-ukraine-war.html
[48] Ibid
[49] Ibid
[50] https://www.nytimes.com/2023/09/30/technology/ukraine-russia-war-drones-china.html

marketplace without government subsidies, to be competitive on price. One U.S. drone industry executive noted that "DJI dropped its prices by as much as 70% in less that a year," driving the U.S. company to end drone production, and to begin making software for DJI drones.[51] This drives sales away from commercial U.S. companies and into subsidized Chinese companies, fulfilling the goal of Made in China 2025.

The Chinese government policies harm the U.S. industry's ability to attract capital, investment, and workforce and ultimately stifle innovation and the growth of the U.S. market. This vicious cycle can be upended through targeted government action, including demand signals, tax incentives, grant programs, and other efforts to level the playing field for U.S. manufacturers. It will be imperative that any potential grant program has palatable and sensible requirements and that the funding is easily and widely accessible.

Threat to U.S. Values & Fundamental Human Rights

In addition to posing threats to U.S. national security and distorting the economic marketplace by flooding the U.S. with subsidized drones, DJI has been alleged to support human rights abuses. The U.S. Department of Commerce placed DJI on the Entity List,[52] and the U.S. Department of the Treasury placed DJI on the Office of Foreign Assets Control's (OFAC) list of Chinese tech firms that are part of the Chinese military-industrial complex.[53] These lists restrict U.S. investments in DJI based on allegations of support of human rights abuses against the Uyghur people. Specifically, the Department of the Treasury noted, "SZ DJI Technology Co., Ltd. (SZ DJI) operates or has operated in the surveillance technology sector of the economy of the PRC. SZ DJI has provided drones to the Xinjiang Public Security Bureau, which are used to surveil Uyghurs in Xinjiang. The Xinjiang Public Security Bureau was previously designated in July 2020, pursuant to E.O. 13818, for being a foreign person responsible for, or complicit in, or that has directly or indirectly engaged in, serious human rights abuse."[54]

It is U.S. government policy to combat forced labor in Xinjiang and strengthen international coordination against this egregious violation of human rights.[55] To be consistent with this policy, and American values, the U.S. must move away from Chinese drones, specifically DJI drones, which have been found by the U.S. government to facilitate human rights abuses against the Uyghur people.

SOLUTIONS FROM THE PARTNERSHIP FOR DRONE COMPETITIVENESS

U.S. Drone Manufacturing Competitiveness & Security

From the perspective of U.S. competitiveness and security, incentivizing U.S. leadership in the drone industry — the focal point of a new era of aviation — represents a strategic imperative in a

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[51] https://www.vox.com/2017/4/14/14690576/drone-market-share-growth-charts-dji-forecast

[52] https://www.bis.doc.gov/index.php/documents/regulations-docs/2326-supplement-no-4-to-part-744-entity-list-4/file

[53] https://sanctionssearch.ofac.treas.gov

[54] https://home.treasury.gov/news/press-releases/jy0538

[55] Public Law 116-145, UYGHUR HUMAN RIGHTS POLICY ACT OF 2020: https://www.govinfo.gov/content/pkg/PLAW-116publ145/html/PLAW-116publ145.htm

market long characterized by state-subsidized companies based in China. AUVSI believes it is essential to advance security and competitiveness in a thoughtful way that respects existing investments while building toward a more secure, sustainable future that puts U.S. interests — including security, the economy, and overarching values — first. By addressing these issues in a measured manner, we believe we can help to balance competing interests and facilitate sound policy.

Leveling the Playing Field for U.S. Drone Manufacturing

U.S. drone manufacturers and their component supply chain have struggled to compete against foreign subsidized competition, which hinders the availability of American-made UAS on the market and impedes workforce growth and investment. Accordingly, the U.S. government must foster a more competitive and fair playing field for U.S.-based drone manufacturers. AUVSI is advocating for specific proposals that would generate demand for U.S.-made drones and supply-side measures that level the playing field for U.S. drone and component manufacturers against subsidized competition and dumping practices.

Bolstering new drone manufacturing capabilities and the associated workforce will require infrastructure and capital expenditures. Providing tax incentives, loan guarantees, and other mechanisms to spur that spending would accelerate growth and development that would have otherwise been delayed or denied. Manufacturer tax credits for the production and sale of certain UAS equipment and components produced and sold in the U.S. would benefit the industry and its competitiveness and would decrease reliance on subsidized, foreign drones.

This has worked in other industries. According to the *Financial Times*, U.S. manufacturing commitments doubled — to more than $200 billion, creating 82,000 jobs — based on the success of tax incentive programs for other industries, including solar panels, semiconductors, electric vehicles, and other clean technologies.[56] In the solar industry alone, since the passage of the Solar Energy Manufacturing Act (SEMA), more than $100 billion in private sector investment has been made into fifty-one new manufacturing facilities in the United States, ultimately representing more than 20,000 additional U.S. jobs to be created and significant capacity added for domestic solar panel production.[57] In a recent hearing on the CHIPS and Science, it was stated that since the law was enacted, along with $39 billion in government appropriations and 25% investment tax credit to spur domestic production of semiconductors, more than $200 billion in additional private sector funding has flowed into the industry in the U.S.[58] Recently, the Energy Department has made $15.5 billion in new funding available to spur domestic battery manufacturing through cost-shared grants and loans.[59] The time has come for the U.S. Government to act

[56] https://www.ft.com/content/b1079606-5543-4fc5-acae-2c6c84b3a49f

[57] https://www.seia.org/research-resources/impact-inflation-reduction-act

[58] Senate Committee on Commerce, Science, and Transportation CHIPS and Science Implementation and Oversight, October 4, 2023: https://www.commerce.senate.gov/2023/10/chips-and-science-implementation-and-oversight

[59] https://www.energy.gov/articles/biden-harris-administration-announces-155-billion-support-strong-and-just-transition

to similarly spur investment into the U.S. drone and component marketplace. The Partnership for Drone Competitiveness supports:

- Manufacturing tax credits: To promote domestic drone manufacturing capacity, Congress needs to develop a tax incentive program for drone manufacturing. This program can leverage the language and model the frameworks of SEMA, CHIPS, the House's Bioeconomy Research and Development Act of 2021 (America Creating Opportunities for Manufacturing, Pre-Eminence in Technology and Economic Strength (COMPETES) Act of 2022), and the Senate's United States Innovation and Competition Act (USICA) on semiconductors and other technologies.
- Loan guarantees: In addition to tax incentives, to promote competitiveness against subsidized Chinese competition, Congress should develop a program of loan guarantees to U.S. drone and component manufacturers modeled around language included in the Advanced Technology Vehicles Manufacturing Direct Loan Program.
- Ensuring critical mineral access: Access to rare earth driven components is a challenge to U.S. drone and component manufacturers. Congress should enact legislation along the lines of H.R. 8981, the Securing America's Mineral Supply Chains Act, from the 117th Congress. It would be highly beneficial to the American drone industry by helping ensure the domestic availability of critical materials that are required in the manufacturing of UAS and their components.

In taking action to level the playing field and promote competition, the U.S. government should also coordinate activities with allied and partner nations to create a stronger, more secure supply chain.

Federal Market Demand Programs

Programs focused on U.S.-made drone acquisition incentives, specifically grants, would signal to investors the market opportunity for U.S. drones, stimulating investment into U.S. drone and component manufacturing. These programs are also fair and market-driven, maximizing public choice, as the government would not be picking winners and losers.

Federal Grants for First Responders

According to a 2019 survey by Droneresponders, 92% of first responders in the U.S. are using drones made by China.[60] This is a direct consequence of China subsidizing the drones, driving down costs, and a program to donate DJI drones to first responders.[61] The Droneresponders survey also noted that 88% of first responder agencies would prefer to use U.S. drones; however, cost is a major factor in being able to transition away from the subsidized Chinese drones to market-based U.S. drones.[62]

[60] https://www.droneresponders.org/2019-chinese-uas-technology

[61] https://www.newsweek.com/lawmakers-request-federal-inquiry-over-concerns-drones-donated-china-are-being-used-spy-us-1504222

[62] https://www.droneresponders.org/2019-chinese-uas-technology

- Congress should enact a new program designed to help public safety agencies transition from using Chinese drones to U.S.-made solutions. This program could borrow lessons from the Supply Chain Reimbursement Program which "reimburses providers of advanced communications services … incurred in the removal, replacement, and disposal of communications equipment and services produced or provided by Huawei Technologies Company (Huawei) or ZTE Corporation (ZTE)."[63]
    - This new program should be funded appropriately to ensure sufficient annual funding to ensure that a) public safety agencies can begin to replace and upgrade drone fleets, and b) U.S. domestic drone manufacturing can meet demand in terms of both production capability and drone reliability and capability.
- Congress should enhance existing federal grant programs for first responders. Reports confirm that FEMA and other agencies have permitted federal taxpayer dollars to fund the purchase of Chinese-made drones.[64] Congress should ban that practice and ensure that federal grant programs to support first responders are adequately funded to enable state and local agencies to transition to secure, U.S.-made solutions.
    - This should include, among other programs, the Department of Homeland Security's (DHS) Urban Areas Security Initiative (UASI) Program, the Federal Emergency Management Agency's (FEMA's) Homeland Security Grant Program, and grants administered by the U.S. Department of Justice.
    - Critically, these and other federal grant programs for first responders must allow grant recipients to purchase drones. At present, the Justice Department's Bureau of Justice Assistance flatly prohibits the use of grant funds to purchase UAS,[65] as does FEMA's Assistance to Firefighters Grants (AFG) Program. Enabling these programs to support the purchase of U.S.-made drones would significantly benefit first responders.

Federal Grants for Infrastructure Inspection

- Congress should enact the Drone Infrastructure Inspection Grant (DIIG) Act, which would create a $100 million grant program for local, state, and tribal governments to use U.S.-made drones for critical infrastructure inspection and construction projects.
    - The DIIG Act also provides $100 million in grant funding for workforce development programs, coupling with community colleges and four-year institutions, to enable the future workforce required for the U.S. to remain a global aviation leader.

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[63] https://www.fcc.gov/supplychain/reimbursement

[64] https://www.tabletmag.com/sections/news/articles/government-funds-chinese-spy-technology-americas-backyard

[65] https://bja.ojp.gov/program/jag/prohibited-expenditures-associated-procedures-under-jag

    - The DIIG Act would enhance U.S. drone competitiveness by spurring investment in the U.S. drone industry and worker training and provide tangible benefits for infrastructure resilience.
- U.S. Department of Transportation (DOT) programs that enable the use of drones for infrastructure inspection, such as the Every Day Counts (EDC) program, should incentivize the use of U.S. manufactured drones.
- Congress should enact a new program designed to help industrial inspection companies engaged in critical infrastructure inspection transition from using Chinese drones to U.S.-made programs, which could reflect, in part, the Supply Chain Reimbursement Program as mentioned above for first responders. Again, the program should be funded appropriately to ensure that critical infrastructure owners and operators can begin to replace and upgrade drone fleets and U.S. domestic drone manufacturing can meet demand in terms of both production capability and drone reliability and capability.

DoD Programs

DoD programs across all domains have identified uncrewed systems as essential tools for the future of warfare.[66] The potential for DoD investment into these systems, many of which are dual purpose commercial and defense technologies, benefits the warfighting capabilities of the United States. It also boosts U.S. industry, spurring job creation, investment, and advanced R&D. A recent study by the Special Competitive Studies Project notes that to close the deterrence gap and to build the joint-force of the future, the U.S. should purchase "high volumes" of drones, a recommendation AUVSI strongly supports.[67] Nevertheless, as the New York Times recently reported, drone companies, as well as other advanced technology industries "are facing a stiff challenge on another field of battle: the Pentagon's slow-moving, risk-averse military procurement bureaucracy."[68] The DoD must work with industry to overcome the acquisition challenges to get capable tools into the hands of warfighters faster, ensuring a strong U.S. industry for defense and commercial missions.

The recently announced Replicator initiative by Deputy Defense Secretary Kathleen Hicks is a step in the right direction. In an August 28, 2023, speech, Secretary Hicks noted: "... now is the time to take all-domain, attritable autonomy to the next level: to produce and deliver capabilities to the warfighter at the value and velocity required to deter aggression, or win if we're forced to fight."[69] The goal, according to Hicks, is "to field attritable autonomous systems at scale of multiple thousands, in multiple domains, within the next 18-to-23 months."[70] To meet this goal, DoD will have to rely on both traditional defense companies as well as commercial autonomy platforms, which Hicks acknowledged. Accordingly, a significant boost to the advanced manufacturing capacity of the United States will be required. While details on the Replicator program

[66] https://www.nationaldefensemagazine.org/articles/2021/5/28/unmanned-systems-and-the-future-of-war
[67] https://www.scsp.ai/wp-content/uploads/2023/05/Offset-X-Closing-the-Detterence-Gap-and-Building-the-Future-Joint-Force.pdf
[68] https://www.nytimes.com/2023/05/21/us/politics/start-ups-weapons-pentagon-procurement.html
[69] https://www.defense.gov/News/Speeches/Speech/Article/3507156/deputy-secretary-of-defense-kathleen-hicks-keynote-address-the-urgency-to-innov/
[70] Ibid

are forthcoming, the sentiment delivered by the DoD is certainly welcome and, if successful, will help to drive investment and innovation that will be an important element of the transformation of the drone industry.

The DoD has established the Office of Strategic Capital (OSC) "to develop, integrate, and implement proven partnered capital strategies to shape and scale investment in critical technologies."[71] The OSC is designed to "identify and prioritize promising critical technology areas for the Department of Defense" and, importantly, "fund investments in those critical technology areas, including supply chain technologies not always supported through direct procurement."[72] Given that access to capital can be a challenge for the drone and component manufacturing industry, the OSC offers promise to the industry as a tool for overcoming limitations from the private sector. OSC should designate and prioritize drones and drone components as a critical technology and immediately work to fund investments in this area to expand U.S. capabilities and manufacturing capacity. It is imperative that DoD purchases drones of all sizes, at scale, from U.S. companies. OSC should partner with other agencies, like the Small Business Administration, to leverage their tools in the form of loan guarantees, loans, and other mechanisms.

Further, Congress and the DoD should continue to invest in AFWERX, which is "a Technology Directorate of the Air Force Research Laboratory (AFRL) and the innovation arm of the Department Air Force."[73] Multiple AFWERX programs offer opportunities for the drone industry, including AFVentures, which, "invests in emerging technologies to scale Department of the Air Force capabilities, strengthening the US industrial base that empowers Airmen and Guardians by incentivizing private, for-profit investment in national security interests"[74] and Prime, which seeks to "accelerate emerging dual-use markets by leveraging government resources for rapid and affordable fielding."[75]

Enabling Regulations

As noted in the opening paragraph of this paper, the one segment of the aviation industry that the United States is not leading is drone manufacturing and operations. While much of this paper is focused on leveling the playing field in drone and component manufacturing, AUVSI similarly advocates for bold action by the U.S. government to enable drone operations to scale.[76] The U.S. is falling behind other nations in the global effort to safely and efficiently integrate drones – which perform many lifesaving and critical industrial missions – into the airspace. Accordingly, the Federal Aviation Administration (FAA) must take steps to streamline approval processes and minimize the bureaucratic barriers to successful integration. Congress can assist by giving the FAA additional tools, authorities,

[71] https://www.cto.mil/osc/
[72] Ibid
[73] https://afwerx.com/
[74] https://afwerx.com/afventures-overview/
[75] https://afwerx.com/prime-overview/
[76] https://www.auvsi.org/our-impact/advocacy-initiatives/auvsi-air-advocacy-committee

and resources to accomplish this mission. Such tools should include mechanisms to help the FAA implement 2023 FAA Reauthorization efforts/mandates. Making progress on drone operational integration will spur investment into the drone industry, including manufacturing and workforce development in the United States.

Drone Cybersecurity

AUVSI, through its Trusted Cyber Program Working Group, made up of nearly forty companies in the uncrewed and autonomy industry, has developed a framework for cyber standards for drones.[77] In conjunction with the DoD's Defense Innovation Unit (DIU)[78], AUVSI brought to market the Green UAS compliance program to assess and verify commercial drones to ensure that they meet the highest levels of cybersecurity and NDAA supply chain requirements.[79]

- The Green UAS cleared list of drones meet updated levels of security requirements of the DIU's Blue UAS 2.0 Program. Accordingly, U.S. government agencies should apply Green UAS, along with Blue UAS, to their respective drone acquisition policies to ensure secure drones are available for acquisition. Congress should require this as a best practice of USG agencies and encourage this practice at the state, local, tribal, and territorial level.
- The FAA should incorporate voluntary consensus standards in the uncrewed systems cybersecurity arena like those developed by AUVSI to ensure trust, integrity, and availability of data collected by drones.
    - This is accomplished through a security controls assessment and vulnerability and penetration test.
- Congress should continue to fund the DIU's Blue UAS program to allow the program to scale and incorporate connected drones in the future.

Restrictions and Tariffs on Chinese Drone Imports

Country of Origin Restrictions

AUVSI has developed targeted principles for legislative or executive measures designed to advance the use of trustworthy systems made in the U.S. and allied nations in a responsible, measured manner. Our principles for rational, tailored country of origin restrictions are as follows:

- Ensure any UAS restrictions are reasonably related to national security, cybersecurity, human rights concerns, and target companies whose governments provide significant subsidies and are engaged in other unacceptable practices, such as military-civil fusion. This may include referencing sources such as:
    - The Consolidated Screening List (International Trade Administration), Entity List (U.S. DOC, Bureau of Industry and Security), entities identified by the DoD as military companies from countries of concern operating directly or

[77] https://www.auvsi.org/cybersecurity-working-group

[78] https://www.diu.mil/latest/auvsi-launches-green-uas-cybersecurity-certification-program-for-commercial

[79] https://www.auvsi.org/green-uas

indirectly in the United States, and other such lists managed, maintained, and regularly updated by the U.S. government.

- With respect to components, limit any restrictions to security-critical components (and omit passive components). These types of restrictions are best exemplified by the American Security Drone Act (ASDA), a legislative initiative that limits component restrictions to two components (communications links and the controller).
- Afford end users suitable transition periods for the use of products that may be restricted in the future. This is important operators using UAS manufactured in countries of concern, most notably China.
- Include affirmative measures designed to support a timely, low-friction transition, which may include grants or other incentives to end users or pathways designed to support the domestic manufacturing of trustworthy UAS systems.
    - Following the transition period, those mechanisms must remain in place to foster a more competitive and fair playing field for domestic, United States-based manufacturers.

Tariffs

In July of 2018, the United States Trade Representative (USTR) instituted Section 301 tariffs on a broad range of Chinese goods, including drones. The 25% tariffs were reinforced in July of 2022 and specific categorizations were added for different categories of drones.[80] At a minimum, the Partnership supports maintaining the current 25% tariffs. USTR, however, should consider increasing the tariff amount to better blunt the dumping of subsidized Chinese drones into the U.S. market. By DJI's own admission in a filing with USTR, "Market surveys show a majority of the commercial drone products purchased by U.S. residents are still manufactured outside of the U.S. In addition, the majority of drones assembled in the US still use Chinese components. Having additional duties did not have positive effects on domestic manufacturing of drones or downstream products."[81] Accordingly, the 25% tariff should be reviewed by USTR for enhancement to produce positive effects on domestic manufacturing of drones.

CONCLUSION

The capabilities, utility, and life-saving potential for drones are unparalleled, but the inability to scale and grow the market are hampered by stifling international subsidies and bureaucratic roadblocks to enabling regulations. The policies in this paper would help to level the playing field for U.S. drone and component manufacturers, ensuring a key industry remains in America to meet the growing demand from industry and the warfighter.

[80] https://www.wileyconnect.com/new-import-codes-for-drones-what-you-need-to

[81] DJI in comments to USTR on 301 Tariffs, USTR-2022-0014-00034924: https://comments.ustr.gov/s/commentdetails?rid=DYBJHKW9QR