



Unmanned Aerial Vehicles A Challenge to a WMD/DVs Free Zone in the Middle East

Christian Weidlich and Jürgen Altmann
in Cooperation with Ioannis Anastasakis, Reuven Pedatzur,
Oleg Shulga, Philipp Stroh, and Pieter Wezeman

The 2010 Review Conference of the Nuclear Non-Proliferation Treaty (NPT) proposed a conference to be held in 2012 on the establishment of a zone free of weapons of mass destruction (WMD) in the Middle East. The mandate also includes delivery vehicles (DVs) which are explicitly mentioned with reference to the 1995 Resolution on the Middle East. The relevant clause “[c]alls upon all States in the Middle East to take practical steps in appropriate forums aimed at making progress towards, inter alia, the establishment of an effectively verifiable Middle East zone free of weapons of mass destruction, nuclear, chemical and biological, and their delivery systems, and to refrain from taking any measures that preclude the achievement of this objective.”¹

Unregulated Systems to Deliver Weapons of Mass Destruction

Three different types of armaments are subsumed under the term WMD: nuclear, biological, and chemical. All of these are prohibited or regulated by various international treaties. Chemical and biological weapons are outlawed in general, whereas no comprehensive nuclear weapon ban has yet been achieved. In addition to the NPT, different nuclear weapon free zones have been established over the last decades (see POLICY BRIEF No. 5 by Roberta Mulas). In general, however, “there is still no multinational treaty restricting the development and use of delivery systems.”² This is astonishing in as much as they constitute an important part of WMD: appropriate means of delivery are required to transport WMD from their storage or deployment areas to their targets in a ‘militarily useful’ way. Therefore, the control of delivery systems is a relevant step towards reducing the threat of weapons of mass destruction and making them useless.

Taking the Middle East Conference (MEC) mandate seriously requires dealing with various delivery systems: ballistic and cruise missiles, combat aircraft, and unmanned aerial vehicles (UAVs). This POLICY BRIEF focuses on the challenges UAVs pose for the Conference and how to appropriately address them with the goal of establishing a WMD/DVs Free Zone in the Middle East. Therefore, we concentrate in the first part on why UAVs are important for the creation of such a zone as well as why states seek to acquire these systems. In the second part, we focus on the status and recent trends regarding UAV proliferation in the Middle East. We then take stock of various arms control regulations which address UAVs in a direct or indirect way. Based on these insights, we make recommendations on how to deal with armed unmanned aerial vehicles at the Middle East Conference and propose feasible first steps in the field of UAV norm building and arms control.

Unmanned Aerial Vehicles: Definition and Characteristics

UAVs represent the latest available military technology in the field of delivery systems. An unmanned aerial vehicle is commonly defined as a “powered, aerial vehicle that does not carry a human operator, uses aerodynamic forces to provide vehicle lift, can fly autonomously or be piloted remotely, and can carry a lethal or nonlethal payload.”³ UAVs are perceived to be fundamentally different from manned aircraft and cruise missiles, although they share some common features. This makes it difficult to draw a clear distinction among these categories. Manned aircraft and most UAVs are recoverable by design, whereas cruise missiles are intended to be one-way vehicles which explode on impact.⁴ Hence, the U.S. government’s exclusion of cruise missiles from the category of UAVs is

Abstract

Among delivery systems, unmanned aerial vehicles (UAVs) constitute the latest military technology available. They offer new military options, but also new challenges in terms of their implications for politics and conflict in the Middle East. In this POLICY BRIEF, we argue that the establishment of a WMD/DVs Free Zone in the Middle East is effective only if all regional states agree on restrictions regarding the development and use of UAVs, since they could be capable of carrying nuclear, biological, or chemical weapons. We therefore strongly encourage Middle Eastern states and external powers to bring the issue of the control of UAVs on the agenda of the Middle East Conference.

In this POLICY BRIEF, we take stock of various regulations which directly or indirectly address the UAV problématique. We do so by evaluating existing arms control regulations, export controls, transparency as well as confidence- and security-building measures. Based on these insights, we make recommendations on how to deal with armed unmanned aerial vehicles at the Middle East Conference and propose feasible first steps in the field of UAV norm building and arms control. ■

This POLICY BRIEF draws on a number of contributions from participants of the ACADEMIC PEACE ORCHESTRA MIDDLE EAST workshop held in Budapest, Hungary, from September 26–28, 2011. Members of the UAV working group came from the Middle East/Gulf and Europe.



Christian Weidlich is a Graduate Research Assistant at the Peace Research Institute Frankfurt and on the staff of the ACADEMIC PEACE ORCHESTRA MIDDLE EAST. He holds an MA in International Studies/Peace and Conflict Studies from Goethe University, Frankfurt, and a BA in Political Science from Münster University. His research interests include arms control in the Middle East, the automation of warfare, and civil-military cooperation.



Jürgen Altmann is a physicist and Peace Researcher at the Technische Universität in Dortmund, Germany. Since 1985 he has focused on technical problems of disarmament and written on laser weapons, ballistic missile defense, microsystems technology, nanotechnology, non-lethal weapons, and armed uninhabited vehicles. Another focus of his work is the assessment of new military technologies and preventive arms control.



Ioannis Anastasakis is an Advisor on international and regional security issues, specializing in export controls, defense investments, and armaments. He served as an officer, pilot in command, and flight instructor in the Greek Air Force and worked for the Greek Ministry of Defense. Further, he was elected for two years as the Expert Group Chairman of the multinational Wassenaar Arrangement, dealing with export controls of military and advanced technology (dual-use) items and technologies.



Reuven Pedatzur is the Director of the S. Daniel Abraham Center for Strategic Dialogue and a Lecturer at the Department of Political Science at Tel Aviv University. He holds a PhD from the Department of Political Science of Tel Aviv University. He served as a fighter pilot in the Israeli Air Force Reserves as well as a Defense Analyst for the Haaretz daily newspaper.

– at least from a technical standpoint – not convincing because they fulfill all criteria of the definition.⁵ Nevertheless, their operational use differs since the cruise missiles' explosive is an integrated part of the one-way system, whereas the weapons of UAVs are an added payload not necessary for the operational use of the mostly recoverable vehicle.

UAVs originate as a tactical surveillance and intelligence gathering platform which makes them particularly attractive. They can, for example, capture high-resolution video that even satellites may be unable to provide because of distance, clouds, and interruptions in coverage. At the operational level, the current generation of UAVs has relatively low and uncomplicated logistical requirements and, depending on their size, tends to be easy to transport. Training requirements for UAV operators are relatively few and these systems can be pushed into an area of operations at short notice. More advanced UAVs possess not only automatic flight control, but can also take off and land autonomously. Furthermore, it is possible to adapt them to a range of missions based on theater-specific requirements, and upgrades can be relatively inexpensive because of their typically open system architectures. Once in action, low-flying, slow-speed, and small UAVs can be particularly difficult to detect, track, and target by air surveillance radar due to their low altitude, radar cross section, and electronic signature. More sophisticated designs can mask their heat signature as a countermeasure against infra-red detection, and stealth design can make radar detection even more difficult.

If UAVs are equipped with lethal weapons, operators can benefit from a safer targeting platform against land- and sea-based targets than manned aircraft. However, armed systems must compromise some of the key features that make non-combat UAVs so useful, in particular for clandestine operations. For example, they need higher payload capacities – particularly when their use as a reconnaissance asset (as tends to be the case) is to be preserved. In these scenarios, vehicles typically need to be larger and thereby have greater fuel requirements as well as lower endurance. Perhaps more importantly, the larger the UAV the more easily it can be detected because of its stronger radar reflex as well as electronic and heat emissions. Thus, it will need to be able to fly at higher altitudes to keep out of reach of air defense systems. UAVs with highly modular architectures can be quickly adapted to carry a range of payloads, including WMD. However, unlike in the case of combat aircraft

or cruise and ballistic missiles, which are by design and definition offensive, this is not universally true with UAVs.

In sum, without endangering a human crew aboard, UAVs constitute an aerial platform that could be useable for various kinds of missions and payloads: surveillance equipment, conventional air-to-ground and air-to-air missiles, but also nuclear weapons and disseminating devices for biological and chemical weapons as well as WMD-equipped missiles.

UAVs and Weapons of Mass Destruction

Given that some countries in the Middle East are believed to possess WMD capabilities, UAVs become a possibly appealing delivery system. The transport of biological and chemical weapons and disseminating devices requires a payload of only about 50–150 kg, a threshold which basically every small/medium-sized UAV can reach.⁶ Biologically or chemically equipped UAVs offer the possibility to circle above a certain target area and dispense their payload. Until now, Iraq (under the rule of Saddam Hussein) was the only country in the Middle East known to have developed an UAV designed to disseminate biological agents (Al Musayara-20). While the primary concern for the use of WMD-armed UAVs has been with nation states, there is a potential for terrorist groups to produce or acquire small UAVs and use them for chemical and biological weapons delivery. Provided sufficient outside assistance and access to commercially available subcomponents, it is at least conceivable, if not highly likely, that a terrorist organization could develop a much cruder type than the Iraqi UAV (or maybe hijack operating systems).⁷ What is especially important is the psychological impact of WMD-equipped UAVs: the mere possibility that small and medium sized systems could deliver those weapons to a populated area without being detected makes them weapons of terror for holding civilians hostage.

In general, there are no reports that any Middle Eastern state has equipped UAVs with nuclear weapons. To be capable of delivering them, UAVs must be able to carry greater payloads: states with advanced nuclear capabilities can produce nuclear warheads which weigh less than 100 kg, whereas countries with less experience might produce nuclear warheads of around 1,000 kg. The latest Israeli drone (Heron TP) can carry a 1,000 kg payload which would certainly be sufficient for transporting nuclear bombs.⁸ The most



recent Iranian UAV (Karrar), designed to be a long-range unmanned bomber aircraft, is reported to be able to carry a payload of 227–500 kg for a range of 500 km which could also be quite sufficient for delivering a small nuclear weapon. Since there are no reported plans to equip UAVs with nuclear weapons in the Middle East, it can be assumed that states currently favor traditional delivery systems like missiles and fast strike combat aircraft over unmanned systems. Nevertheless, when range, payload, and reliability of UAVs increase, these systems could constitute an effective alternative to traditional systems for the delivery of nuclear arms.

Status and Trends of UAV Proliferation

Nowadays, about 600 different types of UAVs are developed and produced by more than 50 countries in the world, including various states in the Middle East. Three general trends can be observed:

1. Horizontal proliferation is advancing since more and more militaries use these systems. There is a significant growth in the development and deployment of UAVs.
2. An increasing number of UAVs are armed with lethal weapons. This began with the UAV programs of the United States and Israel and is now being taken up by many. Prototypes for the next generation of fully capable unmanned combat aircraft are being developed by the U.S., some European states, Russia, and China.
3. The coming generations of UAVs will incorporate enhanced autonomy. Without international limitation, the exponential pace of technological change and military pressures could sooner or later lead to the development of autonomous weapon systems.

The Unmanned Arms Race in the Middle East

In the Middle East Israel and, to a much lesser extent, Iran are at the forefront of UAV technology, not counting external actors with significant presence in the region like the United States. Over the decades, Israel has become the UAV superpower in the Middle East: more than 30 types manufactured in its armaments industry are operated by its own air force and are to be found in dozens of armies around the world. The Israeli UAV experiences and capabilities are not comparable to any other state in the Middle East and are only trumped by the

United States. The number of UAV flight hours in the Israel Defense Forces increased by hundreds of percent over the past decade and armed drones have been widely used in recent military campaigns.

Until 1979, Tehran had enjoyed access to some of the most advanced Western defense technologies. Following the Islamic Revolution, however, Iran was widely cut off from weapons transfers. Today, the country possesses an arsenal of short-, medium-, and long-range missiles. The Iranian UAVs have essentially been domestically developed from these missile programs. Although the country boasts a range of UAV types, the capabilities and numbers of these vehicles are difficult to assess. Though Iranian UAVs are comparatively much less advanced than those operated by other important regional players such as the United States and Israel, they represent an increasingly important and rapidly growing dimension of Tehran's military capabilities. However, their experience with armed UAVs is relatively recent and untested in the harsh conditions of the operating environment and against forces that possess superior electronic warfare and targeting platforms as well as sophisticated air defense systems.

Saudi Arabia and the United Arab Emirates (UAE) are not known to have procured UAVs with significant payloads. It has been reported that the U.S. government has approved efforts by an American company to sell a special version of Predator drones to these states. Based on foreign technological input, the UAE is trying to create its own high technology defense industry. This includes significant activities in the field of UAVs, especially with regard to the development of the armed United 40 drone, which should be operational by the end of 2012. The general lack of UAVs in the inventories of the Gulf states heavily contrasts with their procurement of high technology items throughout the whole spectrum of military equipment. Considering the long-standing efforts of both countries to obtain the latest arms technology, one can expect that these countries will try to procure UAVs, including armed ones, in the future.

Although relatively few countries in the Middle East have for now acquired armed UAVs (see Table No. 1), this situation is set to change. "In the coming years, unmanned systems of greater and greater sophistication will be used in the region in greater and greater numbers. The robotics revolution is



Oleg Shulga is President and CEO of Shulga Consulting, providing technical support to the Defense Threat Reduction Agency/Cooperative Threat Reduction Directorate in Moscow, Russia. He interacts with all Russian government agencies and enterprises involved in strategic missile elimination projects in Russia. Mr. Shulga holds certificates as Russian Federation INF, START, CFE, and Open Skies Inspector and UN Missile Inspector.



Philipp Stroh is Research Assistant at the Institute for Public Law, Public International Law and European Law at Justus Liebig University Gießen, Germany. He worked on a report on unmanned systems for the Office of Technology Assessment at the German Parliament. Mr. Stroh is currently writing his dissertation on armed UAVs in International Humanitarian Law and supervises a project of the German Foundation for Peace Research on UAVs.



Pieter Wezeman is a Senior Researcher with the Stockholm International Peace Research Institute's Arms Transfers Program. His area of research is the global proliferation of conventional arms with a special focus on arms procurement in and arms transfers to Africa and the Middle East. His research interests further include global developments in arms transfers, proliferation of missiles and other long-range strike systems in the Middle East, and arms embargoes.

Table No. 1: Numbers of UAV Types in the Middle East by Country

Country	No. of UAV Types in Total	Armed UAVs	Wingspan (m)	Payload (kg)	Range (km)
Israel	37	Sparrow-N	2.4	12	120
		Harop	3	23	150
		Harpy/Cutlass	2	32	500
		Heron TP Eitan	26	1,000	NA
		Delilah	1.15	30	250
Iran	4	Ababil-T	3.25	45	150
		Karrar	2.5	227	500
UAE	5	–			
Jordan	1	–			

Source: M. Daly (ed.) (2010) *Jane's Unmanned Aerial Vehicles and Targets, Issue 35, Coulsdon, Jane's*.

Other compilations give markedly higher numbers of types. The armed UAVs in this table are given by name and their basic characteristics. The numbers refer to UAV types and not to the quantities held by the different states. Cruise missile types not listed as UAVs in our source are not included.

at hand and the Middle East won't fail to be a player in it.”⁹

New Challenges to Stability in the Middle East

UAVs offer not only new military options, but also new challenges in terms of their implications for politics and conflict in the Middle East. It is interesting to see who is absent from the list of key producers and users: larger state powers in the region like Egypt, Syria, and Saudi Arabia for the moment have not acquired UAVs by producing or by importing these systems – although Saudi Arabia has to some extent started domestic UAV programs and is said to have tried to acquire armed Predator or Reaper drones from the U.S.

One could argue that the lack of UAV capabilities in larger Middle Eastern states is a sign of changing regional power dynamics. UAVs offer smaller states a way to expand their strength beyond traditional expectations: “Nations like Israel and the UAE may be small in population and geography, but they are utilizing unmanned systems to police borders in a more efficient manner, as well as to gain reconnaissance and strike capabilities well beyond their much larger neighbors.”¹⁰ However, current developments offer only a snapshot. Regional states that have not yet acquired UAVs are highly likely to do so in the future without effective arms control in place. Since the number of potential suppliers of both complete systems and UAV technology is high, there is no reason why states, especially from the conflict-ridden Middle East, would refrain from seeking access to UAVs and related technology. Furthermore,

the use of UAVs is by no means limited to states. Hezbollah flew UAVs multiple times over Israel, and Al-Qaeda is reported to have explored the use of drones as a means of attack on an international conference in 2001.

Since conflict structures may shift in the future, threat perceptions could also change. These perceptions are largely based on the fact that countries may decide much more easily and quickly to go to war when they do not have to put the lives of their soldiers at risk. Without endangering an on-board crew, UAVs could be sent on more dangerous missions with less impediments. Hence, unmanned operations may alter the calculations of political and military leaders and could embolden them to wage war in a different way in the future. As a result, UAVs can be even more destabilizing than manned aircraft.¹¹ When flying at low altitudes, the detection of UAVs is difficult. This allows them to carry out surprise attacks deep inside enemy territory. Besides their ability to carry weapons of mass destruction, drones with conventional armament can be destabilizing in a crisis: “If two such fleets were to fly at short distances from each other (along a border, in international territory), watching for indications of attack, misinterpreting each other's intentions could lead to war.”¹² Although military accidents, especially along borders, have occurred in the past without UAVs, there is the “possibility that such incidents could occur more frequently”¹³ if more and more armed UAVs were used by the militaries. This does not paint an optimistic picture of the future of the Middle East.

Existing Regulations for Armed UAVs

We now take stock of various regulations which address UAVs in a direct or indirect way. We evaluate existing arms control regulations, export controls, norm building, and transparency as well as confidence- and security-building measures.

Arms Control

The few regulations covering armed UAVs mostly do not apply to the Middle East. The 2010 New Strategic Arms Reduction Treaty between Russia and the United States puts limits on manned strategic bombers and unmanned nuclear cruise missiles, which the Pentagon explicitly excludes from its definition of a UAV. New nuclear carriers, for example an unmanned nuclear bomber, have to be notified to the other party. The 1987 Intermediate-Range Nuclear Forces Treaty



prohibits nuclear ballistic and cruise missiles with ranges between 500 and 5,500 km – but only applies to the U.S. and Russia.

Conventionally armed UAVs fall under the definition of combat aircraft or attack helicopters of the Treaty on Conventional Armed Forces in Europe (CFE, 1990, adapted 1999, regrettably suspended since 2007).¹⁴ The treaty binds the countries of NATO and the former Warsaw Pact, but similar restrictions are lacking in other regions of the world, including the Middle East. Yet, the treaty approach presents a very useful model for arms limitations, including UAVs, in the region. This has the objective of “establishing a secure and stable balance of conventional armed forces [...] at lower levels than heretofore, of eliminating disparities prejudicial to stability and security and of eliminating, as a matter of high priority, the capability for launching surprise attack and for initiating large-scale offensive action.”¹⁵ The same holds for its verification scheme which uses data exchanges and on-site inspections.

While UAVs and other delivery systems are not prohibited as such in the Middle East, weapons of mass destruction are regulated by international agreements. It is important to state that the Biological and Toxin Weapons Convention (BTWC, 1972) as well as the Chemical Weapons Convention (CWC, 1993) prohibit the respective weapons by a general-purpose criterion, specific DVs are not mentioned. Thus, signatory states of these conventions are not allowed to acquire, develop, or test UAVs with chemical or biological weapons. There is not yet a comparable Nuclear Weapons Convention, but the NPT (1968) prohibits nuclear weapons for its non-nuclear weapon parties (all except the five permanent Security Council members). Thus, the great majority of states are not allowed to have nuclear weapons on UAVs. However, membership in the two conventions and the NPT in the Middle East is not comprehensive (see Table No. 2), so that the restrictive effects from these agreements on future UAVs are limited.

Export Controls

Export controls try to regulate or prevent transfers of militarily-relevant products, production equipment, technologies, or knowledge to other countries. In contrast to arms control treaties, export control regimes are generally not legally binding, but are political in nature. Therefore, the final decision about an export license or denial rests with the individual state. Some export

controls are demanded by international treaties, for example the NPT; nuclear exports to non-nuclear weapon states should only take place if safeguards of the International Atomic Energy Agency are applied. There are two regimes for international nuclear export coordination: the Zangger Committee and the Nuclear Suppliers Group. Exports potentially relevant for biological and chemical weapons are coordinated by the Australia Group.

Other export control regimes specifically address delivery vehicles. For UAVs the Missile Technology Control Regime (MTCR) is particularly relevant; today it comprises 34 countries – mainly Western, but also Russia and Ukraine. Other missile exporters such as China, Israel, India, Iran, North Korea, or Pakistan are not members.¹⁶ In order to limit the spread of WMD-capable delivery vehicles, the MTCR countries restrict exports of ballistic missiles and unmanned air vehicles, dividing them in two categories. Category I contains items that should not be exported except in rare cases; it includes, among others, complete unmanned aerial vehicle systems (encompassing cruise missiles, target and reconnaissance drones) capable of delivering at least a 500 kg payload to a range of at least 300 km. Category II lists items that can be exported after considering the following six criteria:

- A. concerns about the proliferation of weapons of mass destruction;
- B. the capabilities and objectives of the missile and space programs of the recipient state;
- C. the significance of the transfer in terms of the potential development of delivery systems (other than manned aircraft) for weapons of mass destruction;
- D. the assessment of the end use of the transfers, including the relevant assurances of the recipient states;

Table No. 2: Members and Non-members of the BTWC, CWC, and NPT in the Middle East

Treaty	Member States	Non-member States
<i>Biological and Toxin Weapons Convention</i>	<i>Bahrain, Egypt*, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria*, United Arab Emirates*, and Yemen</i>	<i>Israel</i>
<i>Chemical Weapons Convention</i>	<i>Bahrain, Iran, Iraq, Israel*, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, United Arab Emirates, and Yemen</i>	<i>Egypt and Syria</i>
<i>Nuclear Non-Proliferation Treaty</i>	<i>Bahrain, Egypt, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, and Yemen</i>	<i>Israel</i>

* Signed the convention, but has not yet ratified it.

- E. the applicability of relevant multilateral agreements;
- F. the risk of controlled items falling into the hands of terrorist groups and individuals.

Category II has no payload criterion for UAVs – it concerns systems with at least a 300 km range. If a UAV system provides autonomous flight or remote control beyond visual range and incorporates an aerosol dispensing system with a capacity greater than 20 liters, it falls under Category II, regardless of its payload and range.

The Wassenaar Arrangement (consisting of 40 mainly Western member states) is a multilateral export control regime for conventional weapons and sensitive dual-use goods and technologies to regions and states representing serious concerns to the members. Its lists contain UAVs for military use, dual-use UAVs, and related equipment. Yet, several important producing and exporting countries are not members to the Wassenaar Arrangement.

The problem with most export control regimes is that not all relevant countries participate and that economic interests of the arms industry and exporting countries act against stringent controls. For these reasons and because there are UAV producers in the region, the limits on UAVs required to support a WMD/DVs Free Zone in the Middle East are unlikely to come about by way of export controls. But with adequate criteria and very detailed technology lists, these regimes can provide suggestions for designing UAV limits.

Norm Building in the Field of UAVs

In addition to strengthening export control arrangements, efforts to increase UAV norm building are imperative.¹⁷ In this respect, the Hague Code of Conduct Against Ballistic Missile Proliferation (HCOC) is especially relevant because it calls upon states to make annual declarations about their missile and space rocket policies and to give advance notice of testing. The Code has been signed by 134 member states – 93 signed up at the time it was launched in 2002 – although in the Middle East it has not found a receptive audience.

The Code does not attempt to ban or proscribe ballistic missiles but instead requires member states to pursue maximum possible restraint in ballistic missile development, testing, and deployment and to adopt basic rules of transparency. So far, the HCOC covers

only ballistic missiles but neither UAVs nor cruise missiles. Therefore, we propose an approach which includes both of these neglected weapon systems into the regime and argue for universal adherence to this rule-based system.

Middle Eastern states could benefit from the confidence-building and cooperation-promoting measures of the HCOC if existing political objections could be overcome. If regional states signed on to the control regime, which was expanded to include UAVs and cruise missiles, the Middle Eastern security environment would change for the better. This would show that regional cooperation on security issues is possible. The feasibility of such an agreement is enhanced by the fact that the Code's transparency measures do not require the revelation of sensitive information but rather are non-sensitive and non-intrusive.

Paradoxically, despite (or perhaps because of) the HCOC's restrictions, the limited scope of its rules could present an opportunity for states seeking to cooperate on developing rule-based approaches to missile and UAV control.

Transparency and Confidence- and Security-building Measures

Transparency in military matters can reduce mistrust and help prevent the excessive and destabilizing accumulation of arms. The UN Register of Conventional Arms requests countries to report arms transfers (exports and imports) in seven categories: battle tanks, armored combat vehicles, large caliber artillery systems, combat aircraft, attack helicopters, warships, and missiles and missile launchers. The definitions of the first five categories follow those of the CFE Treaty and do not mention a crew. Thus, combat UAVs with fixed/variable-geometry wings count as combat aircraft, and unmanned attack helicopters count as attack helicopters. In addition, Category VII (missiles and missile launchers) explicitly includes remotely piloted vehicles "capable of delivering a warhead or weapon of destruction to a range of at least 25 kilometers."¹⁸ Despite the decision of the countries in the Middle East to accept the norm of military transparency, they rarely live up to it in practice. Only Israel, Jordan, Iran until 1998, and occasionally Qatar, have disclosed their arms transfer as the UN Register requires.

Confidence- and security-building measures extend transparency in various respects,

Endnotes

1. Review and Extension Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (1995) 'Resolution on the Middle East', NPT/CONF.1995/32 (Part I), Annex. Emphasis added.
2. Jürgen Scheffran (2011) 'Nuclear Disarmament and the International Control of Delivery Systems'. Online, available at <http://www.reachingcriticalwill.org/legal/nwc/mon3/scheffran.html> (February 26, 2012).
3. NATO (2010) 'Glossary of Terms and Definitions, AAP-6'. Online, available at <http://www.nato.int/docu/stanag/aap006/aap-6-2010.pdf> (February 20, 2012), p. 2-U-2.
4. The U.S. definition of a UAV (and unmanned vehicles in general) explicitly mentions "recoverable or expendable" but excludes cruise missiles, see U.S. Department of Defense, DoD (2007) 'UMS Roadmap 2007–2032'. Online, available at <http://www.acq.osd.mil/usd/Unmanned%20Systems%20Roadmap.2007-2032.pdf> (February 20, 2012), p. 1.
5. One could, therefore, argue that cruise missiles should also be counted as UAVs in the wide sense, since their characteristics are in compliance with the definition of UAVs presented here.
6. Jeffrey N. Renahan (1997) 'Unmanned Aerial Vehicles and Weapons of Mass Destruction: A Lethal Combination?', Maxwell AFB: Air University Press. Online, available at http://aupress.au.af.mil/digital/pdf/paper/t_renehan_unmanned_aerial_vehicles.pdf (February 15, 2012), p. 34.
7. Dennis Gormley (2005) 'Unmanned Air Vehicles as Terror Weapons: Real or Imagined?'. Online, available at http://www.nti.org/e_research/e3_68a.html (February 15, 2012).
8. J. R. Wilson (2007) 'UAV Worldwide Roundup 2007', *Aerospace America*, (5): 30–37, here p. 36.
9. Peter W. Singer (2009) 'A Revolution Once More: Unmanned Systems and the Middle East'. Online, available at http://www.brookings.edu/articles/2009/11_robotic_revolution_singer.aspx (February 22, 2012).
10. See on this Singer (2009), op. cit.



but can go further to include limitation and verification. Here the 1999 Vienna Document of the Organization for Security and Co-operation in Europe (55 members, European countries plus Canada and U.S.) provides a model. It stipulates annual exchanges of information on military forces, major weapon and equipment systems, defense planning, consultation, visits, prior notification, and observation of military exercises. Inspections serve to verify compliance and military exercises are limited. With respect to armed UAVs, combat aircraft and helicopters have to be reported with the respective military unit in the annual information exchange. For new types, data and deployment plans have to be provided at the latest when the new types are stationed in the area of application.

The 1999 Vienna Document prescribes a comprehensive system of confidence- and security-building measures concerning all types of conventional weapons of land and air forces. A similar system would be very useful in the Middle East, but can probably only be achieved after a longer process of negotiation. In the context of a WMD/DVs Free Zone, as a first step, data exchange and maneuver observation could be limited to carriers that can be principally used for WMD, including UAVs with a relevant payload capacity.

Conclusions and Recommendations

Although no Middle Eastern state has expressly declared to possess any kind of WMD, the question of weapons of mass destruction and their delivery vehicles cuts across the region. Given their ability to deliver biological, chemical, and nuclear weapons, UAVs should constitute a substantial part of the discussions at the Middle East Conference.

We have shown that the conflict-ridden region already faces an unmanned arms race with unknown consequences for stability. Without effective arms control in place, Middle Eastern states and non-state actors that have not yet acquired these systems could do so in the near future. The establishment of a WMD/DVs Free Zone in the Middle East is only reasonable if regional states agree on restrictions regarding the development and use of delivery systems, including UAVs, capable of carrying nuclear, biological, or chemical weapons. We therefore strongly encourage Middle

Eastern states and external powers to bring the issue of UAVs on the agenda of the Middle East Conference.

Arms Control Options for UAVs at the Middle East Conference

Within the scope of a regional WMD/DVs Free Zone, UAVs should be limited as potential carriers of WMD, as will be the case for missiles. The general task is to make sure that no country possesses UAVs capable of carrying nuclear, biological, or chemical weapons.

Embedding UAVs in *general limitations of armaments and armed forces* in the Middle East is the best option. This could build on the CFE Treaty which has specific limits on national holdings of tanks, combat aircraft, attack helicopters, and further armaments. The aircraft and helicopter restrictions could include sub-limits for armed UAVs, maybe in several classes according to size and range. This goes beyond the goals of a WMD/DVs Free Zone, but should be pursued for the medium term in a general process of building confidence and creating stability.

With respect to *nuclear weapons*, a payload threshold would suffice. One could use the MTCR criterion – no more than 500 kg payload. The MTCR range limit of 300 km is of less utility in most parts of the Middle East. In this case, verification of compliance could be provided by on-site inspections to check the payload limit. If states insisted on conventional armaments above the MTCR limit, much more difficult verification problems would ensue. In a hypothetical scenario where a country without declared nuclear weapons would covertly load them on UAVs, this fact could not be detected from the outside.¹⁹

Concerning *biological weapons*, a much lower payload limit would be needed, because very small amounts of agents can suffice to infect a number of people from which the illness would spread by contagion. As long as UAVs are to be used for non-weapon missions, payloads of tens of kilograms are needed for carrying cameras and radar, thus a payload limit below 20–50 kg seems unrealistic. However, biological agents need to be distributed, so the non-existence of a tank and spraying equipment (including observation of exercises and tests) could give a handle here. Somewhat similar to the MTCR export control rules, UAVs could be prohibited from carrying an

11. Jürgen Altmann (2009) 'Preventive Arms Control for Uninhabited Military Vehicles', in Rafael Capurro and Michael Nagenborg (eds): *Ethics and Robotics*, Heidelberg: Akademische Verlagsgesellschaft, 69–82.
12. Dennis Gormley, Colin P. Clarke, and Jürgen Altmann (2012) 'Missiles in the Middle East: their destabilizing role' in Bernd W. Kubbig and Sven-Eric Fikenscher (eds): *Arms Control and Missile Proliferation in the Middle East*, London: Routledge, 39–61.
13. Armin Krishnan (2009) *Killer robots: Legality and ethicality of autonomous weapons*, Farnham: Ashgate, p. 152.
14. The definitions by conscious decision do not mention an on-board crew (the same holds for the land vehicles), see Altmann (2009), op. cit.
15. Treaty on Conventional Armed Forces in Europe (1990). Online, available at <http://www.osce.org/library/14087> (February 29, 2012).
16. China has stated that it will comply with the MTCR rules. Israel also adheres to the provisions of the regime.
17. This section is based on Dinshaw Mistry and Mark Smith (2012) 'The Missile Technology Control Regime, the Hague Code of Conduct, and missile proliferation' in Bernd W. Kubbig and Sven-Eric Fikenscher (eds) *Arms Control and Missile Proliferation in the Middle East*, London: Routledge, 234–250.
18. United Nations Department for Disarmament Affairs (2007) *United Nations Register of Conventional Arms: Guidelines for Reporting International Transfers: Questions & Answers*, Annex III, New York: United Nations.
19. This is different from the situation between the U.S. and Russia under SALT II: they differentiate heavy (nuclear-armed) bombers from other aircraft by so-called 'functionally related differences' that could be observed even by national technical means of verification.
20. Civilian UAVs for crop spraying should rather be excluded from the region due to the potential for misuse and suspicions. The MTCR Category II rule applies only to UAVs with an aerosol dispensing system/mechanism above 20 liters and allowing exports after considerations seems too generous here.
21. Bruce W. MacDonald (2009) 'Steps to strategic security and stability in space: a view from the United States', *Disarmament Forum* (4): 17–25, here p. 23.

Further Reading

- Peter W. Singer (2009) *Wired for War: The Robotics Revolution and Conflict in the Twenty-First Century*, New York: Penguin Press.
- Dennis Gormley and Richard Speier (2003) 'Controlling Unmanned Air Vehicles: New Challenges', *The Nonproliferation Review* 10(2): 66–79.
- Michael Franklin (2008) 'Unmanned Combat Air Vehicles: Opportunities for the Guided Weapons Industry?', Royal United Services Institute (Occasional Paper). Online, available at http://www.rusi.org/downloads/assets/Unmanned_Combat_Air_Vehicles.pdf (February 24, 2012).
- Niklas Schörnig (2010) *Robot Warriors: Why the Western investment into military robots might backfire*, PRIF-Report No. 100, Frankfurt: Peace Research Institute Frankfurt.

aerosol dispensing system/mechanism, irrespective of their payload and range.²⁰

Chemical weapons pose a minor problem since the agents do not propagate; for a significant effect, they have to be distributed in much larger quantities than biological agents. As in the case of biological agents, chemical weapons need to be distributed. Prohibiting UAVs from carrying an aerosol dispensing system would eliminate one delivery vehicle from the list of possible DVs. However, biological weapons should be covered in parallel to chemical weapons, a solution effective for the former would work for the latter, too.

The proposed criteria would limit the firepower that could be delivered by conventionally-armed UAVs. In a scenario where their payload is not capped, but increases to hundreds of kilograms and a few tons, UAVs would have the inherent capability to carry WMD, especially nuclear weapons. Some assurance that armed UAVs are not equipped in such a way could be gained from cooperative verification and confidence-building measures. On-site inspections at UAV bases and flight-test sites, observation of testing, demonstrations, and exhibits could all be used to convince

the partners to the treaty of the effective compliance with the WMD/DVs Free Zone regarding UAVs.

Furthermore, we have argued that on the way to the envisaged WMD/DVs Free Zone in the Middle East it would be helpful to expand the scope of the Hague Code of Conduct Against Ballistic Missile Proliferation to include cruise missiles and UAVs. The HCOC's confidence-building and cooperation-promoting benefits could facilitate the development of cooperative, rule-based approaches to (missile and) UAV control. Such initial limited scope cooperation could pave the way for stronger long-term cooperation in containing UAV proliferation in the Middle East.

Incrementalism Is Needed

We share the common belief that regional arms control solutions for UAVs will not be achieved overnight, but that incremental progress is possible: "In getting from the first floor to the second floor of a building, one climbs a staircase with multiple steps. Trying to do so in one big step is a formula for making no progress at all."²¹ ■

About the ACADEMIC PEACE ORCHESTRA MIDDLE EAST (APOME)

The ORCHESTRA is the follow-up project of the "Multilateral Study Group (MSG) on the Establishment of a Missile Free Zone in the Middle East". The ACADEMIC PEACE ORCHESTRA MIDDLE EAST is a classical Track II initiative: it consists of some 70 experts – mainly from the Middle East/Gulf, one of the most conflict-ridden areas of the world. The ORCHESTRA is meeting regularly in working groups (CHAMBER ORCHESTRA UNITS) on specific topics in the context of a workshop cycle from 2011-2014. The main goal of this initiative is to shape the 2012 Middle East Conference on the establishment of a zone free of weapons of mass destruction and their delivery vehicles agreed upon by the international community in May 2010.

For this reason, these experts develop ideas, concepts, and background information in a series of POLICY BRIEFS which are the results of intense discussions within the CHAMBER ORCHESTRA UNITS. In this framework, the broader normative Cooperative Security Concept will be further developed, embedded, and institutionalized in the region. At the same time, the ORCHESTRA meetings serve as venues for confidence building among the experts. The networking activities of PRIF's Project Group are documented by the ATLAS on Track II research activities in or about the Middle East/Gulf region.

Editor/Project Coordinator: Adj. Prof. Dr. Bernd W. Kubbig
Co-Editors: Roberta Mulas, MA and Christian Weidlich, MA
Peace Research Institute Frankfurt,
Baseler Straße 27-31,
D-60329 Frankfurt am Main,
Phone: +49-69-95910436, Fax: +49-69-558481,
E-Mail: kubbig@hsfk.de,
Internet: www.academicpeaceorchestra.com



The views presented by the authors do not necessarily represent those of the project coordinator, editors, sponsors, or PRIF.
© 2012 ACADEMIC PEACE ORCHESTRA MIDDLE EAST.
All rights reserved.
Layout: Anke Maria Meyer

The Academic Peace Orchestra Middle East wishes to thank its generous sponsors, the Foreign Ministry of Norway, the Swiss Federal Department of Foreign Affairs, the Friedrich Ebert Foundation, and the Protestant Church of Hesse and Nassau.