

CCW Meeting of Informal Experts on Lethal Autonomous Weapons Systems

Geneva, April 15, 2016

Speaking Notes

[Cover slide]

Thank you, Mr Chair. Good morning to all of you.

I'll like to thank Ambassador Biontino and team at the United Nations Office in Geneva for granting me this opportunity to contribute to this meeting.

Firstly it's important to caveat that my views represent neither the Singapore Government nor the institution I work in, but instead, purely in the private capacity of an academic researcher.

This presentation is an abridged version of a longer preliminary paper submitted prior to this meeting, to which I presume you may already have access. I welcome your comments and suggestions to help refine this preliminary paper.

Due to the limited time I'll only cover the key generalities of my study, based on the salient points outlined for this panel in the Food for Thought paper.

My study examines the scenario of potential LAWS proliferation in the Asia-Pacific maritime domain. However, before plunging into this case study further, it is important to highlight the general concepts that may be the key to how to examine the potential consequences of LAWS in the maritime context.

[Slide: Contemporary naval warfare capabilities, including pictures of increasingly autonomous systems such as Sea Hunter ACTUV, Harop, X-47 UCAV]

In the current era of naval warfare, increasingly autonomous weapons, possessing area loiter characteristics, higher endurance, and increased artificial intelligence have already started to enter service or are at various stages of trials.

These work as part of an integrated whole with other traditional automated systems.

In my study, to project a scenario of the future where LAWS may proliferate and operate within an Asia-Pacific context, it is necessary to use a proxy system to extrapolate. I use semi-autonomous weapons because their technical characteristics – area loiter, endurance and payload – may potentially equate more closely to future LAWS.

Structural naval arms control, which seeks to limit the type and quantity of naval armaments, has barely found any success because of the very nature of naval armaments themselves – many can be used for both defensive and offensive tasks, in war and in peace.

Mankind has seen a number of past failures in naval arms control processes – the Interwar naval arms control talks, Washington Naval Treaty, and the Cold War Soviet-US naval arms control discussions.

Past failures in naval arms control processes can be attributed to how some participants in those discussions view certain naval weapons as so pivotal to their security interests. Moreover, it is also clear that certain naval weapons, which could have been deemed particularly destabilizing, have become instrumental in contributing towards international security.

[Slide: Large amphibious assault landing ships conducting war and peace-time operations]

For example, large amphibious assault landing ships are not just designed for attacking a foreign beachhead but also can be used for humanitarian assistance and disaster relief in times of natural calamities.

In summary, it needs highlighting here that the structural conditions for limiting the type and quantity of naval armaments are already virtually non-existent, and it will potentially extend into the realm of increasingly autonomous weapons.

If that is the case, we have legitimate grounds for worry even before we contend with the emergence of fully-autonomous weapons. The fundamental root of the problem now lies in the cost propositions when it comes to developing naval capabilities.

In the more realistic, foreseeable future, we will see LAWS being one of the many diverse types of naval weapons deployed. As far as naval armament is concerned, the warship will plausibly remain as the key platform.

[Slide: Chart of unit cost of US Navy destroyers]

Let's look at the most traditional form of naval weapon – a warship. Unit cost of modern warships has skyrocketed over a span of a few decades.

This is just unit cost, since the programme cost of an entire class of warship takes into account the supporting infrastructure, manpower training and development, components and their integration, after-sales support, etc. Modern warship programmes are also afflicted by cost overruns and delays in schedule.

All these make a single ship increasingly expensive to acquire, operate and maintain. Modern fleets shrink even though each warship entering service has become increasingly more capable, especially since each is required to perform multiple functions.

Therefore, modern warships are increasingly expensive to lose in times of real operations. Yet it does not help that cheaper countermeasures have emerged, first and foremost anti-ship missiles.

[Slide: Comparing MM-38 and MM-40 Block 2 Exocet]

Take for example, the Exocet missile – one of the all-time favourites of navies worldwide – it remains still many times cheaper than a warship.

Hence more and more countries find it easier to afford and gain access to these weapons. This consequently makes “gunboat diplomacy” riskier to perform.

[Slide: pictures of HMS Sheffield, USS Stark]

History is replete with such examples of how a warship can be sunk or put out of action by just a single attack by such cheaper weapons.

In modern naval warfare the participants need not gain visual view of each other, and combat engagements can take place over the horizon upon split-second, life-and-death decisions. This creates a “use them or lose them” situation with grave strategic implications.

The warship commander may find the urge to respond pre-emptively to tell-tale signs of attack, for example – the illumination of fire control radar systems – which can be construed as demonstration of hostile intent.

This therefore leads to the potential scenario of inadvertent or accidental use of force as a result of miscalculations. If the warship shoots down the LAWS, will that amount to an act of war?

Moreover, various factors may set in to cloud judgment and decisions of the human operator, for example psychological stress in an extremely tense naval standoff. Automated naval systems can fail too, as exemplified in past incidents. What about LAWS?

The geopolitical and technical ramifications are therefore significant. Increasingly autonomous naval systems, at least for the foreseeable period of time, will remain out of reach for many navies worldwide. There will be attempts by this latter group to try to address the imbalance, hence sparking off proliferation.

The initial entry for users of more autonomous weapons will be challenging and thus limited to those with the resources – both financial, technical and manpower. Usually new weapons

cost more, and which will be driven down as the technology becomes more readily available and more easily absorbed.

[Slide: Sea Hunter ACTUV, initial unit cost, projected series production cost]

The Sea Hunter ACTUV is such an example – the first unit will cost USD22-23m, but series production will see it lower to USD20m. It'll still be cheaper than a warship though.

With this concept in mind, the attention now turns to the Asia-Pacific where one might ask whether proliferation and deployment of such weapons is possible?

[Slide: Map of Asia-Pacific with various sub-regions highlighted]

It depends on which part of the Asia-Pacific we're talking about, simply because the Asia-Pacific is not a monolithic region to be treated as whole in a proper study. It's made up of a number of distinct sub-regions each its own peculiar security complex.

When projecting scenarios of LAWS proliferation in the Asia-Pacific, it is necessary to look at each of the sub-regions. And even this methodology is far from perfect, since it does not take into fullest account each nation-state within each sub-region.

A SIPRI report on trends in world military expenditures in 2015 also shows a 5.4% increase in spending in the Asia-Pacific. There is a steady influx of high-powered weapons geared towards the maritime-air dimension, characterized by quick responsiveness, high mobility, high endurance, high precision, long range, heavy firepower and enhanced protection.

Given these attendant, pre-existing conditions, are maritime LAWS proliferation and use conceivable in the Asia-Pacific?

To draw this scenario, besides examining sub-regions, it is necessary to view this potential from four influencing factors.

[Slide: Maritime Security Threat Perceptions]

The first is maritime security threat perceptions. This is important because increasingly autonomous weapons can be most efficacious for high-intensity military operations.

As such, militaries confronting primarily traditional security threats are more likely to employ LAWS in the future than those confronting mainly non-traditional security threats.

[Slide: Military Employment of Unmanned Systems]

The second is the extent of military employment of unmanned systems which can be used as proxy indicator for LAWS. This factor depends on the state's financial and manpower capacities to acquire and absorb such technologies.

Militaries which have already operated a range of unmanned systems, especially lethal ones, have higher tendency to acquire LAWS.

[Slide: Access to Technologies]

The third is access to technologies. LAWS technologies may be restricted to only a few advanced countries capable of developing their own.

Therefore, countries which already develop their own autonomous systems, or have secure access to other countries' technologies, may have a higher chance of acquiring LAWS.

[Slide: Operational Deployment of Unmanned Systems in Maritime Domain]

Finally, we consider the operational deployment of unmanned systems in the maritime domain.

The tendency to deploy unmanned systems in real operations may indicate the likelihood of similar deployment of LAWS in the future.

Taken altogether, my study gives a rather uneven picture, only one or two Asia-Pacific sub-regions are more likely to proliferate and use LAWS in the maritime context.

[Slide: World seaborne trade by region, 2014 as % share in world tonnage]

But perhaps even more pertinent question is, proliferation aside, will Asia-Pacific countries be inclined to use LAWS.

Human intent may change. If there's anything that'll remain constant, it's geography. The Asia-Pacific cannot divorce itself from the importance the world economy attaches to safe and secure access to sea lanes plying through the region.

[Slide: World shipping lanes map]

This is another illustration. You'll see that shipping lanes are particularly dense for the Asia-Pacific, considering the semi-enclosed water spaces characterizing this region's littorals.

Given that LAWS is an area loiter system, the potential risk of systems failure and its catastrophic consequence dealt to shipping safety will be way much higher than, say, sea lanes plying more open waters.

To conclude, the Asia-Pacific case study is an example that illuminates the difficulty in controlling proliferation as a result of such diverse contexts.

From the policy standpoint, there can be an overarching set of international norms to follow, but solutions may have to be tailored according to the conditions of certain regions or sub-regions by taking into account their distinct contexts.

We also ought to ask whether militaries are, first, able to afford, and second, able to absorb such technologies. This is not just a matter of the country's wealth but also its technical and manpower capacity to induct, infuse and diffuse the technology in question.

With that, I thank you for listening to my presentation.