At the push of a button

Automated weapons systems on earth and in space

'Threats to peace and disarmament - the way forward'
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Introduction

Before outlining what this paper covers, I should first explain what I mean by automated weapons systems. The unfortunate history of weapons development has of course involved the extension of the ability to maim and kill beyond the immediate face-to-face combat situation. Over the past fifty or so years, the ability to send weapons beyond the line of sight, aided by computerised guidance and control systems, has been dramatically extended; particularly in the area of missile technology. Increasing dependence on computerised missile detection and warning systems was a feature of the Cold War years when the inherent problems of mis-identification and computer malfunction, exacerbated by human error in a situation of extreme paranoia, were clear - as were the potentially catastrophic consequences.

Technological developments in weapons systems have continued in the direction of increasing computerisation and automation, both of the weapons systems and of their delivery systems. Pilotless planes with the ability to fire weapons are already deployed - you may recall the incident in November 2002 when a CIA-controlled Predator, operated by someone sitting at video screen miles away, fired a Hellfire missile to kill six suspected 'terrorists' in Yemen. Further 'unmanned', remote controlled and robot weapons systems are currently in the research and development stage, and that is what I am going to be talking about today.

This paper is focused on US weapons systems because while other governments are involved in developing some similar systems, none has the particular 'full spectrum' combination that the US government is planning or such complete plans to deploy weapons in space.

There are six sections in this paper: relevant US government policy; an overview of automated weapons systems which covers future combat systems and Ballistic Missile Defence; relevant international treaties and PAROS; costs and consequences of the development of these systems; and a concluding section on ways forward.

Due to time constraints, each section provides an outline of only some of the issues involved - obviously the issues are far more complex than can be adequately dealt with in thirty minutes.

Relevant US government policy

[slide] To turn to the first section - US government policy - in recent years a succession of US national security and military policy documents have emerged in which their intentions are made frighteningly clear.

Documents such as the Joint Chiefs of Staff's Joint Vision 2010 in 1996, the Space Command Long Range Plan in 1998 which included the Vision for 2020, the Doctrine for Joint Operations in 2001, the Nuclear Posture Review in 2002, the various Air Force Strategic Master Plans, the National Security Strategy documents from 2002 onwards, and the draft Doctrine for Joint Nuclear Operations of last year lay out the concepts which provide the

context for the development of increasingly high-tech and automated weapons systems. These concepts are not new of course, nor is the underlying ideology of domination by the threat or use of armed force, but they are perhaps more explicitly stated than previously.

[slide] Two of these concepts are particularly relevant to this paper - the first is the concept of 'full spectrum dominance' of space, sea, land, air and information to protect US strategic and economic interests. Noting that - "the United States does not expect to face a global military peer competitor within the next two decades, we have entered a 'strategic pause'" - rather than use this opportunity to divert resources away from the armed forces and build the economic and social conditions nationally and globally in which genuine disarmament might occur, instead the conclusion was reached - "thus, the US military has an opportunity similar to the period between World War I and World War II a time for exploring innovative warfighting concepts and capabilities."[1]

When the various policy documents are taken into account, it becomes clear that 'full spectrum dominance' involves the modernisation and development of new weapons systems, both conventional and nuclear; the integration of nuclear weapons into a wide spectrum of military capabilities; the deployment of weapons in space; and to make all of this work - huge reliance on surveillance, reconnaissance, targeting, guidance, firing, command and control computerised systems.

[slide] To enable full spectrum dominance, 'full force integration' is required for the armed forces of the future - this is illustrated in this image which shows the linkages among land, air, sea and space forces, as well as theatre (locally deployed) systems and space systems.

[slide] The second concept developed in those documents was that of pre-emptive and even preventive military strikes which by the time of the 2006 National Security Strategy was described thus: "To forestall or prevent such hostile acts by our adversaries, the United States will, if necessary, act preemptively in exercising our inherent right of self-defense. The United States will not resort to force in all cases to preempt emerging threats. Our preference is that nonmilitary actions succeed. And no country should ever use preemption as a pretext for aggression."[2] - the latter remark would be laughable were it not so tragically untrue in the case of the US government.

The document also refers to "*proactive counterproliferation efforts* to defend against and defeat WMD and missile threats before they are unleashed" and states: "We aim to convince our adversaries that they cannot achieve their goals with WMD, and thus deter and dissuade them from attempting to use or even acquire these weapons in the first place."

This deterrence and dissuasion is to be based on fear of US military might. Clearly the US government intends pre-emptive military strikes against any perceived emerging threat (real or imagined) to their interests, rather than any actual threat; and given the failure of their invasions and occupations of Afghanistan and Iraq, automated weapons are an essential component of how they are likely to do that in the future rather than risking the involvement of large numbers of troops.

Overview of automated weapons systems

Automated weapons systems are of course the ultimate military fantasy of those politicians who seek to dominate others by armed force because they provide the possibility of inflicting

destruction and death on perceived enemies while sustaining no injuries or damage to their own civilian population, armed forces and territory.

Automated weapons systems distance and sanitise the impact of warfare by moving those who give the orders, and those who act on those orders, further and further from seeing the impact of what they have done. Endless computer simulations and re-runs of scenarios numb the operators of weapons systems to the point where it is difficult to differentiate between what is real and what is not. The reality of warfare is similarly distanced from observers as was demonstrated in the media coverage of the Gulf War in 1991 and in US-led wars since, with surreal images of missiles fired at a long distance - their contrails lighting up the night sky followed by the resulting flash on detonation - but few images of the devastation each missile wrought. And of course, should any upsetting image of death or destruction need to be justified, then the blame can be placed on a failure in the technology, rather than on those who were responsible for giving the orders and those who carried them out. [3]

So what are the types of automated weapons systems currently deployed or in the research and development phase?

a) Future combat systems

On the ground, the Army's Future Combat Systems[4] will comprise a wide range of new automated and semi-automated weapons systems, and here are some examples.

[slide] On the top left is the Armed Robotic Vehicle - this comes in an Assault version that will do remote reconnaissance, deploy sensors and direct-fire weapons and special munitions; and in a Reconnaissance, Surveillance and Target Acquisition version which will do what its name suggests.[5]

Below that is the Non-Line-of-Sight Cannon - which "will reduce the risk of United States casualties by providing a much-needed artillery system that can outmatch and outsmart any enemy." "Unlike today's physically taxing cannon systems ... [this] technology gives the soldier pushbutton firepower. [It] integrates tactical software with robotic ammunition handling and auto-loading systems to create a fully automated cannon".[6]

Below that is the Intelligent Munitions System which is an unattended munitions system - it will have lethal and nonlethal munitions integrated with command, control, communications, sensor and seeker devices ... "once on the ground, it can locate itself, organize all of its components and report its location to the Battle Command Mission Execution."[7] Do you think there is a model that can do housework? Certainly that would be a much more socially useful product.

On the top right is the Non-Line-of-Sight-Launch System which is a 'family' of Precision Attack and Loitering Attack missiles in a launch unit with self-contained tactical fire control electronics and software for remote and unmanned operations.[8]

Below that is the soldier - in future: "All Soldiers in the Modular Force are part of the Soldier as a System ... all Soldiers systems will be treated as an integrated System of Systems". [9] If that sounds a rather dehumanising approach, then how about this: "The Pentagon predicts that robots will be a major fighting force in the U.S. military in less than a decade, hunting and killing enemies in combat." ... "They don't get hungry," said Gordon Johnson of the Pentagon's Joint Forces Command. "They're not afraid. They don't forget their orders. They

don't care if the guy next to them has just been shot. Will they do a better job than humans? Yes.""[10]

It has been reported that the Army's Future Combat System will cost up to US$145 billion, a figure which incidentally does not include the development of robot soldiers.[11]

[slide] In the air, there is continued development of unmanned aerial vehicles from their previous reconnaissance role, into attack aircraft. The MQ-1B Armed Predator was first deployed as an attack aircraft in Afghanistan in 2001[12]; and as mentioned before, one was used to kill suspected 'terrorists' in Yemen in 2002. Last year the Army awarded a contract for the development of an Extended-Range Multi-Purpose unmanned aerial vehicle - the ERMP 'Warrior'. It will have a long range capability, "multiple on-board weapons and be capable of loitering over enemy territories for 36 hours at altitudes up to 25,000 feet".[13]

These weapons represent a small fraction of the systems currently in development and have been included to give you a sense of where the US armed forces are heading. The systems mentioned, along with ballistic missile defence which I will talk about in a moment, are being developed alongside new programmes or upgrades involving the full gamut of military vessels, vehicles and aircraft in all branches of the armed forces.

b) Ballistic Missile Defence

To turn now to Ballistic Missile Defence or BMD - in its current form BMD has some resemblance to the Strategic Defence Initiative announced by the Reagan administration in the 1980s, what was commonly referred to as 'star wars'. The main characteristics of the development of what is now BMD have been frequent name changes of the project as a whole, of its component parts and of the systems involved; frequent cancellations and later resurrections of some projects; a small number of prototype tests and even less tests that have worked as intended; and expenditure now estimated at more than US$120 billion dollars since the 1950s[14].

[slide] The concept of 'star wars' is somewhat misleading when it comes to BMD, because it is a component of full force integration and thus involves land, air, sea and space forces as illustrated by this rather overcrowded image from Air Force Space Command. BMD is intended to be a layered missile defence system, with interceptors launched or fired from land, sea, air and space on the premise that if one layer misses, the next one will intercept the missile and so on.

[slide] Before looking at some of the elements of BMD, it is useful to look at the three stages of ballistic missile flight, because the BMD systems planned for each stage are different. The boost phase is from launch until the engines stop firing; missiles are most easily detected in the boost phase. The midcourse phase starts when the rockets finish firing; it is the longest stage of flight and when the separation of the warhead and any decoys from the missile occurs. The terminal phase is the shortest phase - it begins when the warhead re-enters the earth's atmosphere and continues until impact. Short and medium range missiles do not always have separable warheads or leave the earth's atmosphere, but the flight phases are the same.[15]

[slide] Now to the BMD systems. First there is Ground-Based Midcourse Defence for national defence - the key element is a ground-based missile interceptor consisting of a multistage booster and an exoatmospheric kill vehicle (EKV), which separates from the booster in space to seek out its target which it then destroys its target by colliding with it, a process referred to

as hit-to-kill. Last month, the Department of Defence announced that a "rudimentary missile defence system" is now in place[16], with an initial two interceptors deployed at Vandenberg Air Force Base, California, and nine at Fort Greely in Alaska[17]. Two early-warning radars are being upgraded to help track ballistic missiles launched from the direction of the Middle East - at Fylingdales in England and at Thule Air Base in Greenland.[18]

[slide] Second is the Aegis BMD - a sea-based defence with a ship-based missile (SM-3) and existing Aegis Combat System to detect and track multiple targets simultaneously while directing the ship's weapons to counter them. The SM-3 is a hit-to-kill missile comprised of a three-stage booster with a kill vehicle. Initially, the Aegis BMD is intend to intercept short, medium, and intermediate range ballistic missiles during their midcourse phase; eventually, it may be developed to counter those missiles in their terminal stage, and to counter strategic ballistic missiles.[19]

[slide] Third is the Airborne Laser (ABL) - a modified Boeing 747 plane equipped with a chemical oxygen-iodine laser. The ABL is intended to shoot down all ranges of ballistic missiles in their boost phase.[20] The ABL programme includes the aptly named HEL, the acronym for High Energy Laser[21]. There are a number of other laser systems being developed, for example through the High Energy Liquid Laser Area Defense System which will integrate HEL onto tactical aircraft and UAVs,[22] and the joint US-Israeli project to deploy the Mobile Tactical High Energy Laser on planes and ground vehicles.[23]

[slide] Fourth is Terminal High Altitude Area Defence (THAAD) which comprises a missile with a single rocket booster with a separating hit-to-kill vehicle that seeks out its target with a specifically designed radar; THAAD missiles are fired from a truck-mounted launcher. It is designed to intercept short- and medium-range ballistic missiles at the end of their midcourse stage and in the terminal stage either inside or outside the atmosphere.[24]

[slide] Fifth is the Patriot Advanced Capability-3 (PAC-3) - it consists of a one-piece, hit-to-kill missile interceptor fired from a mobile launching station, which can carry 16 missiles. The missile is guided by independent radar and is designed to intercept short- and medium-range ballistic missiles in their terminal stage at lower altitudes than the THAAD system. There have been some difficulties with the Patriot missile systems already deployed, PAC-3s shot down a US fighter jet, fired on other 'friendly' aircraft and saw numerous false missile targets during the invasion of Iraq, and an earlier version shot down a British warplane.[25]

[slide] Sixth is the Kinetic Energy Interceptor (KEI) which will be comprised of three boosters and a separating hit-to-kill vehicle. Mobile land and sea based versions of KEI will be developed, and there is the possibility of a space based version. KEI is intended to destroy strategic ballistic missiles during their first minutes of flight when their rocket engines are still burning.[26]

In addition to these weapons systems, there are other elements of BMD which there is insufficient time to detail here - software and hardware for command, control, battle management and communications; new radar systems; and new satellite systems including the Space Tracking and Surveillance System which will deploy satellites to provide tracking data on missiles during their entire flight, and the Space-Based Infrared System-high satellites which will be deployed with sensors on two host satellites to provide early warning of global ballistic missile launches.

And that brings me to weapons in space. As mentioned previously, some of the elements of BMD (such as THAAD) may involve the destruction of missiles travelling through space; and others (such as the Kinetic Energy Interceptor) may eventually be based in space.

There are other weapons planned for space, including the Space Based Laser (SBL) which is designed to destroy missiles in the boost phase while still on enemy territory. The intention behind this is "to induce potential aggressors to abandon ballistic missile programs as they would be rendered useless". The SBL will be a constellation of 20 satellites, each with a high powered laser to destroy targets.[27]

Additionally anti-satellite weapons, which may comprise ground[28] or space launched hit-to-kill interceptors or laser weapons remain a possibility.

Finally for this section, the possibility of new weapons delivery systems through or from space remains high. These include long-range ballistic missiles adapted for conventional warheads; manoeuvrable precision guided re-entry vehicles to deliver a range of munitions; and a re-usable launch vehicle designed to perform a variety of military missions in space, including weapons delivery, and return to earth to be used again.[29]

International treaties and PAROS

[slide] So what controls are there on the development of the weapons systems outlined in this paper?

There appear to be no international treaties or other controls which could prevent the development of future combat systems or most of the BMD systems.

With regard to weapons in space and BMD, the three most relevant international agreements[30] are: the Outer Space Treaty; the Anti-Ballistic Missile Treaty; and the Agreement Governing the Activities of States on the Moon and other Celestial Bodies.

The provisions of the Outer Space Treaty, which entered into force in 1967, are, among other things, that the exploration and use of outer space should be for the benefit of all peoples, that space should only be used for peaceful purposes, and it prohibits deployment of nuclear and other weapons of mass destruction in space. So there is incomplete protection in that Treaty.

The ABM Treaty, a bilateral treaty between the US and the Soviet Union which entered into force in 1972, would have been breached by BMD, but the US unilaterally withdrew from it in 2002. The 2006 National Security Strategy explains that withdrawal thus: "The United States has begun fielding ballistic missile defenses to deter and protect the United States from missile attacks by rogue states armed with WMD. The fielding of such missile defenses was made possible by the United States' withdrawal from the 1972 Anti-Ballistic Missile Treaty, which was done in accordance with the treaty's provisions." [31] Curious wording that makes it sound as though withdrawing from the treaty is in some way complying with its provisions.

The Agreement Governing the Activities of States on the Moon and other Celestial Bodies, which entered into force in 1984, has similar provisions to the Outer Space treaty, and additionally prohibits all weapons testing and the establishment of military installations on the moon and other celestial bodies, as well as any hostile act or threat thereof on or from them. The US is not a signatory to this Agreement.

Finally in this section is PAROS, Prevention of an Arms Race in Outer Space, which is a longstanding agenda item in the Conference on Disarmament. The Conference is the main, but not the only, UN body[32] where discussion towards PAROS takes place, but little progress has been made because of political deadlock - this despite the overwhelming majority of states being opposed to the weaponisation of space.

It has been suggested that progress on a treaty to prevent the weaponisation of space might be fast tracked if some governments were willing to initiate something like the Ottawa process which led to the Convention on anti-personnel mines - and if that were to happen, there a number of outlines of possibilities for what could be included in such a treaty[33]. This would be a useful step forward to deal with this particular issue. However, it does not address the wider issues - prohibiting or preventing the development of one type of weapons system or their deployment in one sphere, is like treating one symptom of a disease, but not the disease itself.

Some costs and consequences

To turn now to some of the costs and consequences of the weapons development outlined in this paper, I'm going to speak first about a specific impact of BMD before moving on to more general comments about the costs and consequences of the weapons developments outlined so far.

[slide] There is one place in particular where BMD has had an actual physical impact - Kwajalein, in the Marshall Islands[34]. In 1947 the US government become the administrator of the Marshall Islands. They promised to protect the people, their island homes and surrounding ocean; and to assist them to move towards independence. Instead they exploded sixty seven nuclear weapons in the Marshall Islands - at ground and sea level, and in the atmosphere. The people were told the nuclear weapons test were "for the good of mankind and to end all world wars". Twenty out of the twenty two populated atolls in the Marshall Islands were contaminated either directly, or by fallout from, the nuclear bomb tests.

In 1958 the US developed a military base on Kwajalein and turned two thirds of Kwajalein lagoon into a missile testing range - Kwajalein became the point of impact for missiles fired from the US mainland and other US bases in the Pacific, and the testing range has been crucial to the development of all US missile delivery systems and BMD.

You will see from this slide that currently the test site at Kwajalein is called the 'Ronald Regan Ballistic Missile Defence Test Site', a name change which dates back to 2001. That name change makes me smile because it is simply too absurd for words.

And if I might digress for a moment, just last month US Air Force News proudly announced that the Vandenberg BMD site too had been renamed ... it is now called the Ronald W. Reagan Missile Defence Site[35].

In explanation, the press release states: "President Reagan simply would not accept US vulnerability to nuclear or ballistic missile attack ... And so he called upon the scientific community in our country, those who gave us nuclear weapons, to turn their great talents now to the cause of mankind and world peace, to give us the means of rendering these nuclear weapons impotent and obsolete."[36] In case you missed the full bizarrity of that, let me repeat it - "he called on those who gave us nuclear weapons, to turn their great talents now to the cause

of mankind and world peace, to give us the means of rendering these nuclear weapons impotent and obsolete."

To return for a moment to Kwajalein, whenever BMD and weaponisation of space is being considered, it is crucial to remember what has been done to the people there - their health and well has been irreparably harmed and their way of life destroyed ... and for what? The insane pursuit of ever more destructive weapons systems.

[slide] The wider consequence of the weapons systems development outlined previously is most likely to be a continuation of the downward spiral of proliferation of all types of weapons, as other nations seek to defend themselves or challenge the United States' full spectrum dominance in whatever way they can.

The "cause of mankind (or of anyone else) and of world peace" will certainly not be advanced by the endless development of new and more powerful ways to kill, destroy and dominate. What will be advanced, is global collateral damage - to borrow one of the unfortunate phrases from military parlance - that is, the damage resulting from an over-militarised world where financial, human and physical resources are diverted into keeping armed forces in a perpetual state of combat readiness, and away from meeting human security.

To briefly illustrate this point, in 2004, global military expenditure amounted to more than one thousand and thirty five billion US dollars - on average, more than 2.8 billion US dollars every day. In that year, as now, an average of twenty nine thousand children under the age of five died every day through mainly preventable causes - lack of access to adequate food, clean water and basic medicines. Global spending on official development assistance is less than 8% of global military expenditure[37]. The estimated cost of the US Army's Future Combat System alone would meet the cost of achieving all of the UN's Millennium Development Goals for two years.

We are now into the fifth year of the 'war on terrorism', the latest excuse to justify armed force and armed forces. It is clear that military responses do not work, as many of us here today have said all along, rather they are making the world a more dangerous place and increasing the threats to human security. Yet governments around the world, some more than others but most are culpable to some degree, carry on as though there were no other ways to behave.

While the US government is demonised by some because of their ever increasing levels of militarisation, it is useful to keep in mind that they are not the only offenders in this regard. All but a handful of governments have armed forces, most are developing or purchasing new weapons systems, and many support weapons manufacturers within their national borders - including companies involved in the production of systems or components for nuclear and space-based weapons. There is inconsistency between what the vast majority of governments say about peace and disarmament, and what they do.

If we look at the situation here in Aotearoa for example, the NZ government does speak in support of the abolition of nuclear weapons, and does maintain the nuclear-weapons-free legislation. However, most of the NZ army logistic support contracts are with Serco Project Engineering Ltd[38], which is a joint venture of two companies, one being Serco Group Plc. As you may be aware, Serco Group, together with British Nuclear Fuels Ltd and Lockheed Martin, manages Britain's atomic weapons establishments where British nuclear weapons are designed, produced and refurbished. How consistent is that with a nuclear weapons free stance?

The NZ government supports and promotes companies involved in weapons related production - one of those companies is Rakon[39], based in Auckland, which manufactures quartz crystals. Up to ten per cent of Rakon's work is military based, and Rakon crystals are used in the global positioning systems for 'smart' munitions; for all we know, their crystals are used in BMD and the development of space based weapons. Rakon was the winner of the 2005 NZ Trade and Enterprise Export Awards. How consistent is that with the government's stated commitment to disarmament?

Ways forward

Which brings me to the final section of this paper - ways forward.

My first comment relates to my previous remarks about consistency - there is a definite need for the linkages between governments, military contractors and weapons manufacturers to be further investigated and exposed, and for public pressure on governments to cut those ties if they are not willing to do that themselves.

Similarly, there is a need to inform ourselves and others about the types of weapons being developed at present for the future; and to place those developments within the wider context of economic globalisation, other historical and ongoing forms of colonisation, and militarisation.

The development of new weapons systems operated by the push of a button can only be remedied by a shift away from the ideology of militarism, and the rejection of the use of armed force as a valid or legitimate way to resolve conflict.

As well as the ongoing initiatives, campaigns and advocacy, perhaps as another step towards this goal it is time to reclaim the first of the three crimes outlined in the Nuremberg Principles - that is, crimes against peace[40] - so that it receives the same recognition in international law and public consciousness as the second and third, war crimes and crimes against humanity.

Our security strategy must be full spectrum peace - at all levels, domestic, community, national, regional and international.

To paraphrase the Outer Space Treaty - earth, as well as space, must only be used for peaceful purposes and for the benefit of all peoples.

Edwina Hughes,
Coordinator, Peace Movement Aotearoa and Co-Convener International Demilitarisation and Disarmament Working Group, Women's International League for Peace and Freedom.

This paper was presented with slides, as marked above, a copy of the paper with images included is available from email

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[40] Planning, preparation, initiation or waging of a war of aggression