

Title: Disappearance battlefield age global targeting

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What I'm going to be talking about today is, in some ways, actually part of it comes out of this book I've been putting finishing touches to, book about logistics perception, about targeting, but also in some ways is a first step beyond that because I'm in some ways trying to think about this issue of the battlefield and the fate, or the future of the battlefield, so some of that actually is still quite preliminary so if anything's a bit rough around the edges, I apologise in advance, but I hope to look forward to your comments.

I suppose the way to start here is really with what we might think of as the classical image of the battlefield, so when we think about battlefields in this kind of idealised fashion, what we tend to think about is a bounded physical space, literally very often a field, in which densely concentrated armies meet often by mutual agreement, even if it's only a tacit agreement, and clash for the duration of a single day.

But it's not only a physical space, of course it's also a normative space, that's to say it's a space in which certain rules, certain laws, certain norms prevail. And those norms are different from that of civilian life. This is a space, an exceptional space, in which individuals can kill and be killed absolutely legitimately, which is normally prohibited you would think in other social spaces.

And importantly they are not killed by, and they don't have the right to kill, not by virtue of their individual identities, they are entitled to do so, permitted to do so through their association to a larger collective, whether that collective is formed through allegiance to a cause or to a political community or even a

simple provision of their services for monetary compensation. You kill as part of a collective, not as part of an individual, and you are permitted to kill others on that same basis.

In the ideal, we also tend to think of the battle as something that, or a course of action in which a decisive outcome is produced, one side defeats the other and perhaps it might even decide the fate of the wider war. And with that, the restoration to a state of peace. A famous theorist, Carl Von Clausewitz, theorist of war, talked a lot about the decisive battle, very insistent that what good military leaders sought was to find a battle in which they put in all their forces and reached a decisive outcome that could then bring conflict to an end.

Now this traditional figure of the battlefield arguably still persists heavily in our collective memory, when we think about past wars, we tend to invoke particular battles. Around our cities, we have monuments, we have sights that commemorate battles: Trafalgar, Waterloo and so on. Our media, our cultural representations also full of battles, whether it's the fictionalised versions of all the rings in Star Wars or historical films, when you want to show war, when you want to invoke war, you show battles.

But in reality, actually the battle and the battlefield has all, I will submit, all but disappeared from the contemporary landscape of war. Mass concentrations of force pitted against each other in combat seem to play an increasingly peripheral role. Outside of the special case of urban [seeches 3.41] where we might still see some of that, infantry troops are typically scattered across terrain, move in small units and are involved in sporadic skirmishes, even more markedly, the last major tank battle took place over 25 years ago in the Gulf War and it was a remarkably one sided battle at that. On the seas, there hasn't been a large scale naval battle since World War II. So the battle is really going out of fashion.

What we see instead, because the disappearance of the battle doesn't mean the disappearance of war or the disappearance of organised military violence, what we seem to see is a much more punctual unleashing of military violence that doesn't conform to any spatial [contiguity 4.34] or temporal continuity. Targeting appears truly globalised or increasingly so, designed to deliver lethal force anywhere a threat is identified.

In a classified memo from 2004, Donald Rumsfeld put it quite simply 'today' he says 'the entire world is the battlespace'. Indeed the move is from the battlefield to the battlespace increasingly but I'll return to that shift in a moment.

But of course to speak of a global battlefield or global battlespace is actually tantamount to saying that there's no such thing anymore because you're no longer making a distinction between the battlefield and what is outside, you no longer have a space of exception, you have simply, well that distinction quite simply collapses.

So the spatial dimension or the spatial exclusivity of the battlefield seems to be waning but also we see conflicts in which at the same time the clear temporality of conflict that we are used to also seems absent. Declarations of war and armistices are out. The United States has not declared war on anyone since 1945. You know full well that that's not synonymous with lack of military action. And accordingly, peace treaties and armistices are likewise absent.

Wars seem to simmer on indefinitely punctuated by sporadic operations and certainly not settled by an all mighty clash of arms by some great decisive battle that ends the war. Of course we live in the age of the global war on terror or, as the conflict has been renamed by the Obama administration, probably more accurately, overseas contingency operations. And that tells you everything you need to know about what the war on terror is. It's

contingent, sporadic, it can happen at any particular time or moment and it's clearly indefinite in time.

A further evolution I think that we can see today is that the anonymous and accidental enmity of soldiers, so you end up fighting another man, another individual purely by your accidental associations, you don't know who they are apart from that particular association, that seems to be giving way increasingly to the targeting of specific individuals on the basis of either their known identities, listed terrorists for example, or at least their observed patterns of behaviour and association, we don't actually know who this person is but their mobile phone communications and their associations recorded through intelligence suggest that they are dangerous at the very least.

Now all of this may well suggest that the battlefield is therefore in a state of terminal crisis and with it, a certain conception of war. But in truth, the battlefield has been in crisis for quite some time. In fact the more I think about this question, the more I study it, the more I wonder whether the battlefield has not always been in crisis, not always been something that has actually been questioned. Or perhaps the battlefield has only been a very brief, early modern interval and an inconsistent one at that.

Well while the classical model of the battle was still absolute dominant in the Napoleonic era, I mean, in retrospect maybe that was the apogee of the battle and it's perhaps no coincidence that Clausewitz is writing in the aftermath of the Napoleonic wars in which he participated, so perhaps no wonder he thought the decisive battle was so important because that's something that Napoleon perfected but actually that wasn't typical of warfare prior to Napoleon and increasingly not also typical of what came later.

This is quite emblematic of the battle, dense concentration, a teeming mass of people, physical immediate contact between forces, combat conducted over the course of a single day.

But already by the second half of the nineteenth century, commentators were noting a creeping extension of the battlefield and a dispersal of the troops upon it, so that by the time the First World War had settled into protracted trench warfare, the battlefield was looking like a very different place.

A key to this transformation was the increased range accuracy and therefore lethality of firearms. All of which were made possible by innovations in barrel rifling, [9.23] bullets and smokeless propellants.

So to give you an idea of the technological evolution here, revolution perhaps more appropriately, you have to think that early muskets, so the kinds of weapons that would have been available in Napoleon's time, they could not exceed aim ranges of 75 metres, so beyond 75 metres you simply couldn't aim at anything. So the most effective strategy in these early days of firearms was to amass or line up soldiers and have them fire their weapons at the same time, throw a wall of lead at the enemy and you're going to sure something is going to hit.

By the First World War, it becomes possible for snipers to hit targets at distances of 300 metres, indeed the whole category of the sniper appears in the nineteenth century, it's not a particularly meaningful category prior to that because simply that tactic is not available with the technology of the day. #

If we look at contemporary practices, today trained skilled snipers can reliably hit a target at about 1200 metres, so about four times that, in fact probably the biggest obstacle to firearm position today is the visibility range, so how far you can actually see, it's not how far the weapon can have a true aim.

There's a similar story for artillery. The US Civil War, you could effectively target only something that was about within visible range. By the First World War, you can hit targets at 20 kilometres in distance. So this means two things. First of all, an increased vulnerability of exposed forces, so if you can be seen on the battlespace, there's a very large battlefield, very large, very

great chance that you're going to be hit. And so where protective cover is unavailable, concentrations of forces is a bad idea, it draws attention and of course if there's a hit, which will cover a certain area, you're likely to incur large losses.

The second, it also mean a reduced need to amass forces in order to have effect, as I said, earlier days what you needed is to have a line of soldiers, maybe several lines of soldiers firing in quick succession and that was the way to create effects on the battlefield.

But now you've got very precise weapons, you don't need as many soldiers in order to have a similar effect. So both effects, this increased vulnerability of exposed forces and this reduced need for the massing of forces both contribute to what became referred to as the emptying of the battlefield. Increasingly the battlefield becomes distended, troops become much more dispersed across it, indeed you have the appearance of the no man's land in the First World War, a space between forces where there are no one, there is literally no one.

But this process goes on beyond the First World War and here's a fairly [12.33] table that shows you the distribution or the changes in the expansion of the battlefield and the corresponding dispersal of forces from antiquity until the Persian Gulf War. And what you can see is particularly from the First World War onwards is dramatic increase in the size of area of operations, in the length of the front and in the depth of the rear, to that of course we could also add the volumetric expansion into the airs, the battlefield from the First World War onwards is no longer something that simply happens on a horizontal surface, you also have the vertical, the elevation and air power of course is a crucial part of contemporary warfare. This is perhaps the birth of the battlespace as opposed to the battlefield.

To this increase of the area of combat, we see a corresponding sharp fall in the density of the occupation of the battlespace. What you can see is the

numbers of soldiers per square kilometre keeps falling and the area occupied by each soldier keeps increasing.

This is accelerated in the twentieth century by two further factors. So I've mentioned the importance of increased precision and lethality of firearms, but you have to consider two other phenomena. First is the increased mobility of forces permitted above all by motorisation, so land vehicles, air vehicles, you can move troops around very fast, so of course therefore you can cover a lot more ground. And secondly, the development of information and telecommunication technology so that you can coordinate remote units, indeed one of the problems when you start dispersing on the battlefield is you lose unit cohesion, ability to communicate, you need modern wireless telecommunications effectively to make that happen and that's developed dramatically through the twentieth century.

I mentioned the importance of airpower and here again we can see the increased accuracy of targeting developed from the Second World War onwards. And the move in the last decade into what's called precision guided munitions, bombs guided by laser or by GPS technology. That again is a dramatic increase in the accuracy of targeting. We go from about 9,000 bombs required for the destruction of a target in the First World War and here we're talking about a building sized target, it's quite a big target. We've moved to today to one, maybe two if you want to be sure, munitions to hit a target. So it's dramatically changed the economy of force.

Something else also happens in the twentieth century that contributes to solver the boundaries between spaces of war and peace, military and civilian domains. That is to say that war becomes increasingly total. To be at war in the twentieth century or to be at total war is to call upon the entire sum of a nation's industrial and popular resources. So what is created in this period of course and what it emerges is the home front.

So the classical idea of the front is simply where the enemies meet, where enemy lines will forces -, where the lines end, but increasingly because war depends on the logistical industrial popular support of the military forces, then these become essential components of the struggle. You need the domestic societies to be equally mobilised, you need agricultural power, you need industrial power, all of these mimic or participate in the overall constitution of combat power. Big guns of the home front echo those of the military front.

A note that this is something that happens across all the societies involved in total war, so it's almost a functional prerequisite, it hasn't actually got much to do with the political ideologies involved. Just to give you a couple of other examples, here's a poster from Nazi Germany that tells us 'you are the front' and on the right a soviet poster joins us to, or says that 'everyone must go to the front' and that means of course the factory as well as the combat front.

So on the total war, victory increasingly appears to hinge on the superior mobilisation of one society and on the endurance of the industrial and logistical infrastructure necessary to support one's military's actions.

Indeed, in this period, it's quite clear that battles were no longer seen to be able to settle wars. [17.51] battles extend dramatically. In the First World War we had battles that last a month, that span vast expanses. Same can be seen again in the Second World War. But critically they're not decisive battles. The Germans notably have quite dramatic early tactical successes in the First World War with Blitzkrieg but that doesn't amount to anything and they can't convert that into strategic success because, in the end, these are wars of attrition, you win by innovating the enemy's society and economy to the point of collapse. As long as you can withstand the attrition you'll prevail.

But of course if war becomes about prevailing, about surviving attrition, then the foundations of military strength are in turn targeted. If your enemy strength is no longer simply in the military but in the industrial logistical base then quite logically you start targeting that.

This is most exemplified of course by the tactic of strategic bombing, so airpower allows militaries to reach deep into the enemy's societies and to target their industrial base, their logistical infrastructure. Airpower in the tactics of strategic bombing most perfected let's say in the Second World War by allies against Germany and Japan is directed towards degrading the adversary's war making capability.

What that leads to is extensive studies of the enemy's society industrial base and infrastructural choke points. What you need to do is analyse the enemy's society in its totality to understand how it works, what are the crucial components of its industrial resources, so here we have an air target indexed by the US joint target group for the [19.45] area in Japan and what's listed here are aircraft construction sites, airports, arms manufacturers, automobiles, building materials, chemicals, coal, electric power, harbour facilities, machinery and so on. Sites are identified, coordinates are set, targeting priorities are established, what you are doing is systematically dismantling, or trying to anyway, dismantle the industrial infrastructure of that society in order to sap its combat power. So targeting has now extended itself way beyond the conventional targeting of military forces.

But strategic bombing was not only about targeting the physical infrastructure, it was also about targeting the morale of populations. So if your ability to keep fighting also depends on the popular support and popular willingness to suffer then you need to attack that as well. You need to attack, as the United States strategic bombing survey shows, you need to attack their will to resist by killing, by wounding, by evacuating, by depriving of utilities, by destroying homes, all of that will sap morale, at least that's the theory.

Indeed, what seemed to happen in the Second World War was the original plan to destroy the industrial infrastructure proved to be quite slow or ineffective, largely because targeting is quite imprecise, so you need 9,000 bombs to hit a target, that's going to be quite a slow process. And notably in

Japan but also in Germany, the allies progressively moved towards simply mass targeting of urban cities, notably through fire bombing and incendiary bombs. For example, one night's bombing of Tokyo in late March 1945, 100,000 Japanese civilians were killed and that's more than even atomic bombing. So to understand that populations were being explicitly targeted and annihilated in very large numbers, again on the assumption that eventually this would lead to the collapse of the support for the war.

Now the Cold War that came after the Second World War is in many ways an extension of that logic. Although the nuclear super powers soon determined that a full blown military exchange had to be averted, that you really wouldn't be able to find or to win a war like that or at least what would be left would be barely worth any political objectives you could set, nonetheless, if you were going to avoid the prospect of war, you have to plan every detail of such a conflict and that's the whole theory of deterrents, in order to persuade your enemy not to attack, you have to show them that you are willing, able to counterattack at the drop of a hat and effectively annihilate their society. So even if you don't want war, the best way not to have war is to prepare for war in painstaking detail.

And indeed, that's what the US and Soviet militaries did. Very early on, immediately after the Second World War US military set to work on what became known as the bombing encyclopaedia of the world. So that's an extensive catalogue of all the targets that you might need to hit in a major war. The primary objective of the encyclopaedia was in the words of one of its main initiators, to conduct a pre analysis of the vulnerability of the USSR, to strategic air attack and to carry that analysis to the point where the right bombs could be put on the right targets, could [23.38] with the decision to wage the war without any intervening time period whatsoever.

Right, so you need to have already worked out every target that you're going to hit if World War III breaks out and so extensive production of this is a targeted intelligence form, a sample form, so input this computer processable

forms that would list particular targets, again based on very similar kind of assessment of the industrial infrastructural base of the soviet state and you would develop your war plans on that basis.

By 1960, the encyclopaedia contained about 800,000 target listings across the Soviet Union, China and the Soviet Block. If a full-blown nuclear war had been launched against the Soviet Union, US estimated that casualties would be around 250m.

The Cold War that's definitively installed a set of institutions and rationalities directed toward the initiation of a global nuclear war at the shortest notice and one which would have scarcely distinguished between civilian and military targets. And whether such a war would have involved meaningful battles opposing conventional forces, well we simply don't know. It rather depends on whatever you think might be left after the initial exchange of nuclear fire, perhaps not much at all.

Yet while the Cold Wars defined by the permanent horizon of a global war that would happen everywhere at the same time, it's a rather different spatial temporality of conflict that's emerged in its wake. So in a sense, the Cold War was an expansion, a logical, the end point if you want of the expansion of the battlefield that had occurred in the First and Second World Wars where the battlefield is going to be everywhere, it's going to be all the time or at least for the time that that war lasts, but that was almost a kind of logical end point but also the point of impossibility, where war simply could not be pursued on that basis, at least logically and rationally.

But that doesn't mean of course that war has disappeared all together, so we see different kind of mode of violence emerging, I think starting to appear within the Cold War it's a kind of substitute for a war that just can't happen but taking quite definite shape I think in the post Cold War era.

And perhaps this is an era in which war definitely gives way to something different, what [26.34] refers to as states of violence, temporality discontinuous and geographically disparate states of violence. So rather than any kind of continuity, rather than any homogenous spatial temporal clearly delineated war, what we have are these states of violence that conjoin distant points on the globe for brief moments in space time.

If we want to understand how we've come to that point, we again need to follow the evolution of targeting and the countermeasures deployed against it.

The US air force acts today to boast that is nuclear and conventional precision strikes forces can credibly threaten and effectively conduct global strike by holding any target on the planet at risk and, if necessary, disabling or destroying it promptly, even from bases in the continental United States. And whether that is actually the reality today or not, that is clearly the goal and the objective of an advanced military like US, to be able to strike any point on the globe at the shortest notice.

And so what we are seeing is increasingly granular and individualised mode of targeting. In a way, it's almost completely the opposite to the plans for nuclear war which have been completely indiscriminate, here it's incredibly or at least intended to be incredibly discriminate and granular.

We can see this evolution through the development of the concept of the kill box. The kill box is a military operational concept developed within the US military originally in the context of the Persian Gulf War and it refers to three dimensional areas that are designated as three fire zones, so if you create a kill box, the military official demands for the creation of a kill box, you get a dual referenced box, so three dimensions, created in some space and for limited period of time and then within it, you have authority to effectively fire at anything at will.

But in the 1991 Gulf War, the kill box referred to vast volumetric areas, I mean, the areas the size of the city of New York, they're very large areas, they're effectively meant to be areas that you would patrol with aircraft as part of the aerial [29.21] Iraqi forces, so you would send the US air forces and if they saw Iraqi tanks and so on, they had the authority to fire at them.

But the kill boxes had a rather different life, or at least a changed, reformed life in the global war on terror, where it had been particularly deployed with use within -, for uses outside of recognised war zones, so places where the US is not formally at war and against targets that are perceived threats to national security. Frequently, single individuals whose identifies or patterns of behaviour and association marked them as fit for elimination. I'm thinking particularly here of the so called policy of targeted killings.

So here, the kill box increasingly refers to very small spaces, quite constricted spaces because the target is often a single individual and these kill boxes really work as a way of opening up spaces, brief spaces of violence in areas that are otherwise not officially warzones. So you could see the usage is quite different from the context of the Persian Gulf War. These become spaces where US can operationally and also legally on the understanding of the laws of war, create a very constrained both temporally and spatially space in which killing can take place.

So whereas, sorry I should say the US ends up therefore justifying drone strikes in Pakistan, in Somalia, in Yemen, as being part of a single arm conflict, so in order to counter claims that you're conducting military operations in areas that are not at war, the claim that the US has been making is that actually all these parts of the world are part of a single armed conflict, this global war on terror, if you want. And therefore they don't need to be official warzones in order for the US to legitimately strike at its enemies.

And this is hugely significant when we think about, because whereas the use or the exercise of armed force used to traditionally occur within the existing

battlespace or warzone, so you went to war and now you have a warzone of you have a battlefield, a space that's delineated as a space of conflict; now you can kill people within that space, that's the traditional idea of the battlefield, if you want.

Here, the relationship is being reversed. It's now increasingly the presence of the target, wherever it may be, that justifies the use of force in that location, so once you identify a potential target, that becomes a space of war, or at least a space of war that can be opened up for the brief moment that kill box appears, is open and then closed.

A skill again tends to increasingly contract to the singular body of an individual target. So that the individualisation of targeting that's taking place has seen the US move increasingly towards redefining the legitimate space of war as wherever a designated target finds itself inverting the customary precedence of the former.

So what we are seeing in many ways is a shift in the rationale of targeting. Not only so in the way that I've been talking about but also in terms of how the targets are conceived. Previously, targeting in war was based on, founded on status based on targeting. So you targeted units, formations, equipment that defined them as enemies. Ah this is an enemy tank, this is enemy forces in uniform.

Whereas increasingly what we're moving towards is identity based targeting against individuals but also against cells and networks, in fact increasingly the kind of model for targeting for the enemy is that of the network, you were trying to eradicate a terrorist network and you're mapping that network through communication, through associations and you target that network by targeting the nodes, which happen to be individuals.

But again, it's not by clear association with an enemy force because in many cases you don't quite know which -, these are not formal organisations, the

Taliban or Al Qaeda are quite ill-defined organisations. They're certainly not state militaries and individuals are targeted less on the basis of their membership than on the basis of patterns of behaviour.

So we have a quite different spatiality to violence in the early twenty first century. And this spatial characteristic of contemporary warfare is further complicated by the remote operation of weapon systems, from control posts thousands of miles away. Because these are control posts for drones based in New Mexico. If you think about it, these operatives sitting in these air conditioned trailers in the United States are simultaneously occupying the physical space in which they're sitting, domestic US, and through their tele-presence, they are in the space of war.

As the operatives of these drones often say once you walk into this cabin you are in Afghanistan or you are in Pakistan where the operation is taking place. Then it ends, you leave, drive home and have a BBQ and play with your kids.

This is in a way a collapsing of the spaces of war and the spaces of peace and not only must be quite jarring for the individuals who do so, but we might want to think about the logic of this. You know, are we not implicitly implying, entailing that operatives based in the United States are in fact legitimate targets outside of, well outside of their bases or anywhere, where does the battlefield end or not. The retaliatory logic to this is clearly eventually for individuals to be perhaps targeted as active participants in a conflict despite being physically thousands of miles from it.

I mean, a further consequence of this remote control of weaponry is this establishment of a radical asymmetry between combatants. The traditional reciprocal exposure to risk that defined war; you go to battle knowing that you're risking your life as your adversary is. This is vanished of course here. One side is utterly vulnerable and the other is utterly immune.

And this is paralleled by the absence of mutual recognition that the enemy is not being recognised as a symmetrical adversary, as a legitimate armed combatant, they are treated in any way as unlawful combatants that occupy a kind of grey zone, a kind of legal limbo and so we lose any kind of symmetry, any kind of mutual reciprocity or mutual recognition that was one of the requirements of the traditional battlefield, in many ways to have a battle you need both sides to agree to have a battle, to accept the kind of physical and normative space as the space of context. This of course doesn't prevail here.

As [37.41] has suggested, the use of armed force increasingly comes to resemble the model of the hunt rather than that of the war. So it's the relationship between the hunter and the hunted that defines the drone operation much more than the classical exchange of or combat of equals that we might think of as war. And of course if the hunt is the model then the hunted are compelled to increasingly adopt evermore radical forms of concealment.

It's true of course that the dramatic increase in the accuracy and the range and the lethality of weapons has produced longstanding efforts to counter the vulnerability engendered by their exposure, all sorts of countermeasures have been devised involving techniques that very much resemble that of predator/prey interactions in nature. So for instance, go back to the turn of the century, one of the things that appears precisely at the time where weapons become more accurate is a radical change in uniforms, so out are the bright conspicuous uniforms that were the pride of regiments that allowed the troops to identify themselves on smoke filled battlefields in which it was much more important to be seen, out are those colourful uniforms; in are drab earth coloured uniforms designed to let you blend in to the environment because it reduces your exposure, it reduces your visibility.

And of course the techniques of what became known as camouflage become increasingly sophisticated, not simply earth coloured uniforms but complex disruptive patterns purposefully using markings and colour contrasts to break

up the form of the body and to hinder its recognition. Of course major inspiration for camouflage is in the natural world where again prey tried to evade their predators through complex forms of camouflage that disguised them.

With the extension of military perception into the electromagnetic spectrum, infrared, radar and so on, countermeasures also similarly evolved. The development of stealth, this is a mock F17 being tested in an [40.17] chamber effectively measuring the radar cross section, so you start designing aircrafts, boats and so on so that they will be less visible, less detectable to radar or perhaps to infrared.

So there is in a sense a kind of long catalogue of technical countermeasures to increase perception and corresponding targeting. But we also encounter a more fundamental and [40.46] radical set of responses, responses of generalised concealment, dispersion and expendability.

The first of these is to simply shift the arena of conflict to physical terrains in which the military's perception and its various technologies are significantly hampered. Been a longstanding practice of weaker military forces to retreat to jungles, to forests, to mountains, to dissimulate themselves, to find natural cover from modern armament. Perhaps today in the twenty first century, the increasing site for this is the city, urban warfare is a space in which you can negate some of the advantages of the most advanced militaries. And of course you also have the option of going underground. The [41.45] did this very effectively throughout the Viet Nam war, so effectively that they could have underground tunnels below American bases for years before the Americans realised that swarming below them were hundreds of [].

A second response is characterised by the adoption of principles of dispersion and expendability. Military theorists in the United States have been talking since the 1990s about the tactic of swarming. So again if you think about the

traditional conception of tactics on the battlefield, these were so called linear tactics, you'd line people up and you advance on the enemy.

This evolves progressing into non-linear phases where people become increasingly dispersed and spread out. Swarming is, if you want, the end point. The logic of swarming is what you do is then entirely disperse on the battlefield, reduce your exposure and your concentrating as much as possible and then pulse on an enemy target in a coordinated fashion so that you concentrate your forces for the briefest of moments before you disperse again.

This comes to the fore in the 1990s because to do swarming effectively, you need tele-communications, you need modern communications and even radio is not sufficient, what you need is geographic information systems, the sharing of data and so on. Swarming has become an aspiration for the US military but actually something that more low tech organisations have done quite well. Think for example of the attacks in Mumbai or in Paris, small units moving fast using mobile phones and smart phones to coordinate their operations.

Increasingly, swarming in advanced militaries is being thought of in terms of robotics, so the next generation of robotics is likely to be not the major large platforms like the drone but lots of small, sometimes almost microscopic drones or robots that will be semi-autonomous, that will communicate with one another, that will use principles of swarm intelligence that we recognise in ants and other swarming animals and be deployed across the battlefield.

And let's talk about billions of these robots being unleashed on the battlespace. And of course not only they can swarm, but they're also expendable, they're cheap, they're going to overload the enemy who simply won't be able to target all of them, they will overwhelm the adversary's perception and weapon.

Again, there's a low tech equivalent of the model of expendability, the suicide bomber who covertly weaponises their body.

Finally, there's the strategy of generalised concealment. Or the Iranian philosopher, [44.43] calls hyper camouflage. Hyper camouflage for [] is the silent and fluid military infiltration of civil society by antagonists who endeavour to veil their intentions until the very moment of their assault. In other words, you completely vacate the space of war, you set yourself deep into the enemy's society and you reveal yourself at the last moment.

This participates in []'s term in a process of endo-militarisation of peace by dissolving any notion of the battlefield as a delineated space, by collapsing the respective categories of war and peace and the spheres of the military and the civilian. And of course what this induces is the increasing placing of entire citizenry on the ever greater suspicion. The state in turn enacts a form of retro militarisation in which the teeth of the state flow back down the tail.

So hyper camouflage draws processes of targeting to domestic societies that are now conceived as battlespaces in potential.

Perhaps in this light, the latest operational concept gaining ground in the US military is peculiarly revealing. This is the so called combat cloud. This is an idea that's been gaining some ground in the last two years and it draws its inspiration from civilian applications of cloud computing. Cloud computing is the idea that you don't need to have all the data and all the processing power in your local machine, you can have it stored up in the cloud, so to speak, and you pool and distribute resources and data through the internet in order to meet the specific demands of users.

So the combat cloud is really an attempt to replicate that logic at the military scale. The emphasis is on the centrality of network connectivity and data management and within the notion that the combat cloud ends up advancing a vision of highly distributed operations able to spontaneously access the relevant information, assemble the necessary capabilities, to nullify any emergent threat regardless of where it may be.

As its most prominent promoter, General David [47.23] puts it, linking operations across all domains with accurate information can be the basis of creating an omnipresent security complex that is self forming and, if attacked, self healing. This kind of complex can enable a deterrent effect that would induce stability wherever employed or achieve decisive outcomes if force application is actually required.

So we have the vision of a omnipresent security complex that might be the response to hyper camouflage if you want, a principle of military operations that doesn't recognise distinctions in spaces of war and spaces of peace, that responds in a timely fashion to wherever threats are identified.

So perhaps the final consequence of the erosion of the battlefield and with that of the normative restraints that are associated with the concept of the battlefield may end up leading militaries to deploy their targeting to strike any perceived threat wherever it may be, including in their domestic societies, because if we're no longer able to compartmentalise war, if we're no longer able to distinguish in spaces of peace and war, what we are likely to see is the perpetual punctuated eruption of conflict at the heart of domestic societies and no longer spaces or intervals of peace and war.

Thank you.

[Applause]

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