

Office of the Minister for Disarmament and Arms Control
Chair, Cabinet External Relations and Security Committee

Autonomous weapons systems: New Zealand policy position and approach for international engagement

Proposal

- 1 This paper seeks Cabinet agreement on Aotearoa New Zealand's policy position on autonomous weapons systems, including for our multilateral engagement.

Relation to government priorities

- 2 In line with Aotearoa New Zealand's long held principles on disarmament and arms control and reflecting the adoption of a focused Disarmament Strategy to move this work forward, the Government is speaking with a more active voice on disarmament and non-proliferation, and on the protection and promotion of human rights. The adoption of a clear and cohesive guiding policy on autonomous weapons systems (AWS) will support the Government's objectives for a safe, secure and resilient Aotearoa New Zealand, and ensure the positive use for societal good of new technologies, including artificial intelligence.

Executive Summary

- 3 Although there is no internationally agreed definition of autonomous weapons systems (AWS), they are generally understood to be weapons systems that, once activated, can select and engage targets without further human intervention. While some defensive AWS have been in use for decades, including by Aotearoa New Zealand, a number of countries are investing in the rapid development of more advanced AWS in pursuit of the potential military benefits they offer. ^{s6(a)}
- 4 The development and potential use of more advanced AWS that do not have the same limitations or controls of existing systems, and which effectively delegate life and death decisions to machines, raises significant questions about their compliance with international law and about their ethical acceptability.
- 5 Discussions to date in the Convention on Certain Conventional Weapons (CCW), the dedicated multilateral forum in Geneva, have helped to slowly build a shared understanding of the potential risks and benefits of AWS. But they have failed to deliver clarity or consensus, and have yet to demonstrate the urgency required to achieve meaningful limits on AWS before they are widely in development and use. Aotearoa New Zealand has a stake in ensuring that timely and sufficient limits are imposed on future AWS to address our concerns, and to ensure that the realisation of any military benefits offered by AWS does not come at the expense of fundamental legal or ethical considerations.
- 6 This paper seeks Cabinet's agreement to a proposed AWS policy for Aotearoa New Zealand, which will guide our national approach as well as our engagement at the

December Review Conference of the CCW in Geneva to set the future direction of multilateral work. The policy proposes that Aotearoa New Zealand advocate for legally-binding prohibitions, rules and limits on AWS, and for controls or positive obligations to ensure sufficient human control or oversight throughout the lifecycle of the weapons system. It proposes that we engage actively and constructively to secure a meaningful outcome from the existing multilateral process on AWS, while also remaining open to other opportunities to make progress. The policy also articulates the expectation that Aotearoa New Zealand will seek to play a leadership role in building an effective multistakeholder coalition to achieve the required constraints on AWS, leveraging expertise from an informal domestic inter-agency working group.

Background

What are autonomous weapons systems?

- 7 In the absence of an agreed definition of AWS, these systems are best understood as a spectrum of weapons, at the far end of which would be found “fully” autonomous weapons. Once deployed, such weapons would have no possibility of human involvement in the targeting and engagement decisions they make, relying instead on information gathered through sensors to trigger actions based on pre-programmed or self-learning algorithms. Below the threshold of “fully” autonomous systems, the spectrum includes weapons systems that have varying opportunities for human control over – or involvement in – targeting and engagement decisions.
- 8 It is important to note that while fully autonomous systems do not yet exist, some systems at the other end of the spectrum have been around for decades and are not understood to fall within the scope of this policy (for example, the Phalanx ship defence system used by the Royal New Zealand Navy, sentry guns deployed by Republic of Korea, and Israel’s Iron Dome missile defence system). Because of the specific characteristics and in-built limitations of each of these defensive autonomous systems (see annex 1), they (and their military benefits) are considered ethically and legally acceptable.

Why are autonomous weapons systems being pursued?

- 9 As with almost all other sectors, militaries have utilised technological developments to modernise and advance their capabilities. A number of countries ^{s6(a)} see significant military benefits in investing in AWS. These potential benefits are strategic, organisational, operational, and tactical.
- 10 Remaining ahead of the curve in respect of AWS gives militaries a strategic advantage above competitors, positioning them well for any arms race and reducing the risk that their platforms and personnel will be rendered obsolete or vulnerable to significant deployment of AWS by others. From an organisational perspective, AWS have the potential to help militaries overcome demographic challenges, such as difficulty recruiting sufficient military personnel, and to achieve significant cost savings in procurement, especially for smaller, non-piloted platforms.
- 11 Operationally, the benefits could include the provision of a decisive military edge in combat through faster machine decision-making and reactions, unencumbered by

human fatigue or emotion. AWS may also reduce the risk of military casualties by requiring the deployment of fewer (and potentially no) personnel. It is also suggested that AWS could reduce the risks of civilian casualties as a result of greater precision in targeting. Removing the need for a communication link between the AWS and a human operator, for example as is envisaged for fully autonomous weapons, would also expand the range of terrain where such a system could operate, and would reduce the risk of an opponent hacking or otherwise taking control of the system remotely.

What are the concerns around more advanced autonomous weapons systems?

- 12 Even the most ardent advocates of AWS recognise that such systems carry risks and pose considerable challenges to existing legal and ethical frameworks, and to regional and global stability. In understanding these concerns it is important to note that just as AWS can be seen as existing on a spectrum, so too does the severity of the legal, ethical and security concerns they raise. Not all AWS will be unethical, nor is it impossible to envisage some AWS being able to operate in compliance with international humanitarian law (IHL) or international human rights law (IHRL). A central pillar of Aotearoa New Zealand's proposed approach to AWS, however, is a precautionary one – that the potential benefits of AWS should not be pursued without prior (or at least parallel) efforts to address the following concerns.

Legal concerns

- 13 There are significant concerns about the ability of future AWS to comply with international law. AWS may not be able to predictably comply with some of the central tenets of IHL, such as requirements to distinguish at all times between protected persons and objects (who cannot be the object of attack), and combatants and military objectives. Parties must ensure that all attacks in pursuit of a military objective are proportional to any incidental civilian casualties or damage, and take feasible precautions to avoid and minimise incidental civilian losses. It is not readily apparent how accountability for violations of IHL involving AWS would be established.
- 14 Many experts highlight that human behaviours are so complex that it is beyond the capabilities of current and even future technology to be able to respond lawfully to every scenario they may encounter. Experts also doubt that technology will ever be up to the task of making judgments about proportionality, and taking the measures necessary to ensure that standards of precaution have been met. In addition, potential bias in a machine's data, and human bias in over-relying on machines' findings add to the complexity.
- 15 There are similar concerns about whether all AWS could comply with human rights law. For example, IHRL requires that any lethal force be used in a gradual, escalatory manner, in response to the threat – automated targeting decisions risk being arbitrary, in violation of human rights law. There are also concerns that the use of complex algorithms in targeting decisions would violate human rights standards by potentially and unknowably introducing biases. The international use of facial recognition software in a law enforcement context has raised such concerns. New Zealand law enforcement recognises that algorithms that include insufficient training data on minority groups have the potential to hold biases against said groups. It is also recognised that, irrespective of adequate inclusion in training data sets, minority populations, especially those who have experienced structural inequality may feel that the use of their data is

being used against their best interests. This may further entrench inequality and has the potential to breach human rights laws.

Strategic and security concerns

- 16 As with other novel weapons technology, AWS bring a range of new risks and concerns for global peace and security. AWS have the potential to be a destabilising factor in future conflicts and the maintenance of peace. The political threshold to deploy force may be lower if human lives are not on the line, and the risk for conflict escalation may be higher. Poorly-designed AWS may behave unpredictably, and spark or worsen conflicts where there is inadequate human control. Based on the precedent of armed, unmanned aerial vehicles (UAVs) use, AWS will be attractive to a range of States for clandestine, extraterritorial lethal strikes.
- 17 As with all emerging military technologies, there are risks that countries and other actors that have less regard for human rights and international norms will use AWS contrary to the rules of armed conflict. In time, it is almost certain that this technology will fall into the hands of non-State armed groups including terrorists. Outside of armed conflict, it is foreseeable that in some countries, AWS technologies will find their way into domestic law enforcement use. AWS will likely present another tool for authoritarian governments to deploy against their citizens.

Ethical concerns

- 18 Ethical considerations are closely linked to legal acceptability; it is often ethical concerns about a particular method of warfare that serve as the impetus for adopting legal constraints. From a values-based and ethical viewpoint, Aotearoa New Zealand must determine its comfort with substituting human decision-making with algorithms and machine processes. This moral question was front of mind for New Zealanders in a public survey commissioned this year on the use of AWS in war. Of the 2,000 New Zealanders surveyed, 72% said they opposed the use of AWS in war, with the crossing of a moral line cited as one of the main concerns. Targeted public consultation across civil society, academia, technical experts and the business community also saw ethical concerns emerge as a driver of opposition to AWS.
- 19 Experts, including the International Committee of the Red Cross (ICRC) which is regarded globally as the guardian of international humanitarian law, argue that ceding life-and-death decisions to machines dehumanises warfare even more, reducing our moral responsibility, our shared sense of humanity, and human dignity. The ICRC also argues that such systems abrogate the international legal principles of humanity and the dictates of the public conscience.

What protections are already in place?

- 20 Some ^{s6(a), s9(2)}_{(g)(i)} have argued that there is no military benefit to be gained from deploying unpredictable machines (i.e. “fully autonomous weapons systems”), and have stated that their national standards and military doctrine, informed by international law, are sufficient to prevent the development, deployment and use of systems that would be considered illegal or unethical. Many countries also point to the requirement to conduct reviews of prospective weapons to ensure their lawfulness as another safeguard in the development and use of AWS.

21 In the multilateral discussions to date, Aotearoa New Zealand has taken the position that while weapons reviews serve an important and useful function, they have limitations and are insufficient on their own to address our concerns. There are no internationally agreed rules on how to conduct weapons reviews, no common standards which must be met, and no requirements to share results. There are also questions about how review practices can reliably assess how an AWS might operate on any given occasion. The current tools leave space for differing interpretations of what international law and ethics require, and for doubt about whether adversaries are applying and holding themselves to the same standards.

Aotearoa New Zealand’s interests

22 Aotearoa New Zealand’s commitment to disarmament issues is long-standing and consistent, from our well-known nuclear-free advocacy through to our more recent efforts to ban the use of anti-personnel landmines and cluster munitions. Strengthening the international rules-based system as it applies to AWS through the lens of kaitiakitanga and whanaungatanga keeps legal and ethical considerations to the fore and promotes consistency of global approach.

23 Aotearoa New Zealand places great importance on upholding and strengthening international rules and norms, not only because of the protections they afford to smaller States, but because they contribute to a safer and more prosperous world. We have a stake in ensuring IHL keeps pace with technological developments, and continues to offer protection to civilians. Although it is clear that existing international legal frameworks apply to AWS, dedicated effort is needed to provide clarity about how these systems can be known to be complying with the law. We have an interest in contributing to this effort and shaping its outcome.

24 Aotearoa New Zealand also has hard security interests in play, including how to defend against future AWS and protect our personnel and platforms. We also have an interest in maintaining interoperability with our key defence partners ^{s6(a)}

As such, our policy settings will need to take into account the prospects of operating alongside, and being able to communicate meaningfully with, AWS-deployed militaries. We therefore have significant interests in actively shaping a framework that makes clear the prohibitions, limits and controls we think are needed to ensure that any pursuit of the benefits of AWS does not come at the expense of fundamental legal and ethical considerations.

25 Taking a principled position on AWS is consistent with Aotearoa New Zealand's broader approach to the responsible development and use of artificial intelligence (AI). While this paper’s scope is narrowly

Adjacent workstreams

- MBIE: National AI Strategy - “Shaping a Future for New Zealand”; Space Policy Review
- Police: Emerging and critical technologies oversight group
- Transport: Drones and enabling drone integration; Civil Aviation Bill update; emerging aviation technologies; autonomous vehicles
- Department of Conservation: Predator Free 2050
- DPMC: Emerging Technologies Working Group
- MoD: Defence Assessment; Defence Policy Review
- NZDF: Future Operating Concept; Technical Cooperation Program; Artificial Intelligence Strategic Challenge

focussed, we need to ensure our approach does not inadvertently stifle innovation in AI. Consultation with domestic industry representatives confirms that they do not plan to directly contribute to AWS research and development, but that they require certainty about which activities and partnerships are unacceptable. In addition, there may be second order effects including on dual-use goods that we will need to work through.

Multilateral context

26 Since 2014, AWS have been discussed in the Convention on Certain Conventional Weapons (CCW) in Geneva and, since 2017, its Group of Governmental Experts (GGE). The GGE's strength is that it brings together in one well-established forum interested delegations including military powers, international organisations, and civil society. A key limitation of the current GGE, however, is that it can only take decisions by consensus, a significant hindrance in the absence of any agreement on how to address the challenges posed by AWS and with what level of urgency.

27 Countries investing in advanced AWS have stated their opposition to any binding regulations. These countries do not share the same concerns as Aotearoa New Zealand about AWS, arguing that the current legal framework is sufficiently robust, and that anything additional contemplated should be at most voluntary. ^{s6(a), s9(2)(g)(i)}

At the other end of the spectrum are countries that have aligned with the International Campaign to Stop Killer Robots in calling for an outright ban and a treaty to govern AWS as a matter of urgency. ^{s6(a), s9(2)(g)(i)}

In between these two seemingly irreconcilable positions are a range of nuanced views, from those who advocate for regulations and controls (without necessarily specifying the vehicle for this), those who favour some form of non-binding political declaration, and those who have not weighed in on the matter or are still determining their national positions ^{s6(a), s9(2)(g)(i)}

28 Although consensus remains elusive, there has been some progress within the GGE. Widespread agreement does appear to be forming that the essentially unpredictable and uncontrollable nature of fully autonomous weapons systems means it will not be possible to address their legal and ethical risks (although, as noted above, States are divided as to whether such systems should be subject to a new and express prohibition or are already proscribed under international law).

29 For weapons systems that are less than fully autonomous, discussions within the GGE have increasingly focused on how the legal and ethical risks such systems pose could be addressed through the imposition of controls and limits. Following more than six years of debate, it is clear that determining these controls and limitations is no easy task. There is not yet agreement on the extent of the legal and ethical risks that such controls are intended to mitigate. Nor is there agreement on the standard of mitigation required – for example, whether “meaningful human control” over the weapon is required, or whether it would be acceptable to provide only for human involvement or judgment. So, too, does debate continue about where in the lifecycle of a weapon system these limits or controls are needed to be effective (for example, in the software design, during development and testing, in decisions to deploy and recall, during the system's operation, or throughout all of these stages).

- 30 The challenge lies in providing sufficient space to enable convergence, without ceding control of the pace of discussions (and outcomes) to those most opposed. Multilateral processes necessitate a balancing of levels of ambition and levels of uptake of any agreed outcome. The CCW's Review Conference in December is a key waypoint for future direction of multilateral work, including the GGE's future mandate and scope. s9(2)(j)

Proposed Aotearoa New Zealand position

- 31 Although the global community is a long way from agreeing how to address the challenges posed by AWS, it is timely for Aotearoa New Zealand to articulate the key principles upon which we will base our international engagement. Our policy settings need to ensure compliance with international law and alignment with Aotearoa New Zealand's values, while preserving the opportunity to pursue the legitimate military advantages that some AWS may offer, particularly as defensive systems.
- 32 Our resources are best directed towards multilateral processes, rather than creating a domestic framework that has limited impact or uptake internationally. Reflecting that there may be important movements in positioning as countries grapple with this issue, and that the policy needs to remain fit for purpose even with technological advancements, the policy elements articulated below are deliberately high-level.

Key elements of Aotearoa New Zealand's policy on AWS

- 33 The prospect of future unregulated AWS presents serious legal, ethical and security risks that engage Aotearoa New Zealand's interests and values. Acknowledging that some AWS may offer legitimate military benefits, and noting the rapid pace of technological developments, we recognise the urgent need for adequate rules or limits to be imposed on such systems before any potential benefits can be realised.
- 34 Existing international humanitarian law was developed when autonomy in weapons systems did not exist or was not contemplated, and it is not immediately clear how that body of law can be operationalised through AWS. With this in mind, and in keeping with Aotearoa New Zealand's preferred approach to past disarmament issues such as nuclear weapons and cluster munitions, we should advocate for a legally-binding instrument to articulate sufficiently specific rules or limits to govern the development and use of AWS. This would also serve to address our ethical and security concerns.
- 35 In the process of articulating rules and limits, Aotearoa New Zealand recognises that a range of controls may be required for AWS that occupy different points along the spectrum of autonomy, and should engage actively in efforts to identify appropriately nuanced prohibitions, controls and restrictions. We should pursue an express prohibition on AWS that are not sufficiently predictable or controllable to meet legal or ethical requirements, whether they be defined as "fully" autonomous weapons systems or as some other category of AWS. We should also pursue controls or positive obligations on other AWS to ensure sufficient human control or oversight throughout the lifecycle of the weapon system.

- 36 Aotearoa New Zealand should support international efforts to strengthen the existing weapons review process, recognising the contribution that this work can make to the effective control of AWS.
- 37 Aotearoa New Zealand should also support interim steps and measures such as non-legally binding guidelines, declarations or norms, without prejudice to the future adoption of legally binding measures.
- 38 Acknowledging that the CCW is currently the most appropriate forum for negotiation and discussion on AWS, Aotearoa New Zealand should play an active and constructive role in seeking a forward-leaning mandate for a refreshed Group of Governmental Experts at its Review Conference in December 2021.
- 39 Recognising that the GGE's requirement for consensus has the potential to thwart efforts to make meaningful progress on AWS within the CCW, Aotearoa New Zealand will remain open to other opportunities to move this issue forward.
- 40 Acknowledging that we have much to learn from other delegations engaging in the GGE, Aotearoa New Zealand should nevertheless seek to play a leadership role in building an inclusive and effective coalition of States, experts, and civil society to promote and contribute to the timely elaboration of the necessary rules and limits on AWS, both within the CCW and any other credible fora that emerge.
- 41 Elaborating the detail of Aotearoa New Zealand's position on AWS will require input from multiple stakeholders. The Ministry of Foreign Affairs and Trade will coordinate and lead an inter-agency Working Group to elaborate Aotearoa New Zealand's views on the prohibitions, rules, controls and limits required to address concerns posed by AWS. Relevant government agencies will contribute the expertise and resources required to support the Working Group. The Working Group will also provide for the appropriate participation of industry, academia, civil society, and Māori.

Financial Implications

- 42 There are no financial implications.

Legislative Implications

- 43 There are no legislative implications at this stage. ^{s9(2)(j)}

Human Rights

- 44 There are no immediate human rights implications of this paper, noting that the proposed policy positions are intended to protect human rights from future violations involving autonomous weapons systems.

Consultation

- 45 The Civil Aviation Authority, Department of Conservation, Department of the Prime Minister and Cabinet (National Security Group), Ministry of Business, Innovation and Employment, Ministry of Defence, Ministry of Transport, New Zealand Defence Force,

New Zealand Police, and Waka Kotahi the New Zealand Transport Agency were consulted on this paper and their views were incorporated.

46 Outreach during the development of this paper included the commissioning of a public survey, and engagement with civil society, industry and academia.

47 s9(2)(g)(i)

To ensure the Crown meets its obligations and commitments under te Tiriti o Waitangi, further engagement must be conducted with Māori as the policy process progresses s9(2)(g)(i)

Communications

48 Given public interest in the issue of autonomous weapons systems, it is proposed that this policy be communicated publicly by the Minister for Disarmament and Arms Control should it be approved by Cabinet. The policy will also form the basis of engagement by New Zealand's delegation in multilateral discussions on AWS. A briefing to the Foreign Affairs, Defence and Trade Committee is envisioned.

Proactive Release

49 Consistent with usual practice for negotiations, the nature of this paper and the grounds to withhold set out in the Official Information Act 1982, the Minister for Disarmament and Arms Control intends to release this Cabinet paper *in redacted form* within 30 business days.

Recommendations

50 The Minister for Disarmament and Arms Control recommends that the Committee:

50.1 **Note** that autonomous weapons systems are generally understood to be weapons systems that, once activated, can select and engage targets without further human intervention;

50.2 **Note** that autonomous weapons systems exist along a spectrum of autonomy, from existing acceptable systems to future “fully” autonomous systems intended to operate completely outside of human control, and that the risks posed by such systems generally increase alongside their level of autonomy;

50.3 **Note** that some autonomous weapons systems offer potential military benefits and are being actively pursued by a range of global militaries including our close military partners;

50.4 **Note** that the prospect of future unregulated autonomous weapons systems presents serious legal, ethical and security risks that engage Aotearoa New Zealand's interests and values;

50.5 **Agree** to Aotearoa New Zealand's proposed policy position, namely that:

50.5.1 There is an urgent need to agree new and adequate rules and limits on the development and use of autonomous weapons systems, including to enable the realisation of their potential military benefits;

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- 50.5.2 Aotearoa New Zealand will advocate for a legally-binding instrument to articulate these rules or limits, and will also support interim steps and measures such as non-legally binding guidelines, declarations or norms, without prejudice to the future adoption of legally binding measures;
 - 50.5.3 Aotearoa New Zealand will engage actively in efforts to identify appropriately nuanced prohibitions, controls and restrictions, recognising that a range of controls may be required for AWS that occupy different points along the spectrum of autonomy;
 - 50.5.4 Aotearoa New Zealand will actively engage in international fora to pursue an express prohibition on AWS that are not sufficiently predictable or controllable to meet legal or ethical requirements, as well as controls on other AWS to ensure sufficient human oversight;
 - 50.5.5 Aotearoa New Zealand will actively engage to pursue controls or positive obligations on other AWS to ensure sufficient human control or oversight throughout the lifecycle of the weapon system;
 - 50.5.6 Aotearoa New Zealand will support international efforts to strengthen the existing weapons review process, recognising the contribution that this work can make to the effective control of AWS;
 - 50.5.7 Aotearoa New Zealand will play an active and constructive role in seeking a forward-leaning mandate for a refreshed Group of Governmental Experts at its Review Conference in December 2021;
 - 50.5.8 Aotearoa New Zealand will also remain open to other opportunities to make progress;
 - 50.5.9 Aotearoa New Zealand will seek to play a leadership role in building a diverse, inclusive, and effective coalition of States, substantive experts, and civil society groups to promote and contribute to the timely elaboration of the necessary rules and limits on AWS in a multilateral setting, both within the CCW and any other credible fora that emerge;
- 50.6 **Note** the establishment of an informal inter-agency working group to leverage expertise and elaborate the details of Aotearoa New Zealand's position;
- 50.7 **Authorise** the redacted release of this paper.

Authorised for lodgement

Hon Phil Twyford
Minister for Disarmament and Arms Control

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Annex 1.



Examples of current AWS considered acceptable by international community



PHALANX CLOSE-IN WEAPONS SYSTEM (CIWS)

- First used by the US Navy, now used by a number of countries including on New Zealand Navy frigates
- CIWS is a rapid-fire, computer-controlled, radar-guided mounted gun, designed to detect and automatically fire at approaching threats like missiles, small high-speed boats and aircraft
- Defensive in nature, it has a narrow targeting scope and does not define its own targeting criteria or target humans directly
- Human control: Operator can intervene to deactivate

SGR-A1 ROBOTIC SENTRY GUN

- Developed and deployed by Republic of Korea for border security purposes along the demilitarised zone
- Gun turret can autonomously identify and destroy targets, issue verbal warnings and recognise certain surrender motions, such as if the target were to drop a weapon and raise their hands. Gun can be fixed in place or mounted on a vehicle
- Human control: Operator can intervene to deactivate



HARPY LOITERING WEAPON



- Developed by Israel
- Autonomous missile that can stay airborne for some time to identify target and then attack by self-destructing into the target
- Scope and area of operations: Designed to fly to pre-determined geographical area, using GPS coordinates or pre-programmed flight routes, where it then activates its anti-radar to search for and locate radar-emitting targets. The Harpy's loitering time (time between launch and detonation) is up to 2.5 hours; the upgraded Harpy NG can loiter up to 9 hours. It may use pre-programmed rules to prioritise between targets (the Harpy NG, for instance, can operate with multiple pre-programmed scenarios). Some models will self-destruct if a target cannot be located, while others can return to base
- Human control: Some models can operate autonomously, while others have an option for a human operator to supervise the system and abort the attack

Future AWS?

- Fully autonomous weapons are estimated to be in use within five years, absent any international intervention or agreed limitations
- Wide targeting scope and area of operations: Detect and select targets independently based on sensors, algorithms and programming, over a wide geographical area, without operators necessarily knowing the specific target or location
- May be able to sync with other AWS for swarming capabilities
- May be able to self-learn 'on the job', synthesising new data received while in operation to classify objects and change targeting parameters
- Human control: May not be able to be deactivated by an operator



