

PEER-REVIEWED ARTICLE

**HAS THE BIRD FLOWN THE COOP?
Obsolete Unmanned Aircraft System Export Control Policies
Undermine United States' Industry and National Security Objectives**

Lieutenant Colonel Calvin Powell
United States Air Force

Ambassador Douglas Griffiths
U.S. Foreign Service, retired

ABSTRACT

Many near-peer competitors are rapidly eroding overall U.S. unmanned aircraft systems (UAS) supremacy. Most notably China and Russia, although not yet matching U.S. UAS capability, threaten U.S. security interests by encroaching on areas of traditional U.S. influence. The United States' restrained posture towards UAS sales has cost U.S. dominance of the relative market and undermined opportunity for broader strategic partnerships. The United States released in April 2018, an updated *Conventional Arms Transfer Policy* and *U.S. Policy on the Export of Unmanned Aerial Systems*, which provide the opportunity to cultivate greater trust with close partners and exploit the inevitable future of unmanned aerial technology. The United States should now: 1) lead significant changes to the *Missile Technology Control Regime's (MTCR)* unmanned aerial vehicle (UAV) definitions; 2) cultivate increased UAS collaboration and sales to develop cultural interoperability and solidify normative behaviors of use and export; and 3) anticipate and capitalize on the results of the policy shift. Such efforts are necessary for the U.S. to preserve a majority share of the international UAS market opportunity and strongly influence the remainder, protect the United States' defense technological advantage, and counter market subjugation by near-peer competitors.

Keywords: unmanned aerial vehicles; security interests, defense technology, partnerships, obsolete policies

For nearly two decades, the United States maintained a decided advantage in unmanned aircraft systems (UAS)¹ technology and capability. Although the United States retains superiority in certain military employment capabilities, such as across-the-globe satellite operations, many near-peer competitors are rapidly eroding overall U.S. UAS supremacy. Most notably China and Russia, although not yet matching U.S. UAS capability, threaten U.S. security interests by encroaching on areas of traditional U.S. influence. “In fact, every international transfer of an armed drone to date with the exception of the U.S. transfer to the United Kingdom [and now Italy] has been from China.”² The United States’ hesitancy to sell UAS to allies and partner nations creates a void readily filled by emerging competitors³ willing to take the lead for UAS sales most anywhere the United States will not.⁴ Export control restrictions further impinge on the United States’ ability to develop relationships through follow-on sales and long-term sustainment. Such international arms export competition is not new; the ability to challenge U.S. UAS technology and capability dominance, however, is developing far quicker than U.S. policy and standing international agreements can adapt.

The United States’ restrained posture towards UAS sales has cost U.S. dominance of the relative market and undermined opportunity for broader strategic partnerships. Refreshingly, the United States released in April 2018, an updated *Conventional Arms Transfer Policy* and *U.S. Policy on the Export of Unmanned Aerial Systems*, which provide the opportunity to cultivate greater trust with close partners and exploit the inevitable future of unmanned aerial technology. Well-coordinated implementation could disrupt the surge of near-peer competition, solidify global norms, and ensure a competitive U.S. defense and civil industry advantage in this burgeoning niche market. The United States should now: 1) lead significant changes to the *Missile Technology Control Regime’s* (MTCR) unmanned aerial vehicle (UAV) definitions; 2) cultivate increased UAS collaboration and sales to develop cultural interoperability and solidify normative behaviors of use and export; and 3) anticipate and capitalize on the results of the policy shift.

Obsolete Policies Impede Progress

In April 2018, the United States released an updated *Conventional Arms Transfer (CAT) Policy* which “provides a framework under which all U.S. government agencies will review and evaluate proposed arms transfers and approve commercial defense sales by American companies.”⁵ The United States simultaneously released a new *U.S. Policy on the Export of Unmanned Aerial Systems*, replacing the 2015 *U.S. Export Policy for Military Unmanned Aerial Systems*⁶ and loosening previous restrictions with a new focus on “delivering a crucial military capability to [U.S.] allies and partners.”⁷ U.S. military UAS are traditionally sold via the Foreign Military Sales (FMS) program, overseen by the Defense Security Cooperation Agency (DSCA), as authorized by the *Arms Export Control Act*.⁸ The 2018 UAS export policy will bolster U.S. UAS sales’ opportunities by “enabling U.S. firms to increase their direct sales to authorized allies and partners,” according to Dr. Peter Navarro, Assistant to the President for Trade and Manufacturing Policy. Regardless of the new language, the *Conventional Arms Transfer Policy* continues to provide balance between meeting “legitimate security requirements of [U.S.] allies and partners in support of [U.S.] national security and foreign policy interests” and actions “destabilizing or dangerous to international peace and security.”⁹

In late 2016, the United States led 52 other nations in negotiating the *Joint Declaration for the Export and Subsequent Use of Armed or Strike-Enabled Unmanned Aerial Vehicles (UAVs)*. Although specific to strike-enabled UAS, this joint declaration is a critical and positive move towards appropriately scoped and flexible policy governing UAS export and use. The states agreed to the broad principles of adhering to international law, promoting responsible export control and transparency consistent with existing multinational agreements. The parties also committed to continued dialogue on the subject.¹⁰ The 2018 policy updates remain supportive of this *Joint Declaration*.

Both the 2018 U.S. UAS export policy and 2016 joint declaration were carefully drafted to adhere to, or at least not contradict, U.S. commitment to the *Missile Technology Control Regime* (MTCR). The MTCR is a 30-year old multilateral agreement between 35 nations—the United States being one of the original seven adherents—to counter proliferation of weapons of mass destruction (WMD) delivery systems and related technologies. The agreement has no legal binding or formal consequence apparatus. Instead, it relies on good faith in a “strong presumption of denial” to abate proliferation and influence export decisions. In 1992, UAV were added to the MTCR’s Categories I and II and are now the blanket terminology for “cruise missile systems, target drones, and reconnaissance drones.”

Category I accounts for “complete delivery systems,” of both rocket systems and UAV, “capable of delivering at least a 500 kg [1102 lb] ‘payload’ to a ‘range’ of at least 300 km [162 nm].”¹¹ Category II includes, again, both rocket systems and UAV “not covered in Item I, capable of a maximum range equal to or greater than 300 km.”¹²

Although the *MTCR* accounts for a relatively small subset of large UAS, it is often critiqued for providing inadequate and outdated guidance for UAS transfers, unnecessarily restricting exports.¹³ The inclusion of UAV in the *MTCR* represented good intentions in the 1990s, but lacked clear understanding of the rapid advances in technology and subsequent conventional military and commercial dual-use possibilities divergent from missile systems. Furthermore, the prescribed weight and range limitations defining UAV categories were carried over from earlier, arguably conservative, parameters for nuclear-capable ballistic missiles.¹⁴ As a result, conventional UAS sales are constrained by the arbitrary language of an overly restrictive international agreement designed for a wholly different purpose—restricting the proliferation of MWD delivery systems.

Arms export control policy should set the conditions for a dynamic market environment and encourage the defense industrial base to innovate, take risks, and anticipate new challenges and opportunities in the interest of U.S. national security. Instead, complying with the “strong presumption of denial” under the *MTCR* consistently shrouds UAS export discussions in negative tones. According to the Aerospace Industry Association, the *MTCR* has become the “big barrier”¹⁵ and one of “several anchors”¹⁶ to constructive U.S. UAS export control. These are strong phrases for an agreement with no legal bounds but accurately represent UAS industry perceptions. As with any multilateral agreement, the ends should justifiably affect all participants fairly. With respect to restrictions placed on UAS technologies, the United States has far more to lose than any other *MTCR* adherent.

During the *MTCR* annual plenary meeting in October of 2017, member states specified their intent to “intensify the efforts of Partners to prevent the proliferation of unmanned delivery systems capable of delivering WMD.” The partners also stressed the “*MTCR Guidelines* are not designed to impede technological advancement and development” or “hinder legitimate trade.”¹⁷ Such official disclosure provides some clarity of intent but fails to adequately improve the agreement’s effectiveness.

The disruptive nature of UAS innovations offer tremendous military and commercial opportunities well into the future. UAS are far from single-purpose cruise missiles, as insinuated by the *MTCR*. Ironically, the *MTCR* overtly provides concession for advances in legitimate, non-WMD space programs. It also omits *manned* aircraft not converted for unmanned flight,¹⁸ even though many manned fighters and bombers are capable of delivering nuclear weapons. Unfortunately, it does not offer similar concession to *unmanned* aerial capabilities. Instead, the Partners continue to devote “increased attention to... Unmanned Aerial Vehicles.”¹⁹ In an effort to correct these apparent limitations, according to Defense News, the United States circulated a white paper on potential *MTCR* adjustments governing UAS technologies during the 2017 plenary meeting.²⁰ Unconfirmed sources indicated the recommendations center on adding further speed restrictions to the UAV categories, a position also advocated by the Aerospace Industries Association (AIA)²¹, the self-proclaimed “voice of American aerospace and defense.”²² This is a positive step, and the United States must capitalize on every opportunity to negotiate substantial policy change in advance of the 2018 *MTCR* plenary meeting.

Unfortunately, UAS speed, although a valid discriminator, is just as insufficient as the current restrictions of payload and distance. In the 1990s, the categorizations seemed appropriate for the existing capabilities; just as today, speed seemingly differentiates most UAS from cruise missiles. For example, Lockheed Martin’s hypersonic SR-72 unmanned aircraft should not be considered a cruise missile *ex ante*, just because it is “conceivably capable of topping Mach 6 (4,000 miles per hour).”²³ A UAS’s ability to exceed manned flight performance does not mean it is particularly culpable of WMD delivery. Instead, the United States should lead the change to discount specificity towards UAS platform capabilities in the *MTCR* in favor of accounting for intended use and effects of the technology. This would allow the *MTCR* to focus on its true intent of preventing WMD proliferation.

Why It Matters

Market Opportunity

“Like the internet and GPS [Global Positioning System] before them, drones are evolving beyond their military origin to become powerful business tools...creating a market opportunity that’s too large to ignore,” totaling \$100 billion between 2016 and 2020, according to Goldman Sachs Research.²⁴ A maturing military UAS market will likely account for \$70 billion of the anticipated \$100 billion market. Such opportunities represent “only the tip of the iceberg,” as the “ripple effects [will surely continue to] reverberate through the economy.”²⁵ The challenge for the United States, of course, is to preserve a majority share of this market opportunity and strongly influence the remainder. The threat to success is the United States’ general “acceptance of lowered expectations” for remaining king of the advanced-technology hill.²⁶ Steve Zaloga, a Teal Group senior analyst, characterized this concern in the *2017 UAV Market Profile and Forecast*, predicting “the [United States] will account for 57% of total military worldwide [research, development, test, and evaluation] spending on UAV technology over the next decade...[yet only] about 31% of the [global] military procurement.”²⁷

Responding to the challenge, Lieutenant General Charles Hooper, Defense Security Cooperation Agency’s (DSCA) Director, is keen on extending the U.S.’s fiscal year 2017, \$41.93 billion FMS market by continuing to provide U.S. partners the “total package...of training, maintenance, and sustainment.”²⁸ While the overall U.S. aerospace industry exported over \$90 billion in civil and military systems in 2016, with similar expectations in 2017, AIA President and Chief Executive Officer (CEO), David Melcher, cautioned industry leaders in December 2017, to not become complacent: “The recent track record of defense export success does not address the growth of foreign competition and influence in the global defense market. Nor does it answer the question of whether we are missing opportunities to build partner capacity in the manner and timeframe most beneficial to American interests.”²⁹ Insufficient and slow to adapt policies only exaggerate surging foreign competition and waning U.S. influence, particularly in the UAS industry. The United States must act decisively to maintain global UAS market dominance as, “The UAV market continues to soar,” according to Philip Finnegan, Teal Group’s director of corporate analysis. “Increasing trade in costly high-altitude, long-endurance systems, demand for armed UAVs, the development of the next generation of unmanned combat systems, and potential new applications such as missile defense continue to drive the market.”³⁰

Industry Relevance & Innovation

Keeping pace with disruptive innovations, such as UAS, requires consistent market awareness and capability relevance. “The U.S. defense industrial base must remain competitive and technologically relevant at all times. It is not a just-in-time resource,” according to Kelvin Stroud, AIA.³¹ The *Summary of the 2018 National Defense Strategy of the United States of America* reiterates this point, highlighting dependence on “a healthy and secure national security innovation base that includes both traditional and non-traditional defense partners” to protect the United States’ defense technological advantage.³²

The new paradigm where many defense-related technologies are developed or advanced by the commercial sector and outside of governments continues to accelerate technology transfer and challenge the North Atlantic Treaty Organization (NATO) and many sovereign militaries, according to Admiral Manfred Nielson, NATO’s Deputy Supreme Allied Commander Transformation. He believes the prevalent but fading mindset of the Cold War era, where government often led technology advancement, still involves long and often expensive timelines and limits the technology adaptation rate. To modernize at a rate Admiral Nielson considers the “speed of relevance,”³³ a phrase also used in the United States’ *2018 National Defense Strategy*,³⁴ defense and security policy must acknowledge the non-defense industry more often sets the relative pace of modernization. Unfortunately, in regulating evolving and, potentially, disruptive technologies, policy makers are at a disadvantage, as the cycle of innovation can outpace the U.S. government policy, budget, and acquisition cycles.³⁵

As a result, the commercial sector is leading many of the current UAS technology innovations. One example is a small start-up company called Natilus, developing an unmanned Boeing 777-sized cargo transport UAS.³⁶ Such an aircraft could prove very valuable to both commercial and military logistics. If Natilus subsequently desired to

export this UAS, surely capable of traveling more than 300 km and carrying more than 500 kg, it would be subject to the *MTCR* Category I restriction of “strong presumption of denial.” While liable to plenty of suitable export laws, the innovative minds at Natilus and the multitude of other U.S. commercial UAS start-ups should not have to concern themselves with a WMD counter-proliferation international agreement for what are essentially commercial aircraft.

The U.S. UAS defense sector’s need for flexibility to innovate with relative assurance of global market accessibility is no different. Given more favorable export control policies, increased foreign sales will likely “create additional demand for support infrastructure, including ‘training; service, support and maintenance; and data management,’” as seen with the U.S. UAS industry’s rapid growth over the last decade.³⁷ Long-term customer support for foreign military sales is often considered a U.S. competitive advantage used to grow and nurture international partnerships, establish normative behavior in line with U.S. interests, and ensure future market opportunities.³⁸ As a market-driven industry, aerospace defense relies on those future opportunities, or at least optimistic market signals, for continued production and increased research and development.³⁹

The U.S. aerospace industry’s “passion to invent, innovate, and imagine paths never taken,” according to Melcher of AIA, “...helps explain why [the aerospace industry is] such a critical contributor to U.S. leadership in the global economy.”⁴⁰ Government regulations should fuel this passion and encourage the defense establishment to help refine future policy and drive perpetual ambition for further transformation and the resulting technology. Facilitating international commercial partnerships only enriches such imagination. “The modern economy,” according to Yuval Harari in *Homo Deus*, “needs constant and indefinite growth in order to survive.”⁴¹ The UAS commercial and defense industries, as part of this modern economy, do as well. Without consistent global market access and intellectual cooperation, the U.S. UAS defense industry risks losing its competitive advantage.⁴²

Emerging Foreign Competition is Eroding U.S. Influence

Global UAS spending is exploding, estimated at \$40.2 billion between 2017 and 2021, excluding the United States’ \$17.5 billion.⁴³ Most concerning to the United States’ market dominance should be Russian, Chinese, Israeli, and Iranian indigenously-developed UAS.⁴⁴ Of these four nations, none signed the 2016 *Joint Declaration*, and Russia is the only *MTCR* Partner.⁴⁵ As the third highest global UAS investor (\$3.9 billion) and second largest military systems exporter behind the United States, Russia continues to be a strategic threat as it “pursues veto power over the economic, diplomatic, and security decisions of its neighbors.” China, “a strategic competitor using predatory economics,”⁴⁶ is second only to the United States in UAS investments (\$4.5 billion).⁴⁷ Along with Israel, China *claims* to adhere to *most* of the *MTCR Guidelines*⁴⁸ but demonstrates no particular restraint with respect to armed UAS exports.⁴⁹ Israel, the world’s leading exporter of military UAS,⁵⁰ provides one of the highest quality combat-tested products on the market. Although not a significant UAS exporter or investor, “Iran continues to sow violence”⁵¹ by providing UAS, to include reversed-engineered advanced stealth UAS, to Lebanese Hezbollah.⁵² “The reemergence,” according to the United States’ *2018 National Defense Strategy*, “of long-term strategic competition, rapid dispersion of technologies, and new concepts of warfare and competition,” require U.S. adjustments.⁵³ Furthermore, the U.S. defense industry “no longer enjoys the [traditional] level of dominance...in technical innovation, in their applications, or in the processes or practices by which they are brought into use,” in great part due to “institutional and policy reasons.”⁵⁴ Continued policy reform is therefore fundamentally critical for the United States to counter market subjugation by near-peer competitors.

The *MTCR* Category I threshold causes the greatest negative pressure on U.S. UAS sales, as the United States maintains a significant market share of medium and high altitude, long endurance, large UAS.⁵⁵ These UAS also tend to garner significant negative attention due to the rapid, effective, and often secretive use by the United States over the last two decades.⁵⁶ However, small UAS, a commercial market dominated by the Chinese—Chinese small-UAS developer, D.J.I., alone commands 72% of the global market⁵⁷—reflect a growing dual-use market opportunity and threat to U.S. and partner security.⁵⁸ Small UAS are affordable, accessible, simple, expendable, and adaptable. There is also significant overlap of commercial and military small UAS technology.⁵⁹ Small UAS reflect many of the same positive technological advances and negative threat capacities as their larger counterparts. Although small UAS are not, and should not be, restricted by the *MTCR*, UAS of all sizes should be considered under the auspices of the 2016 *Joint Declaration* and any U.S. UAS-specific export policies.

Even with substantial market share, China's efforts are not restricted to small or unarmed UAS. China consistently fills the void left by the United States, with several traditional U.S. military sales partners included in the list of Chinese UAS exports.⁶⁰ China, however, does not have to usurp U.S. influence through long-term sustainment contracts. Instead, they simply need to block market access through an initial military sales deal.⁶¹ This is particularly critical in nations with relatively small defense budgets, only able to procure systems once every several years. Such cycles limit the opportunities for U.S. influence. Furthermore, China's military-grade UAS, although less capable than similar U.S. products, are sold at a "fraction of the cost," further exaggerating the challenges. The Chinese CH-4 Rainbow is advertised at \$1 million compared to the near \$15 million price tag of the "similar" U.S. MQ-9 Reaper.⁶² When the United States seems unwilling, is policy-restricted, and sells a product costing fifteen times more, even a sub-optimum capability is better than no capability for many nations.⁶³ This is particularly compelling when buying initial entry to the UAS game. When allies and partners buy elsewhere, U.S. security objectives are threatened as the United States loses long-term influence over UAS end-use, additional transfers, research and development stimulation, and secondary regional market opportunities. "When [the United States] enables [its] allies and partners to more easily obtain appropriate American defense articles and services," however, U.S. national security improves.⁶⁴

In the *2018 National Defense Strategy*, Jim Mattis, U.S. Secretary of Defense, writes: "Failure to meet our defense objectives will result in decreasing U.S. global influence, eroding cohesion among allies and partners, and reduced access to markets that will contribute to a decline in our prosperity and standard of living."⁶⁵ Each viable U.S. competitor approaches the problem differently and requires uniquely flexible U.S. engagement strategies to avoid Secretary Mattis' warning. Even though long-time European allies seem the obvious first step to increased U.S. UAS FMS efforts, the European Union continues to push for sole indigenous UAS production, "full operational sovereignty," and independent intelligence management for future UAS capabilities.⁶⁶ Israel will continue to exploit their historic geographical linkage to Europe and the Middle East. Russia's policy of western alliance destabilization also extends to FMS, as demonstrated by the recent agreements to sell S-400 air defense missiles to Turkey and Saudi Arabia, both historic U.S. FMS partners.⁶⁷ China, on the other hand, gains from European stability and seeks to exploit the market through cheaper wares and a "no strings attached" policy. Unlike the United States and European Union, China "[does] not ask the difficult questions, preach, or push for privatization and restructuring of inefficient state-owned enterprises."⁶⁸ As a result, the United States must enhance the value of its often more expensive products while balancing European Union market competition with enhanced collective trans-Atlantic security.

Multinational Industry Collaboration

Market competition and a degree of uncertainty does not indicate a complete lack of international cooperation but does demonstrate the existing friction when establishing and cultivating international relationships. Three examples where U.S. UAS manufacturers were able to overcome policy impediments and achieve preliminary success exist in Australia, with Insitu and General Atomics-Aeronautical Systems Inc. (GA-ASI), and in Japan, with GA-ASI. First, Insitu established an international business-to-business relationship with Queensland Gas Company (QGC), a Shell-owned natural gas company in Australia. Insitu, a subsidiary of Boeing Corporation, builds the low altitude long endurance Scan Eagle UAS—an airplane used extensively in the U.S. military. QGC plans to fly the Scan Eagle to inspect wells, pipelines, facilities, and the surrounding environment to "drive improvements in our safety performance, more efficiently and effectively survey our infrastructure and reduce our footprint on the environment," according to a QGC general manager.⁶⁹ Such breakthrough dual-use examples are no longer unique for UAS. Although the largest financial opportunities remain in military contracts, Goldman Sachs predicts the highest UAS job growth in the next five years in non-military construction and agriculture sectors.⁷⁰ Insitu's U.S. military UAS role should not limit international commercial or military cooperation. U.S. leadership in the military and commercial UAS sectors are more critical today than ever, as there are few examples of dual-use technologies where the thin line of civilian from military separation—weaponization—is more prevalent than with UAS. Therefore, the United States should promote an example of partnership and cooperation to firmly establish international standards of use and proliferation and to maintain innovative relevance in this rapidly progressing field.

The second and third partnerships involve GA-ASI, the U.S. makers of the U.S. Air Forces' medium altitude, long endurance (MALE) UAS-of-choice, the MQ-1 Predator and MQ-9 Reaper. In September 2017, GA-ASI expanded its "Team Reaper Australia" to nine companies in an effort to provide solutions to Australia's "Project Air 7003" UAS requirement.⁷¹ These arrangements are intended to spark greater innovation and technical knowledge sharing through expanded access while capitalizing on the "rise of the globalized [research and development] complex."⁷² If successful, such a business-to-government partnership will also firmly secure U.S. influence in the Australian military's fledgling armed UAS program and greatly strengthen the capabilities of one of the United States' most trusted allies in the Pacific.

In mid-2017, GA-ASI also entered a business-to-multiagency research collaboration agreement with a diverse Japanese team, representing Japanese industry, government, and academia with an objective to "accelerate operational approval for MALE UAS to fly in non-segregated Japanese civil airspace."⁷³ Expanding beyond the traditional business-to-business and business-to-government relationships, this collaboration demonstrates the powerful potential of the U.S. defense industrial base's normative influence on foreign UAS use and civil integration. No less crucial in this example is how "different fields influence one another in such intricate ways that even the best minds cannot fathom how break-throughs" in one emerging technology might impact other fields.⁷⁴

It is tempting to tout these three cases as examples of success under recent conservative policies in argument against the need-for-change. No doubt these represent U.S. industry success and future possibilities. However, such intimate international multi-functional cooperation is far from normal, only occurring after 20 year of U.S. UAS dominance and with a very limited subset of the most-trusted allies. The opportunity for change is fleeting as the U.S. UAS industry faces reduced available global market space considering, "UAS activity is already globalized, with basic technical and industrial capability widely spread and ubiquitous," according to the Royal Aerospace Society. Recent export restrictions on U.S. UAS only further exaggerate the challenges with the "unintended effect of advantaging foreign UAS manufacturers."⁷⁵ U.S. government and industry must work together quickly under the authorities of the 2018 policy updates to reduce lost opportunities.

Indeed, it seems the United States often tends toward transactional relationships, expecting clear answers to: 1) what is the United States providing the other party; 2) what is the other party providing the United States; and 3) what are the associated United States' costs.⁷⁶ To continue to promote collaboration in the future similar to the highlighted cases, U.S. UAS export policy makers should take comfort in the response: 1) sharing lessons from decades of UAS experiences, establishing norms of use and export, and securing regional influence; 2) gaining critical transnational commercial access and valuable technical collaboration; and 3) in the long-term, improving the foreign policy objectives of sustained partnerships and enhanced U.S. business opportunities,⁷⁷ that if carefully managed, will outweigh most any U.S. financial costs or security risks.

An Example of Future Possibilities: Denmark

Denmark provides an instructive example of UAS sales' opportunities the United States is failing to exploit. Denmark boasts one of the world's highest incomes per capita. But with a relatively small population, it programs a similarly small defense budget.⁷⁸ Even with limited defense resources, Denmark consistently provides high quality niche capabilities to coalition efforts around the globe. Furthermore, their national defense strategy accounts for gate-keeping the Baltic Sea and the defense of Greenland and the Faroe Islands, providing sovereign access to the Arctic Circle.⁷⁹ The combination of consistent and trusted coalition participation, a willingness to share resources and intelligence, and a highly professional and interoperable military, all bolstered by their strategic geographic sovereignty, make Denmark a perfect target for increased strategic partnership through UAS sales.

Denmark's small defense budget but vast geographic responsibility drives their willingness to cooperate for collective defense and information sharing. The austere conditions and increasing importance of monitoring activity in the Arctic, creates an opportunity for UAS activity. Owning a fleet of UAS outright, however, is unrealistic with their current defense spending priorities.⁸⁰ In this scenario, relaxed U.S. UAS export policies create an environment to entice Denmark to partner with one or more close U.S. North Atlantic partners to share assets and intelligence. Denmark demonstrated their willingness to enter such agreements over the last few years by leading an eleven nation buy of U.S. precision guided munitions.⁸¹ The United States should facilitate a similar relationship for UAS, likely

with fewer partners, to improve the northern tier information network. In doing so, the United States gains greater access to the intelligence gathered in and around Denmark's territories, reinforces the desired normalization of UAS operations, sets a favorable precedent for pooled and shared UAS assets, and actively expands the UAS market.

The opportunity is not free of challenges. Any agreement must reconcile releasing technical *MTCR* Category I information and capability (until changes are made to the *MTCR*), adjudicate third-party sharing agreements, and arrange mutually beneficial information sharing. The Arctic weather poses great mechanical challenges as well. In this environment there is opportunity for significant long term technological advances though. Despite these challenges, a Denmark-United States-multilateral UAS arrangement remains a relatively low-risk U.S. investment-in-change and sets a clear avenue for future arrangements. Facilitated by existing North American Aerospace Defense (NORAD) and NATO structures and agreements, Canada might prove the perfect initial partner for a shared U.S. built-and-exported Danish UAS fleet supporting collective Arctic security and intelligence gathering and sharing. Lastly, Denmark's responsible UAS partnership and use in the Arctic becomes a key and favorable norm-setting example for Russia. Perhaps a tertiary effect of existing Denmark-Russia cooperation, this collaboration even facilitates, in time, a healthier United States-Canada-Russia relationship in the Arctic.

Recommendations

"It is imperative the United States remain the center of gravity for UAV doctrine, innovation, utilization, and employment."⁸² Security cooperation, including UAS foreign sales and sustainment, is a critical enabler to retaining the lead. U.S. UAS export policy must, therefore, allow sufficient flexibility for each foreign sale opportunity to account for the diverse objectives of the involved sovereign entities while fulfilling U.S. national security strategy.

Lead significant changes to the *MTCR*

"Individual partners are responsible for implementing the [*MTCR*] *Guidelines and Annex* on the basis of sovereign national discretion and in accordance with national legislation and practice."⁸³ Although this passage would allow the United States to discount *MTCR* language on UAS transfers, it would be preferable for the United States to lead *MTCR* rewrites on behalf of evolving UAS technology. Leading significant *MTCR* rewrites will prove quite challenging, as agreement between 35 nations is never easy. Naturally, after 26 years, many nations have grown comfortable with the language, and likely even adjusted their systems to account for *MTCR* provisions. Others unfortunately might use the push for significant edits to weaken the *MTCR*, take advantage, or even gain in other, perhaps less scrupulous, matters.⁸⁴ However, this is not the time for diplomatic compromise in the guise of progress. Incremental change will only continue to plague productive UAS advancement. The United States, instead, should pursue major changes to the accounting methods for UAS in the *MTCR* for long-term success.

Omitting every reference to unmanned aerial vehicles from the *MTCR* is not necessarily the best approach. Neither is adding further detailed discriminators, such as additional speed restrictions. Inclusion of UAV as written in today's *MTCR* no longer, if it truly ever did, accurately represents the threat associated with non-missile unmanned aerial WMD-delivery systems. In the place of the existing language, the *MTCR* should be modified to better account for primary intent or purpose. If, like cruise missiles and ballistic missiles, the primary or sole intent of the entire system is to deliver an integrated WMD-capable warhead to a specific target, then the *MTCR* should account for the associated threat of such unmanned vehicles. Likewise, delivery mechanisms, such as the aerosol dispensing systems in Item 19, should remain but be considered agnostic of delivery platform (manned versus unmanned, small versus large, etc.). Merely being an unmanned aerial platform does not specifically pose a greater WMD threat than a manned platform. Therefore, the majority of descriptions and suggestions of unmanned aerial vehicles and systems in the current *MTCR Annex* and, particularly, the U.S.-produced *Annex Handbook*, for both Categories I and II (Item 1 particularly) and associated subsections (Avionics, Software, etc.), should be deleted.

Inaccurate terminology choices perpetuate misperceptions regarding these aircraft and their use. A sensor ball or a missile is agnostic as to the platform to which it is attached. Whether discussing the act of intelligence, surveillance, and reconnaissance (ISR) operations or the employment of munitions, the end effect has little to do with whether a manned asset or a remotely piloted one is used. The effect is the same.⁸⁵

As previously mentioned, the 2017 MTCR Plenary agreed to “intensify the efforts of Partners to prevent the proliferation of unmanned delivery systems capable of delivering WMD.” This is the ideal window of opportunity for the United States to aggressively shape the definition of “capable of delivering” and fix the Plenary on “primary designed intent to deliver an *integrated* MWD-capable warhead to a designated target.”⁸⁶ Likewise, as international aeronautical certification and regulatory agencies, such as the U.S. Federal Aviation Administration (FAA) and the International Civil Aviation Organization (ICAO), continue to mature UAS certifications, the MTCR Plenary and other policy-making entities should consider such certifications as discriminatory evidence between a missile and an unmanned aircraft.

Cultivate increased UAS collaboration and sales to develop cultural interoperability and solidify normative behaviors of use and export

U.S. foreign policy reaffirms commitment to trans-Atlantic cooperation and defense while demanding a visible increase in European self-defense capability.⁸⁷ This demand, accompanied by an apparent shift of U.S. priorities inward, could exacerbate the existing military capability gaps between the United States and Europe. Easing restrictions on UAS cooperation and sales to the United States’ closest European partners reduces these gaps while improving United States-European cooperation and interoperability. Increased presence of both strike-enabled and unarmed UAS would enhance Europe’s overall defense capability and help NATO “leverage the impact of new technologies,” as recommended by a 2017 GLOBSEC report.⁸⁸ The integration of systems required to effectively operate UAS also creates the desired secondary effects of enhanced strategic networks, intelligence sharing, and command and control capabilities across NATO and even with near-NATO allies. With diverging security strategies, the United States and Europe must continue to actively seek such gap-closers. Parallel fighting is no longer a viable option; the collective defense of Europe, no matter the foe, would demand true interoperability.⁸⁹ NATO and the EU could and should leverage the benefits of UAS to enhance military interoperability. Relaxed U.S. UAS export and FMS policies are essential enablers.

Interoperability is more than a technical term. The interoperable [military] hardware is valuable, but the true value in [U.S.] military sales is enabling a relationship. Relationships create progress, and cultural interoperability ensures success.⁹⁰

Generally, there are three methods to establish normative behavior of individuals, groups, and even nations—incentives, persuasion, and socialization. The effectiveness of each varies by subject and scope.⁹¹ All three techniques are integral to setting international use and export norms for UAS and are most effective when layered for conditional reinforcement. The United States’ top-shelf product and reliable long-term FMS support provides tremendous incentive for foreign governments to buy U.S. UAS. Demanding international buyers adhere to conditions set forth in the 2018 *U.S. Policy on the Export of UAS* and even favoring adherents of the 2016 *Joint Declaration* evoke persuasive norm setting. Together, these methods are effective in shaping use and export norms of a few of the closest partners allowed to buy U.S. UAS. It is yet uncertain as to the broader normative effects of these few cases. Until recently, the impact has been marginal with a small, U.S.-dominated international market. With greater market competition, the United States’ plan to shape international norms lacks ample direct socialization. There are few assurances that those who buy Chinese or Russian UAS will use and further export in line with United States and ally practices, even if they signed the 2016 *Joint Declaration* or *MTCR*. As the list of international UAS users continues to grow, the dominate seller could quickly begin to also delineate “acceptable” practices. Selling U.S. UAS is the surest manner to ensure wider U.S. influence over international use standards, discourage unauthorized technology transfers, and deny competitor FMS opportunities

Anticipate and capitalize on the results

The United States must also anticipate the opportunities and challenges of these policy changes. Increased U.S. involvement and competition in the international UAS market will likely demand future policy adjustments. A successful whole-of-government approach to military exports will require continued emphasis and added incentives for all involved U.S. agencies, as well as consistency in language and expectations from policy down to execution. The United States should also continue to improve operational transparency to truly establish desirable normative behavior. With success, it is likely many of the negative perceptions of UAS will dissipate as dual-use UAS become more common, creating an even greater explosion of military and commercial opportunities and technological advances.

U.S. historic reliance on UAS market dominance and the veil of *MTCR* restrictions can mask challenges of the pending increased market competition. As foreign UAS sales continue to increase, policy makers must provide clear and balanced guidelines to the U.S. diplomats responsible for brokering FMS deals. Overreliance on the simplicity of the “buy American, hire American”⁹² mantra could be misleading and risk compromising other U.S. foreign policy goals. Recognizing international commercial and military UAS collaboration and progress will continue, both in parallel and intertwined, is critical to shaping policy makers’ expectations and guiding future policy adjustments. Increased market inclusion will also highlight the diverging tactics of key international competitors. China, Russia, Israel, and the European Union (and each nation within) each approach military sales differently. A U.S. whole-of-government strategy that accounts for the various political actions, reactions, and counter-actions is necessary to address foreign influence in the international UAS market.

Several factors should be addressed to support a U.S. whole-of-government strategy for arms marketing. First, the general corporate culture must shift to incentivize interagency participation and priority for U.S. UAS exports and collaboration. For example, the relative newness of UAS often challenges existing host nation aviation regulations. Encouraging host nation legal reform, often best facilitated by senior U.S. State Department representatives, can then become a critical first step. End-use monitoring, also often provided by multiple U.S. agencies, is essential to establish and enforce acceptable enduring operational behaviors following UAS transfers. Second, resourcing must back policy rhetoric. Policy execution will always fall short without adequate manpower, funding, and training. Third, diplomatic divisions of labor and associated sales processes should be streamlined wherever possible. In an effort to safeguard U.S. technological advantages and comply with the multitude of United States and international export restrictions, bureaucratic processes sometimes morph to become cumbersome and ineffective and can derail even the best sales arrangements.

Increased U.S. UAS sales, and reinforcement of U.S. export policy stipulations, will continue to drive greater need for transparency in U.S. UAS operations. The “do as I say, not as I do” mentality will quickly prove insufficient, and even detrimental, to establishing international normative behavior. Partners will copy United States and allied actions rather than unquestionably comply with written international use and transfer standards. Leading open dialogue on reasonable and legal UAS use and transfer will endorse U.S. efforts to change the *MTCR*, bolster the effectiveness of the 2016 *Joint Declaration*, and reinforce appropriate U.S. national security safeguards.

Finally, general public perceptions of UAS will improve as UAS become more commonplace, governments embrace greater operational transparency, and technological advances prove the dual-purpose value to society. As this occurs, the U.S. military, UAS industry, and federal aeronautical regulating agencies should anticipate and adjust for the expectation, even demand, for further UAS integration. Specifically, to continue to offer long-term sustainment as a U.S. benchmark, the U.S. military and selected contractors must commensurately increase international operator and maintainer training capacity. Increased capacity can be generated internal to existing U.S. training operations or through aiding, advising, and assisting foreign militaries in establishing indigenous training programs. Likewise, diverging exportable hardware and software versions must be carefully managed to not overreach the efficiencies of U.S. sustainment, support, and desired international interoperability.

As innovations continue to blossom, policy must adjust to account for the added challenges of rapidly evolving dual-use UAS. Naturally, many policy makers today seem to focus on larger, traditional, airplane-sized UAS. Future policy, though, should consider all UAS sizes, from micro to macro, especially as weaponized small UAS continue to progress.⁹³ It is imperative for today’s policy reforms to lay the foundation for flexible adaptation for future capabilities. Clearly establishing normal international use and transfer behaviors with today’s non-autonomous UAS

through cooperative international action is imperative for the future challenges of growing UAS autonomy, artificial intelligence, swarming, manned-unmanned teaming, pilot-optional aircraft, and civil-military dual-use UAS. Fortunately, both civil and government regulatory agencies and partnerships already exist internationally to help inform smart policy of tomorrow. Now policy makers must seek their advice, follow their lead in many cases, and accept the new normal of rapid policy revisit rates to account for the pace of UAS technological evolution.

Conclusion

In 2011, the New York Times reported from the Zhuhai, China airshow on the “stark evidence that the United States’ near monopoly on armed drones was coming to an end with far-reaching consequences for American security, international law, and the future of war.”⁹⁴ Seven years later, the end is very near yet there are few concerted U.S. policy efforts to counteract such threats. The updates in the 2018 *Conventional Arms Transfer Policy* and *U.S. Policy on the Export of Unmanned Aerial Systems* are a great start. This reform, however, to provide positive effects for the greater UAS enterprise must be accompanied by substantial rewording of the *MTCR* and disciplined implementation from government through to industry. Close cooperation between U.S. industry, the U.S. Department of State, and Lieutenant General Hooper’s DSCA will be integral to executing these changes. General Hooper already recognizes, “It is time to take a new sales approach for today’s information-based, networked military capacity.”⁹⁵ This is the opportunity, amidst the potential whole-of-government clamber to increase UAS exports, to restructure the supporting institutional mechanisms and lead U.S. foreign military sales into the information age. Fortunately, there is no better benchmark platform-for-change spanning hardware, software, global command and control, multi-domain effects, and multi-functional intelligence with remarkable military and commercial market opportunity and disruptive capacity than Unmanned Aircraft Systems.

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APPENDIX A – ENDNOTES

- 1 Unmanned Aircraft System: contains the unmanned aerial vehicle and the control infrastructure, which consists of the technical and human parts.
- 2 low altitude, near the ground; a few 10 meters above the ground level
- 3 Aeronautical Information Service
- 4 Data are not changed for longer periods, their validity are longer or at least equal with an AIRAC cycle.
- 5 They may contain frequently changing content, thus their validity are between and AIRAC cycle and a few hours.
- 6 Data with low temporal stability, they can change even every second.
- 7 Data which is continuously changing.
- 8 Staff, J. C. O. (2018). Department of defense dictionary of military and associated terms. Military Bookshop, 242, <http://www.jcs.mil/Doctrine/DOD-Terminology/>. "The DOD Dictionary of Military and Associated Terms (DOD Dictionary) sets forth standard U.S. military and associated terminology to encompass the joint activity of the Armed Forces of the United States. These military and associated terms, together with their definitions, constitute approved Department of Defense (DOD) terminology for general use by all DOD components." The plethora of terms describing unmanned aircraft (or aerial) systems (UAS) is particularly challenging when writing policy, negotiating international agreements, or shaping public opinions. U.S. policies and international agreements on the subject use numerous terms with little explanation or apparent purpose in difference. For purposes of this paper, a UAS is a "system whose components include the necessary equipment, network, and personnel to control an unmanned aircraft." The media often prefers the term drone for ease and perhaps word count, but a drone is a flying target to many militaries and indicates an undefined degree of autonomy and expendability. Another common term, unmanned aerial vehicle (UAV), often refers specifically to the aerial platform. The U.S. Air Force prefers remotely piloted aircraft (RPA) to reinforce the essential human pilotage. Many European air forces and agencies agree but add the word, systems, to get RPAS. This paper will primarily use unmanned aircraft systems (UAS) as approved in the 2018 U.S. DOD Dictionary of Military and Associated Terms.
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