

Lines of descent

Derek Gregory

‘It is a queer experience, lying in the dark and listening to the zoom of a hornet, which may at any moment sting you to death. It is a sound that interrupts cool and consecutive thinking about peace. Yet it is a sound – far more than prayers and anthems – that should compel one to think about peace. Unless we can think peace into existence we – not this one body in this one bed but millions of bodies yet to be born – will lie in the same darkness and hear the same death rattle overhead.’

Virginia Woolf, *Thoughts on peace in an air raid* (1940)

The distance of death

Virginia Woolf composed her brief essay in August 1940 during the Battle of Britain. The Heinkel and Dornier bombers in the night sky over London must seem a world away from the buzzing of Predator drones over Pakistan, but there are genetic pathways between Woolf’s hornets and what the Pashtun now call the *machay*, the bees that have their own deadly sting. Daniel Swift, the author of *Bomber County*, a haunting study of bombing during the Second World War, claims that ‘We live today in a world made by bombing; Britain and America still fight wars under the impression that they may be won from the skies, and today’s Predator drones in Afghanistan

and Pakistan are the direct descendants of the Heinkels and Lancaster bombers of the Second World War.’¹

These are very different sorts of war, but there are several senses in which today’s drone wars in the global borderlands were anticipated by the advocates of what has variously been called ‘progressive’ or even ‘beneficial bombing’ in the 1940s: ‘progressive’ because air war was supposed to be short, sharp and decisive, avoiding the protracted carnage of trench warfare.

² In 1942, six months after Pearl Harbor, A.P. de Seversky could already see a future in which bombing would be conducted over such vast distances that intermediate bases – like the United States Army Air Force bomber stations being prepared in Britain – would be unnecessary: ‘The entire logic of aerial warfare makes it certain that ultimately war in the skies will be conducted from the home grounds, with everything in between turned into a no-man’s land.’³ By the end of that year, when Germany had successfully tested its first ‘Flying Bomb’, it was even possible to imagine bombers without pilots.

¹ Daniel Swift, ‘Bomb proof’, *Financial Times*, 4 September 2010; idem, *Bomber County: the poetry of a lost pilot’s war* (London: Hamish Hamilton, 2010; New York: Farrar Straus and Giroux, 2010).

² Mark Clodfelter, *Beneficial bombing: the progressive foundations of American air power, 1917-1945* (Lincoln: University of Nebraska Press, 2010). That said, Swift, *Bomber county*, p. 38 claims that ‘bombing to the Second World War was what the trenches were to the First: a shocking and new form of warfare, wretched and unexpected, and carried out at a terrible scale of loss.’ In fact it was neither new nor unexpected, but the unprecedented scale and scope of strategic bombing confirmed the predictions of the so-called ‘prophets’ who believed that air power would create a ‘new battlefield’ limited only by the boundaries of the belligerent states – the distinction between combatant and civilian would be lost forever – and, crucially, that ‘command of the air’ would be of decisive importance to the outcome of the war. See, for example, Giulio Douhet, *The command of the air* (trans. Dino Ferrari) (Tuscaloosa AL: University of Alabama Press, 1988 (first published in Italian in 1921).

³ A.P. de Seversky, *Victory through air power* (New York: Simon & Schuster, 1942) pp. 138-9. Seversky was lionized by Walt Disney in an animated film version the following year that celebrated the prospect of devastating air raids against Japan.

Soon after D-Day in June 1944 Germany launched a barrage of V-1 and V-2 rockets against Britain, and in response the USAAF toyed with Operation Aphrodite, in which hundreds of worn-out B-17 Flying Fortresses ('Weary Willies') filled with high explosives and a new weapon, napalm, would be directed to targets in Germany from accompanying aircraft using television cameras mounted in their Plexiglas noses and remote ('robot') control. Test flights showed that the aircraft would crash at best within a mile and a half of the target, and only fifteen, unsuccessful missions were flown. Still, General Arnold's staff argued that robot aircraft were more accurate than radar bombing, and Arnold asked for further research into remote controlled, television-assisted aircraft that could 'fly over enemy territory and look through the leaves of trees and see whether they're moving their equipment.' On VJ Day he predicted that 'the next war may be fought by airplanes with no men in them at all.'⁴

There is another, equally powerful sense in which distance threads through the genealogy of bombing. The production and articulation of what is now called the kill-chain typically works to render bombing an abstract, purely technical exercise for those who execute it.⁵ Here is Len Deighton describing the target maps used by Bomber Command for its area bombing

⁴ Donald Miller, *Masters of the air* (New York: Simon & Schuster, 2006) pp. 299-303, 415; Ronald Shaffer, 'American military ethics in World War II: the bombing of German civilians', *Journal of American History* 67 (1980) 318-334: 326-7; Michael Sherry, *The rise of American air power: the creation of Armageddon* (New Haven: Yale University Press, 1987) p. 187. The radio remote-control system could not handle take-offs, and so volunteer crew took the aircraft up 2,000 feet, when they handed control to operators in the 'mother ship' before parachuting to safety.

⁵ Derek Gregory, 'Doors into nowhere: dead cities and the natural history of destruction', in Peter Meusburger, Michael Heffernan and Edgar Wunder (eds) *Cultural memories* (Dordrecht: Springer, 2011) pp. 249-282.

of German cities under cover of darkness. These were bare-bones affairs, printed in black and magenta so that they could be read in the dim amber light of the navigator's table: 'The only white marks were the thin rivers and blobs of lake, and the roads were purple veins so that the whole thing was like a badly bruised torso'. The cities became 'just shapes, like the ill-defined blurs that passed across the H2S radar tube,' he continues, and 'that, of course, was the whole idea': 'The new grey faceless maps were just one aspect of a new kind of war.'⁶ And here is Graham Swift describing a photo-interpreter's bomb damage assessment:

'I looked down with a privilege no pilot ever had on target after target. Before and after... I learned to distinguish the marks of destruction – the massive ruptures of 4,000-pounders from the blisters of 1,000 pounders and the mere pock-marks of 250 pound clusters – and to translate these two-dimensional images, which were the records of three-dimensional facts, into one-dimensional formulae – tonnage dropped as against acreage devastated, acreage destroyed as against acreage attacked (the tallies never included "people", "homes")... And as operations progressed, the statistics grew larger, the images more other-worldly, more crater-ridden, more lunar.'⁷

These are not novelists' flights of fantasy. A veteran of Bomber Command considered it 'one good thing about being in an aeroplane at war' that 'you never see the whites of their eyes... You drop a four thousand-pound cookie

⁶ Len Deighton, *Bomber* (London: Jonathan Cape, 1970; reissued by HarperCollins, 2009) p. 383.

⁷ Graham Swift, *Out of this world* (New York: Vintage 1993; first published 1988) p. 47.

and kill a thousand people but you never see one of them.’⁸ ‘A German city was always this,’ wrote a navigator, ‘this hellish picture of flame, gunfire and searchlights, an unreal picture because we could not hear it or feel its breath. Sometimes when the smoke rolled back and we saw streets and buildings I felt startled. Perhaps if we had seen the white, upturned faces of people, as over England we sometimes did, our hearts would have rebelled.’⁹ But they rarely did. One Lancaster pilot thought it just as well ‘that no picture came into his [navigator’s] mind of shattered limbs, of burning clothing, of living bodies crushed by rubble. He only saw a coloured target-indicator, as he squinted through his bomb-sight and thumbed the release button.’¹⁰ After his first raid another wrote that the fires burning below ‘looked like sparkling diamonds on a black satin background... [T]hey weren’t people to me, just the target. It’s the distance and the blindness which enabled you to do these things.’¹¹ This was a common sentiment, and Charles Lindbergh saw it as the very diagnostic of modern war, where ‘one kills at a distance, and in doing so does not realize that he is killing’. Far from imagining ‘writhing, mangled bodies’ on the ground below, he wrote in 1944, it was like ‘viewing it on a motion-picture screen in a theater on the other side of the world.’¹² Many critics believe that Lindbergh’s metaphor has been realized – and radicalized – in today’s drone wars, where

⁸ James Taylor and Martin Davidson, *Bomber Crew* (London: Hodder & Stoughton, 2004) pp. 282-284.

⁹ Don Charlwood, *No moon tonight* (Manchester: Crécy, 2000; first published in 1956) p. 131.

¹⁰ Jack Currie, *Lancaster target* (Manchester, Crécy, 1997) p. 79.

¹¹ Taylor and Davidson, *Bomber Crew*, pp. 283, 447.

¹² Charles Lindbergh, whose wartime journals are quoted in Sherry, *Rise of American air power*, pp. 209-10; although Roosevelt was suspicious of Lindbergh’s involvement with the America First movement and refused to reinstate the Air Force commission that he had resigned after Pearl Harbor, Lindbergh flew tactical combat missions in the Pacific in 1944 as a civilian technical adviser.

the pilots of Predator and Reaper aircraft are not thousands of feet above their target in Afghanistan or Pakistan but usually thousands of miles away in the United States. More or less as Arnold had foreseen, they view full motion feeds on their screens and in that moment, seemingly, war is turned into a videogame.

The problems with killing from a distance are legion. The human operator ‘is terribly remote from the consequences of his actions; he is likely to be sitting in an air-conditioned trailer, hundreds of miles from the area of battle.’ He evaluates ‘target signatures’ captured by various sensor systems that ‘no more represent human beings than the tokens in a board-type war game.’ The rise of this new ‘American way of bombing’, as it’s been called, has two particularly serious consequences. First, ‘through its isolation of the military actor from his target, automated warfare diminishes the inhibitions that could formerly be expected on the individual level in the exercise of warfare’. In short, killing is made casual. Secondly, once the risk of combat is transferred to the target, it becomes much easier for the state to go to war. Domestic audiences are disengaged from the violence waged in their name: ‘Remote-controlled warfare reduces the need for the public to confront the consequences of military action abroad.’

All familiar stuff, you might think, except that these warnings were not prompted by the appearance of Predators and Reapers in the skies over Afghanistan and Pakistan. They appeared in *Harper’s Magazine* in June 1972, the condensed results of a study of the US air war in Indochina by a

group of scholar-activists at Cornell University.¹³ As they suggest, crucial elements of today's 'drone wars' were assembled during the US bombing of Vietnam, Laos and Cambodia in the 1960s and early 70s. A key transition from deliberate to dynamic targeting, from fixed to fleeting targets, comes into clear view during that war, and I will show that this not only reinforced the power of abstraction that animated bombing in the Second World War but also introduced elements that prepared for late modern war in the global borderlands. There were three crucial but largely separate innovations: remotely piloted aircraft; real-time visual surveillance; and a networked sensor-shooter system. When these were subsequently integrated into the late modern military assemblage the targeting process incorporated two core practices, a (conditional) visual intimacy and a (limited) normative armature, that require a more nuanced critique than Cornell's scholar-activists anticipated. To say this is absolutely not to resurrect the progressive thesis of the 1940s, but it is to claim that the line of descent from Cologne and Coventry to Kandahar has been more tortuous than Swift allowed. And since the roll call must include Kobe, Nagoya, Osaka, Tokyo and Yokohama – if Hiroshima and Nagasaki are taken to be cases apart – a focus on Indochina will also demonstrate that the line of descent was (and remains) profoundly racialized.¹⁴

¹³ 'The American way of bombing', *Harper's Magazine*, June 1972, pp. 55-8; Raphael Littauer and Norman Uphoff (eds) *The air war in Indochina* (Boston: Beacon Press, 1972; revised edition) pp. 159, 163.

¹⁴ This argument is one of the (several) towering achievements of Sherry, *Rise of American air power*, especially the closing chapters; see also Kenneth Hewitt, 'Place annihilation: area bombing and the fate of urban places', *Annals of the Association of American Geographers* 73 (1983) 257-284; cf. Barrett Tillman, *Whirlwind: the air war against Japan 1942-1945* (New York: Simon & Schuster, 2010). I don't discuss the air war in Korea in this essay for reasons of space, but it is an important part of my overall project; there were continuities between the two but also significant differences – in air

From Germany to Vietnam

In the 1960s the combined bomber offensive of the Second World War was still the classical model of deliberate targeting, in which (usually fixed) targets are assigned to aircrews before take-off. There were two kinds of strategic bombing. RAF Bomber Command preferred the area bombing of enemy towns and cities by night, and the US Eighth Air Force prided itself on the precision bombing of military and industrial targets by day. At that time the distinction was more rhetorical than real – while the USAAF made much of the superiority of its Norden bombsight, precision bombing was often terribly *imprecise*, and the Americans ‘judged themselves by their motives rather than their results’¹⁵ – but it assumed much more substantive form in Indochina. The bombing of North Vietnam placed a premium on precision, whereas many of the most devastating attacks on South Vietnam inaugurated a new form of area bombing.

To the US military the first series of air strikes against North Vietnam between 1965 and 1968 (codenamed ‘Rolling Thunder’) was an interdiction

intelligence, close air support and interdiction but also in geography – and the intervention of the Chinese cast long shadows over subsequent US strategy in Vietnam: see Conrad Crane, ‘Raiding the beggar’s pantry: the search for airpower strategy in the Korean War’, *Journal of military history* 63 (1999) 885-920; William Momyer, *Airpower in three wars* (Montgomery AL: Air University Press, 2003).

¹⁵ Richard G. Davis, *Carl A. Spaatz and the air war in Europe* (Washington DC: Smithsonian Institution Press, 1993) p. 435; see also Tami Davis Biddle, *Rhetoric and reality in air warfare: the evolution of British and American ideas about strategic bombing, 1914-1945* (Princeton NJ: Princeton University Press, 2002); Randall Hansen, *Fire and fury: the Allied bombing of Germany 1942-1945* (Toronto: Doubleday Canada, 2008).

campaign designed to close lines of communication and choke off the supply of men and materials from the North to the Viet Cong insurgency in the South. To President Johnson and his civilian advisers its purpose was to open up an altogether different line of communication, a way of ‘sending a message’ to Hanoi through a ‘diplomatic orchestration of signals and incentives, of carrots and sticks, of the velvet glove of diplomacy backed by the mailed fist of air power.’¹⁶ These twin imperatives ensured that Rolling Thunder would dance an intricate gavotte between strategic advantage and political calculation, each of which required careful (precise) calibration. The Air Force had a global database of potential targets – the ‘Bombing Encyclopedia’¹⁷ – and by August 1964 the Joint Chiefs of Staff had pared down an initial list of 451 primary to 94 priority targets. They recommended an intensive air campaign to interdict North Vietnam’s supply of war materials through strikes on ports and rail links and to degrade its military capability through strikes on command and control centres, airfields

¹⁶ Robert Pape, *Bombing to win: air power and coercion in war* (Ithaca: Cornell University Press, 1996) p. 174; W. Hays Parks, ‘Rolling Thunder and the law of war’, *Air University Review* 33 (1982) 2-23. The ‘sticks’ were sticks of bombs; the ‘carrots’ a series of bombing pauses. Johnson put it differently: he compared the slow escalation of the air war in the North to ‘seduction not rape...’: James William Gibson, *The Perfect war: Technowar in Vietnam* (New York: Atlantic Monthly Press, 2000) p. 329. The vocabulary of sexualized brutality saturates this war, like so many others: see Jennifer Milliken and David Sylvan, ‘Soft bodies, hard targets and chic theories: US bombing policy in Indochina’, *Millennium: Journal of International Studies* 25 (1996) 321-59: 335-6.

¹⁷ When the US Air Force was separated from the US Army after the Second World War it established its own Directorate of Targets responsible for the compilation of the ‘Bombing Encyclopedia of the World’ (later re-named the Basic Encyclopedia). Work started in January 1946 on potential targets in the Soviet Union and in six months IBM cards were punched for 5,594 targets; the database quickly became global and by 1960 it contained 80,000 entries.

and barracks, and supply depots and lines of communication.¹⁸ President Johnson rejected their advice, and ordered a gradually escalating series of strikes on target lists that had been re-jigged by his administration. The procedure was convoluted. The Air Force and the Navy submitted lists of targets to the Commander-in-Chief Pacific Command (CINCPAC), whose office reviewed and forwarded a revised list to the Joint Chiefs of Staff, who in turn reviewed and forwarded a revised list to the Pentagon. After officials had calculated the probable impact of a strike and the likelihood of civilian casualties, the Secretary of Defense produced a modified list in consultation with the Secretary of State.¹⁹ By this stage the folders for each numbered target had been reduced to a single sheet of paper with just four columns: military advantage; risk to aircraft and crew; estimated civilian casualties; and danger to third-country nationals (Russian and Chinese advisers). The final target list was decided during the President's Tuesday luncheon at the White House. This was not a casual affair; it followed a meeting of the National Security Council, and those attending were briefed before grading

¹⁸ Mark Clodfelter, *The limits of air power: the American bombing of North Vietnam* (Lincoln: University of Nebraska Press, 2066; 2nd edition) pp. 76-7; Charles Kamps, 'The JCS 94-Target List', *Aerospace Power Journal* 15 (1) (2001) 67-80. Kamps makes it clear that the proposals were shaped by the bombing campaigns of the Second World War but they were no simple extension: see also M.E. Smith, 'The strategic bombing debate: the Second World War and Vietnam', *Journal of contemporary history* 12 (1977) 175-9. Some of Johnson's advisers saw a closer parallel, notably W.W. Rostow, who traded on his war-time experience with the Economic Objectives Unit and provoked Maxwell Taylor, Chairman of the Foreign Intelligence Advisory Board, and a former Army Chief of Staff, to complain that 'some of our bombing advocates still think in terms of World War II and forget there is really no industrial target system in Vietnam worthy of its name': David Milne, "'Our equivalent of guerilla warfare": Walt Rostow and the bombing of North Vietnam, 1961-1968', *Journal of military history* 71 (2007) 169-203: 183, 198. Rostow's enthusiasm for bombing casts a revealing light on his no less dismal desire to impose an American 'take-off' model of development on the rest of the world.

¹⁹ Clodfelter, *Limits*, pp. 84-8; John Smith, *Rolling Thunder: the strategic bombing campaign against North Vietnam 1964-1968* (Walton-on-Thames UK: Air Research Publications, 1994) p. 58.

each target. The President reviewed the grades and made his decision, which was delivered to the NSC in the evening and transmitted to CINCPAC through the Joint Chiefs for immediate execution. The instructions included not only the number of sorties to be conducted against each target but also in the early stages of the campaign the timing of the attacks and the ordnance to be used.²⁰ As targets worked their way up the command hierarchy to Washington, their priority order was reversed; from March 1965 the bomb line was slowly advanced northward through an ascending series of ‘route packages’ as strikes worked their way up from the bottom of the strategic list.²¹

Johnson also stipulated strict Rules of Engagement that prohibited air strikes within 30 miles of the Chinese border, 30 miles from the centre of Hanoi and 10 miles from the centre of Haiphong, and imposed a complex, constantly changing web of regulation whose details had to be incorporated into each day’s operational order. The pilots chafed at the restrictions but

²⁰ David Humphreys. ‘On the Tuesday Lunch at the Johnson White House: a preliminary assessment’, *Diplomatic History* 8 (1984) 81-101. I have described an ideal-typical sequence; Humphreys describes the lunches as orderly affairs, but Clodfelter believes that the results were frequently muddled – after talking with Rusk and Rostow, ‘you would think they had attended separate lunches’ – and the information given to the JCS was sometimes equally confusing. Certainly JCS targeting proposals were often ignored, and very few of its original 94 targets were attacked in the opening phases of the campaign: Clodfelter, *Limits*, pp. 121-3; Smith, *Rolling Thunder*, p. 58.

²¹ Parks, ‘Rolling Thunder’. Pape, *Bombing to win*, p. 86 insists that civilian planners accepted the logic of interdiction and that during the second phase of Rolling Thunder Johnson ‘permitted complete freedom for armed reconnaissance and re-strikes of previously released targets throughout all of North Vietnam, except for small areas around Hanoi, Haiphong and the Chinese border. By the late summer and fall of 1967, nearly all infiltration targets were subject to air attack.’

were adamant that they were scrupulously observed.²² ‘This is different from air operations in South Vietnam,’ one staff officer told the *New York Times*. ‘There is far more advance planning here, far more experienced pilots and tight discipline.’ The reporter did not pursue the implications for the air war in the South, but concluded that in the North the Air Force was not bombing ‘the area targets of World War II and Korea, when civilian losses were largely ignored’, and that attacks on barracks and other military targets required – and received – ‘pinpoint bombing.’ Other correspondents told a different story, notably Harrison Salisbury, who filed a string of reports detailing widespread damage. ‘The bombed areas of Namdinh [in the Red River Delta] possess an appearance familiar to anyone who saw blitzed London, devastated Berlin and Warsaw,’ he wrote. ‘The effects of bombing at ground level seem to have changed little since World War II.’²³ The truth was to be found at both ends of the spectrum and everywhere in between: many of the targets were in rural areas, but when residential districts were bombed there was undoubtedly considerable devastation and loss of life. Johnson had already cancelled Rolling Thunder by the time the Air Force started testing its ‘smart bombs’ in 1968, and even when Nixon resumed strikes against the North in 1972 most of the bombs were still

²² Revising the Rules of Engagement (ROE) was one thing; implementing them quite another. Newly arrived pilots were not cleared to fly combat until they had passed a test on the ROE, and Rasimus describes studying a tattered loose-leaf binder four inches thick, compiled in chronological order as the rules evolved. The test was so heavily annotated ‘only a blind man could fail to distinguish the right answers for the 25 multiple-choice questions’ and ‘no one would be a Rules-of-Engagement lawyer after taking the test, but someone could always say that all of the pilots were trained in the ROE.’ Ed Rasimus, *When Thunder Rolled: an F-105 pilot over North Vietnam* (New York: Presidio/Random House, 2003) pp. 65-6.

²³ Peter Braestrup, ‘US morale high at Thai base, but raid curbs are resented’, *New York Times*, 13 March 1967; Harrison E. Salisbury, ‘No military targets, Namdinh insists’, *New York Times*, 31 December 1966.

conventional ones. Some of them had been retrofitted with the PAVEWAY laser-guided system, and these were used to attack difficult targets like heavily defended bridges and to destroy military-industrial installations around Hanoi and Haiphong that were much closer to civilian concentrations.²⁴

In sum, Rolling Thunder was carefully controlled and calibrated, an imperfect exercise in what then passed for precision bombing. Although it was plainly a strategic air campaign, however, the missions were flown by tactical aircraft – fighter-bombers – rather than the long-range B-52 bombers of Strategic Air Command. Johnson feared these giant aircraft would send a far more dangerous signal to Hanoi and Beijing. Thirty B-52s had been deployed to Andersen Air Force Base on Guam as a contingency measure; their numbers were later increased and basing switched to U-Tapao Air Base in Thailand, but until Nixon ordered them into the Linebacker campaigns against the North in 1972 they were restricted to tactical missions in South Vietnam, Laos and Cambodia. They played a devastating role in all three theatres.²⁵ By April 1965 General Westmoreland, the commander of Military Assistance Command Vietnam (MACV), was so exasperated at the results of strikes by tactical fighter-bombers against the Viet Cong – their lack of concentrated fire power allowed the insurgents to escape – that he urged the JCS to authorize ‘pattern bombing’ missions by the B-52s. They agreed to deploy them for ‘area saturation attacks against target areas known

²⁴ John Correll, ‘The emergence of smart bombs’, *Air Force Magazine* 93 (2010) 60-64; see also David Koplow, *Death by moderation: the US military’s quest for useable weapons* (Cambridge: Cambridge University Press, 2010). A designator aircraft ‘painted’ the target with a laser beam, and strike aircraft locked on to its reflection.

²⁵ See Perry Lamy, *Barrell Roll, 1968-1973* (Research Report, Air War College, Maxwell Air Force Base, 1995) p. 65.

to include VC-occupied installations and facilities for which precise target data to permit pinpoint bombing attacks was not available.’²⁶ The first air strikes were closely monitored in Washington, which was almost as apprehensive about the symbolic significance of deploying the B-52s in the South as it had been in the North, and in parallel with the procedures developed for Rolling Thunder, target areas had to be proposed by MACV, reviewed by CINCPAC and the JCS, and approved by the Secretary of Defense in consultation with the State Department and the White House. If Westmoreland was irritated by these stipulations, he was delighted at the combination of ‘surprise and devastating power’ unleashed by the B-52s. Bombing from 25-30,000 feet they could neither be seen nor heard on the ground, and their strings of high explosive bombs – one of the horribly iconic images of the war (Figure 1) – pulverized a wide area.²⁷

These Arc Light missions issued in a new kind of area bombing – ‘bombing forests’, one Air Force critic called it in despair at the absence of precise targets and bomb damage assessment²⁸ – that was no less abstract

²⁶ Joint Chiefs of Staff, *History of Vietnam War (II) 1965-67* [Vietnam Center and Archive, Texas Tech University] p. 24-3.

²⁷ John Schlight, *The war in South Vietnam: the years of the offensive, 1965-1968* [*The United States Air Force in Southeast Asia*] (Honolulu HI: University Press of the Pacific, 2002; original 1998) p. 50; Donald Mrozek, *Air power and the ground war in Vietnam* (Maxwell AFB: Air University Press, 1988) pp. 139-140; William Head, *War from above the clouds: B52 Operations during the Second Indochina War* (Maxwell AFB: Air University Press, 2002) pp. 17-32. These were all ‘pre-planned strikes’, and although a few months later JCS and MACV were given a freer hand ‘in special emergency situations’, by January 1966 139 targets out of a total of 149 had had to be authorized in Washington, which took 24-30 hours. Targets were nominated by the commander in each of the four Combat Tactical Zones and then evaluated by the Special Targets Section at MACV; the recommended daily priority list was reviewed and approved by Westmoreland himself: Frankum, *Rolling Thunder*, p. 77.

²⁸ Head, *Above the clouds*, p. 24; the same critic also called it ‘operational masturbation’.

than the Second World War original. Wright describes a photo-interpreter poring over a roll of aerial photographs ‘to find the enemy in the negative’, ‘totally absorbed into the fascinating realm of carpet bombing, lost among the oddities of the weave.’ This demanded extraordinary attention to detail, but these local textures were quickly converted into abstractions: ‘Griffin was required to translate pictures into letters and coordinates that were instantly telexed,’ and ‘the data went round and round, and where it came out he preferred not to hear... Wherever he put circles on the film, there the air force would make holes in the ground’.²⁹ Since SAC was primarily a nuclear strike force delivering devastating destructive power, pinpoint accuracy was irrelevant, and those ‘holes’ – vast craters – were distributed across an extensive target box (Figure 2). The first attack was against a box measuring one mile by two miles, and within 30 minutes 1,300 bombs were dropped, ‘slightly more than half of them in the target area’.³⁰ Throughout the targeting process the language of patterns, areas, circles, holes and boxes erased people from the field of view; bombing became a deadly form of applied geometry.

It was no less abstract for those who carried out the attacks. One journalist reported that a B-52 strike was a ‘chillingly spectacular event’ for those on the ground, but for the aircrew, ‘sitting in their air-conditioned compartments more than five miles above the jungle’ (Figure 3), it was little more than ‘a familiar technical exercise.’ They ‘knew virtually nothing about their targets, and showed no curiosity.’ One of them explained that ‘we’re so far away’ that ‘it’s a highly impersonal war for us.’ His crew saw

²⁹ Stephen Green, *Meditations in green* (New York: Bantam, 1984) pp. 39-40, 53.

³⁰ Schlight, *War*, p. 52.

themselves as merely instruments of policy: ‘Where they put the bombs is someone else’s decision and someone else’s responsibility.’ ‘If we are killing anybody down there with our bombs,’ he continued, ‘I have to think we were bombing the enemy and not civilians. I feel quite sure about our targeting.’³¹

The sense of abstraction and, one imagines, misplaced confidence, was heightened by the creation of ‘free bomb zones’ (or ‘specified strike zones’) and the introduction of new forms of radar bombing. In August 1965 Westmoreland was authorized to order strikes in five free bomb zones that were ‘configured to exclude populated areas except those in accepted VC [Viet Cong] bases’. Within these zones the designation of target boxes dispensed with precise co-ordinates and detailed intelligence altogether, so that they became black boxes in every sense of the phrase, and approval was given in advance ‘for execution when appropriate’.³² Westmoreland was perfectly clear that ‘anybody who remained had to be considered an enemy combatant’ and so strikes could proceed ‘without fear of civilian casualties’. By then most Arc Light missions relied on radar synchronous bombing, and from April 1966 a new system called Sky Spot was introduced to direct strikes against ‘unseen targets’ on the command of a distant ground

³¹ Joseph Treaster, ‘Aboard B-52 bomber high over Vietnam a crew takes part in an impersonal war’, *New York Times*, 13 October 1972. Fighter-bombers attacked at lower altitudes but they too saw little. ‘We are going four or five hundred knots, and we can’t see much ourselves. I’ve never seen a body or a person yet, and I’ve been on over a hundred missions’: Jonathan Schell, *The real war* (New York: Da Capo Press, 2000) p. 276; Schell’s reports were originally published in the *New Yorker* in 1968.

³² Joint Chiefs of Staff, History, p. 24-8; MACV Directive 525-3: ‘Combat Operations: Minimizing Non-combatant casualties’; Schlight, War, p. 83. One Forward Air Controller offered a stark translation of a free fire zone, ‘if it moves, shoot it; if it doesn’t move, blow it up’: Mike Jackson, *Naked in Da Nang: a Forward Air Controller in Vietnam* (St Paul MN: Zenith, 2004) p. 25.

controller tracking the flight on his radar screen. By the end of the year this was the principal bombing method used by the B-52s.³³ According to one pilot, ‘bombs were to be released at fifteen to twenty thousand feet in an area where winds were only roughly known, target location was only approximate, and the vectors on the aircraft at the moment of release could not be predicted. It wasn’t your father’s Norden bombsight by any stretch of the imagination.’³⁴ Not all air strikes in the South were like this, of course, and tactical aircraft continued to be used to provide close air support. But area bombing clearly remained a common weapon against the insurgency. As it happened, it was also counterproductive: in the most heavily bombed areas popular support for the Viet Cong increased, provoked by despair at the death and destruction and by the perpetual fear of imminent attack.³⁵

Sensing the enemy

³³ Schlight, *War*, p. 135. The system could track only one flight at a time, however, and so the three planes in a typical B-52 cell would attack in echelon, No 2 to the right and No 3 to the left of the leader, No 2 one nautical mile behind the leader and No 3 one nautical mile behind No 2: Sky Spot ‘could only “see”, and therefore guide, the cell leader; the controllers operated under the assumption that the other two bombers would be carefully shadowing [No 1]’; no matter how ‘careful’ the shadowing, the dispersal of the cell increased the scatter of the bomb pattern. In addition, Schlight notes that technical errors reduced the accuracy of the strikes: aircraft had to fly straight and level while releasing their bombs, which was extraordinarily difficult, and for this reason Skyspot strikes within 3,000 feet of friendly forces were prohibited. In its original form Skyspot was used for pre-planned targets, but in early 1968 the system was refined into Bugle Note so that B-52 cells could be guided to an emergent target of opportunity by the ground controller: Robert Harder, *Flying from the Black Hole: the B-52 navigator-bombardiers of Vietnam* (Annapolis MD: Naval Institute Press, 2009) p.110.

³⁴ Rasimus, *Thunder*, p. 130.

³⁵ Matthew Kocher, Thomas Pepinsky and Stathis Kalyvas, ‘Aerial bombing and counterinsurgency in the Vietnam War’, *American Journal of Political Science* 55 (2011) 201-18

If there were continuities between the combined bombing offensive and the air wars in Indochina there were also significant differences. Some of the most important turned on the problem of air intelligence. Standard target maps and even radar were insufficient in a ‘war without fronts’ where the situation on the ground changed rapidly. In the North, target sets had to be adjusted as surface-to-air missile sites were moved and oil storage depots dispersed; in the South and along the Ho Chi Minh Trail, a dense tissue of roads and paths running from the North through Laos and Cambodia to the South, it was immensely difficult to detect the clandestine movements of the Viet Cong beneath the forest canopy. The fixity of the map was undone not only by the fluidity of the war but also by the land itself: micro-features used for target identification like river channels or sandbars often shifted from one season to the next so that ‘the ground never did look exactly like the map or the target photos’.³⁶ One pilot was warned that ‘there are areas of the country where you’d swear that the map and the ground were two different places.’³⁷ The air war was transformed by three key innovations that sought to provide time-sensitive intelligence: reconnaissance drones; close-in visual surveillance; and the ‘electronic battlefield’.

From October 1964 the Air Force launched reconnaissance drones on programmed flight paths over North Vietnam from C-130A transport aircraft and recovered them by helicopter off Da Nang. The early ‘Lightning Bugs’ were plagued by navigation errors – it was common for flights to complete less than 50 per cent of their planned tracks – but these were reduced when

³⁶ Bell, *100 Missions*, p. 177.

³⁷ Marshall Harrison, *A lonely kind of war: forward air controller, Vietnam* (Xlibris Corporation, 2011; original 1997) p. 3.

crew on the accompanying aircraft used television cameras to fly the drones. The images, and for a time video film captured on these missions were vital components of target folders, but their effectiveness was compromised by two factors that continued to haunt aerial surveillance long after the war. One was the balance between resolution and coverage: low-level flights (between 200 and 2,000 feet) provided high-resolution but limited coverage, whereas high-level flights (usually at 50,000 feet) opened up the field of view only to have it muddied by cloud and haze. The other issue was the time taken to process and distribute the imagery; recent stills were better than stock photographs, but it could take days for the film to be developed and analysed, and by then potential targets could have been hardened, dispersed or relocated. This was improved by the introduction of a satellite link to transmit the images from Saigon to Washington – for Johnson’s inspection – via Hawaii, where the imagery was analysed and the results uplinked back to Saigon for crew briefings the next day. Satellite links are vital for rapid analysis of the imagery from today’s Predators and Reapers too, and they have dramatically compressed the kill-chain: but the Lightning Bugs were all unarmed. In 1972 the *New Scientist*, drawing on a report in *Air Force Magazine*, predicted that in two years time ‘a fleet of new bombers will attack North Vietnam – or some other country’ flown by pilots ‘sitting comfortably on the ground in front of TV screens hundreds of miles away’, and speculated that ‘unmanned drones may be bombing North Vietnam now.’ They weren’t, but by then Nixon had resumed air strikes against the North, and the drones had become so closely integrated into air

operations that the USAF relied on them for assessing the effectiveness of the Linebacker raids.³⁸

In the South the Air Force had been systematically destroying the forest canopy to expose the Viet Cong since 1962. The unmarked aircraft of Operation Ranch Hand ('Only we can prevent forests') were described as 'unarmed', but that deliberately ignored the deadly effects of the defoliants they dispersed on ecosystems and populations.³⁹ Yet opening up the field of view was insufficient: just-in-time intelligence was even more important here because counterinsurgency relies on dynamic targeting, in which cruising aircraft are directed to (usually fleeting) targets of opportunity that emerge in flight, and often involves providing close air support to ground troops suddenly finding themselves in contact with the enemy. In June 1965 the Air Force initiated its own visual reconnaissance programme using slow, single-engine aircraft. These 'Bird Dogs', militarized versions of the Cessna C-130, were also used by the Army. They could fly as slow as 40 mph, maintaining a tight turn to keep a site in view, and while they were not supposed to fly below 1500 feet they usually went much lower. 'You can't even see people from one thousand feet,' one pilot noted: 'You can't see anything unless you go down there.'⁴⁰ They not only looked for direct signs of Viet Cong presence – campfires, tracks on trails, footprints on shorelines – but also carried out what is now called a 'pattern of life analysis'. This

³⁸ Thomas Ehrhard, *Air Force UAVs: the secret history* (Arlington VA: Mitchell Institute for Airpower Studies, 2010) pp. 23-29; Ronald Frankum, *Like Rolling Thunder: the air war in Vietnam 1964-1975* (Lanham MD: Rowman and Littlefield, 2005) pp. 96-7; Robert Barkan, 'The robot airforce is about to take off', *New scientist*, 10 August 1972.

³⁹ See David Zierler, *The invention of ecocide* (Athens GA: University of Georgia Press, 2011).

⁴⁰ Schell, *War*, p. 279.

was an informal practice that could not call upon the formidable analytical apparatus embedded in intelligence, surveillance and reconnaissance today, but in much the same way pilots were required to become sufficiently familiar with their local area of operations – ‘aware of the eating, sleeping, working, traveling and social routine of the people’ – that they would be able to detect ‘the slightest abnormality or change in the ground pattern’.⁴¹ ‘I was steadily learning my trade,’ one pilot recorded. ‘I knew how many villagers should be in the rice fields surrounding each village. Too many might mean they had visitors. Too few could mean that a VC recruitment campaign was under way, or that trouble was afoot and the villagers had wisely decided to stay home until it was over. New footbridges had to be analyzed to determine what sort of traffic was using them, for the farmers seldom strayed away from their local village. A comparative surveillance of the bridges and trails leading to the villages would almost always show the amount of foot traffic in the area. It was impossible to hide movement in the wet season, since tracks would show in the mud and elephant grass. I was starting to feel like something out of James Fenimore Cooper.’⁴² It was an odd sort of intimacy – at once detached and intrusive – that continues to characterize US counterinsurgency today. But it provided a far more animated view than conventional mapping or even photoreconnaissance, and when the pilots also served as Forward Air Controllers (FACs) they could feed information directly to ground troops and mark targets for strike

⁴¹ Schlight, *War*, pp. 47, 74.

⁴² Harrison, *Lonely*, p. 152. The colonial-frontier figuration of that last sentence is by no means unusual: President Johnson urged US troops to ‘bring the coonskin home’ from Vietnam and ‘nail it to the barn’. For a discussion of the role of frontier imagery in the Vietnam war, see Richard Slotkin, *Gunfighter nation: the myth of the frontier in twentieth-century America* (New York: Atheneum, 1992) Part V.

aircraft.⁴³ ‘My observational skills had matured,’ one FAC wrote, ‘and I no longer mistook cemetery plots for bomb craters’ – only to add that ‘on most days my objective was to see to it that bomb craters did indeed do double duty as gravesites.’⁴⁴ Then as now the sensitivities produced through this system were conditional. ‘It gets completely impersonal,’ another FAC told Schell, and ‘after you’ve done it for a while you forget there are people down there.’ Its affinities were with combat troops not ordinary Vietnamese: ‘through this [radio] link,’ another explained, ‘the FAC’s war was personalized and he earned the gratitude of the forces he supported.’⁴⁵

⁴³ These feeds were not integrated into the extended network of today (see below, p. 00). Schlicht, *War*, p. 133 notes that the Forward Air Controller’s radio ‘did not allow the pilot to talk to all the people he should – ground controllers, fighter pilots, the [Direct Air Support Centers assigned to each military region] and the emergency channel.’ Harrison, *Lonely*, p. 9 describes a different but still fractured system: ‘Using a simple row of toggle switches and a round wafer-selector switch, the pilot could simultaneously monitor two UHF radios, two FM radios, a VHF radio, an HF radio, a secure scrambler system, an FM homer, a Guard channel radio for use in emergencies, and assorted navigational gear. However, only one radio at a time could be used for transmissions. Unfortunately, no one else on any of the nets could do the same and therefore had no idea who else was trying to talk to the FAC. This jumble of voices breaking in on each other, each call more strident than the last as they competed for the FAC’s attention, often became an audio nightmare.’

⁴⁴ Jackson, *Naked*, p. 24. But he was also keenly aware of his distance from the ground below: ‘You never really get a close view of what’s happening down there... It was never a matter of making a conscious effort to separate myself from the starkness of jungle warfare below me; it just happened. In the thick of an air strike, I was 100 percent engaged, nerves taut, adrenaline pumping. I made the decisions, sweated the results, cleaned up the mess, then left it all behind me and flew on to the next thing. As events unfolded, they were frantic and immediate and real. But, suddenly, it was over and it wasn’t real anymore, at least not the kind of real that gets under your skin and lies there twitching. Plexiglass and distance protected me, gave me the sense that I was in the action but not completely part of it’ (p. 194).

⁴⁵ Schell, *War*, p. 325; John Flanagan, *Vietnam above the treetops: a Forward Air Controller reports* (New York: Praeger, 1992) p. 24. Harrison, *Lonely*, notes that FACs normally flew only ‘in our own AO [Area of Operations], giving us the opportunity to know it like the backs of our hands’ – but, consistent with the affinities I’ve described, ‘when the brigade’s AO changed, then so would ours.’ On the development of FACs from Korea to Vietnam (when ‘FACs came of age’), see Gary Robert Lester, *Mosquitoes*

In 1966 and 1967 reports from the Institute for Defense Analysis revealed that Rolling Thunder's interdiction campaign had failed: in fact, the flow of men and materials from the North to the South had increased. The analysts proposed the construction of a networked system of ground sensors and strike aircraft to check infiltration along the Ho Chi Minh Trail. The objective of 'Igloo White', as the system was called, was not so much to damage the Trail network – which was readily repaired or altered – but to strike traffic moving along it, and since the targets were fleeting the interval between sensor and shooter had to be minimized. Visual reconnaissance was limited because the movement was usually at night, and so aircraft seeded thousands of acoustic and seismic electronic sensors along the roads in western Laos (triggered by trucks) and the paths in eastern Laos (triggered by people). An on-board camera photographed each sensor as it fell from the aircraft and the image was compared with large-scale photo-mosaics so that the whole sensor field could be mapped. When a sensor was activated, designated aircraft – and for a time drones – orbiting over Laos intercepted its identification signal and transmitted it to the Infiltration Surveillance Center at Nakhon Phanom air base in Thailand.⁴⁶ There two large computer screens displayed the sensor field on a grid; activations were filtered by algorithms to eliminate false alarms triggered by animals or heavy rainfall, and when a critical threshold was passed the sensor was illuminated on screen. One Air Force officer said the Trail was wired 'like a pinball

to wolves: the evolution of the airborne Forward Air Controller (Montgomery AL: Maxwell AFB, 1997)

⁴⁶ Seymour Deitchman, 'The "Electronic Battlefield" in the Vietnam War', *Journal of military history* 72 (2008) 869-887; Mark, Aerial Interdiction, pp. 327-363; see also Anthony Tambini, *Wiring Vietnam: the electronic wall* (Lanham MD: Scarecrow Press, 2007).

machine' that was plugged in each night when the convoys started their engines. 'As the seismic and acoustic sensors pick up the truck movements,' another explained, 'their locations appear as an illuminated line of light, called "the worm", that crawls across [the] screen, following a road that sometimes is several hundred miles away.'⁴⁷ The Assessment Officers and support staff – inevitably called 'pinball wizards' – used the speed and direction of activations to predict the movement of the convoy and designate a target box and time of attack whose co-ordinates were automatically transmitted to available strike aircraft. James Gibson emphasized that for those calling in the attack the target appeared only as a trace on a screen; when 'technowar' reaches its apex, he argued, 'it turns completely into representation. Indeed, the very name for a target was a "target signature"'. Twenty minutes later, when the loudspeakers reverberated with the noise of bombs exploding, the illuminated trace went out. 'The representation disappeared.'⁴⁸ An audio track was played to the Electronic Battlefield Subcommittee of the Senate's Armed Services Committee: 'the sounds of a truck park, men talking, gears grinding, men shouting and then the sound of a Forward Air Controller overhead. Next the Senators heard the roar of jets, the crash of bombs and the firing of anti-aircraft guns as the North Vietnamese fought back.' It left at least one listener stunned. 'Technology now permits one to listen in on an attack you are directing from a control

⁴⁷ George Weiss, 'The Air Force's secret electronic war', *Indochina Chronicle*, 15 October 1971; idem, 'Battle for control of the Ho Chi Minh Trail', *Armed Forces Journal*, 15 February 1972, 19-22; see also Herman Gilster, *The air war in southeast Asia* (Maxwell AFB: Air University Press, 1993) pp. 16-56; Bernard Nalty, *The war against trucks: aerial interdiction in southern Laos, 1968-1972* (Washington DC: Air Force History and Museums Program, 2005).

⁴⁸ Gibson, *Perfect war*, pp. 396-7.

center hundreds of miles away. Only a TV picture is lacking.’⁴⁹ The absence of such a direct visual image made a substantial difference to the attack. As the officer responsible for the system explained, ‘We are not bombing a precise point on the ground with a point target bomb – we can’t determine each truck’s location that accurately with ground sensors, which are listening – not viewing – devices. Since we never actually “see” the trucks as point targets, we use area-type ordnance [including napalm and cluster bombs] to cover the zone we know the trucks to be in’ (Figure 4).⁵⁰ Here too the killing fields were reduced to abstract geometries: lines on screens and boxes on maps. But it was not difficult to imagine what would happen once the electronic battlefield incorporated a visual feed. Not only could it trip the switch from area to precision bombing, but it would also solve ‘a constant problem of Vietnam and other wars – that some men must go and fight while others watch on television.’ The only difference would be ‘the placement of the viewing screen.’⁵¹

From a view to a kill

These three basic elements – remotely piloted aircraft, real-time visual surveillance and a networked sensor-shooter system – prefigure the technical infrastructure for today’s drone wars. Each of them has been transformed and brought together in a unified system. The key difference is that the ‘viewing screen’ now occupies a central place and has become indispensable

⁴⁹ Weiss, ‘Secret’; Paul Dickson, *Electronic battlefield* (Bloomington: Indiana University Press, 1976) p. 88.

⁵⁰ Dickson, *Electronic battlefield*, pp. 86-7; William Rosenau, *Special Operations Forces and elusive enemy ground targets* (Santa Monica CA: RAND, 2001) p. 13.

⁵¹ Paul Dickson and John Rothchild, ‘The electronic battlefield: wiring down the war’, *Washington Monthly*, May 1971.

for those who wage remote war – at present principally the US military (in concert with other NATO militaries) and the CIA.⁵² For USAF operations in Afghanistan multiple screens are dispersed across a transnational network that includes pilots, sensor operators and mission intelligence coordinators at Creech Air Force Base in Nevada, image analysts and intelligence specialists at US Central Command's Distributed Common Ground System at Langley Air Force Base in Virginia, senior commanders, staff officers and advisers at CENTCOM's Combined Air and Space Operations Center (CAOC) at Al Udeid Air Base in Qatar, and Joint Terminal Attack Controllers deployed with ground troops in Afghanistan.⁵³ For CIA operations in Pakistan most of the network remains in the shadows, but the aircraft are flown from Creech AFB and directed from the CIA's Counterterrorism Center at Langley in Virginia.

These are dramatic changes, and yet the essentials remain the same. In the 1960s the electronic battlefield was seen as heralding 'the battlefield of the future', and Westmoreland imagined combat zones under a constant surveillance so the US military would be able to 'destroy anything we locate through instant communication and the almost instantaneous application of

⁵² My discussion is confined to Afghanistan and Pakistan, but the United States has also deployed remotely piloted aircraft in Iraq, Libya, Somalia and Yemen, and there is a ramifying network of bases around the world: see Nick Turse, 'America's secret empire of drone bases', TomDispatch, 17 October 2011. The other major exponent of drone warfare is Israel, which has also leased or sold remotely piloted aircraft to Australia, Canada, France and Germany.

⁵³ Where remotely piloted aircraft are used by Joint Special Operations Command (JSOC) the network includes commanders and image analysts at USAF Special Operations Command at Okaloosa in Florida.

highly lethal firepower.’⁵⁴ Forty years later the use of Predators and Reapers to combine sensor and shooter in a single platform has compressed the kill-chain to such a degree that war seems to have come perilously close to Westmoreland’s vision: so much so that one contributor to *Harper’s* – this time in 2010 – feared that ‘we are watching the future of warfare unfold in the skies over the Afghanistan-Pakistan border area.’⁵⁵

The concerns sound familiar too. Critics of the electronic battlefield believed that it posed two great dangers, the expansion of the physical space of war and the contraction of the moral space of war. Military violence would know no global limits and the distinctions between combatants and civilians would be dissolved. Cornell’s activist scholars predicted that abstraction would reach a terrifying climax through automation: ‘Ultimately we can have the machines fighting the “target signatures” with no human beings involved on either side.’⁵⁶ Senator Gravel, who was instrumental in releasing the Pentagon Papers to the public, was appalled that American troops were being withdrawn only to leave behind ‘an automated war’: ‘We

⁵⁴ Westmoreland was addressing the US Army Association in Washington DC on 14 October 1969; see Dickson, *Electronic battlefield*, pp. 220-1.

⁵⁵ Scott Horton, ‘The trouble with drones’, *Harper’s Magazine*, May 2010. The time from finding to engaging emergent targets is now 30-45 minutes; the USAF currently aims to reduce this to less than two minutes, and some commentators think it can be compressed to seconds by 2025. See Adam Herbert, ‘Compressing the kill chain’, *Air Force Magazine* 86 (3) (2003) 50-54.

⁵⁶ Littauer and Uphoff, *Air war*, p. 160. *Bomber* was written at the height of the Vietnam war, and Deighton remembers wondering what would happen ‘if I wrote a story in which the machines of one nation battled against the machines of another?’ He didn’t, of course; he showed that the combined bomber offensive was no algorithmic war but one that constantly demanded decisions that could not be delegated to machines (though they were constantly mediated by them).

intend to turn the land of Vietnam into an automated murder machine.’⁵⁷ There was also the well-founded fear that the existence of such an advanced technology would produce pressure to use it in ‘countering “insurgency”’ all over the world, and that the Pentagon planned to extend its ‘lethal pinball machine’ to the entire planet, which, ‘if wired right, could become a great maze of circuitry and weaponry, a jungle from which those who walk off the straight line from home to office to store would be eliminated.’⁵⁸ This is not a far cry from the Obama administration’s view that its legal authority to use lethal force is not limited to “‘hot” battlefields’ – that the battle space has indeed become global – so that remotely piloted aircraft, with their extraordinary capacity to conduct targeted killings at a distance, are the new weapon of choice: particularly if they can be fully automated.⁵⁹

Critics were also concerned at the loss of innocent lives. ‘Machines have no qualms about killing civilians,’ the Cornell group wrote in their first draft, and even the architects of the electronic battlefield acknowledged that its reliance on target signatures, blind bombing and area ordnance raised the spectre of striking what one of them archly called ‘misidentified targets’.⁶⁰ The reliance on air power in Vietnam, Laos and Cambodia had magnified the central dilemma of counterinsurgency – how to distinguish insurgents

⁵⁷ Gravel was speaking in October 1971 and was quoting Noam Chomsky, *At war in Asia: essays on Indochina* (Oakland: AK Press, 2004; first published 1970) p. 67. Chomsky also reported that one Pentagon official had offered a ‘Year 2000’ view of ‘the instrumentation of the entire battlefield’, ‘with little lights that flash for different kinds of activity. This is what we require for this “porous” war where the friendly and the enemy are all mixed together’ (p. 68).

⁵⁸ Paul Dickson and John Rothchild, ‘The electronic battlefield: wiring down the war’, *Washington Monthly*, May 1971.

⁵⁹ Peter Finn, ‘A future for drones: automated killing’, *Washington Post*, 19 September 2011.

⁶⁰ Deitchman, ‘Electronic battlefield’, p. 887.

from civilians – and the electronic battlefield only compounded the problem. For as Senator McGovern warned, ‘the sensor which detects body heat, the aircraft thousands of feet in the air, and the computer complex many miles distant, are completely neutral and indiscriminate.’⁶¹ Whether the lack of discrimination was an inherent limitation of air power or whether, in all too many instances, it was a deliberate decision sparked fierce debate. Certainly the Rules of Engagement outside North Vietnam were remarkably flexible and riddled with exceptions, and there were many cases where bombing was unambiguously reckless. In any event, as one military historian conceded, from the air ‘all soldiers looked alike and guerrillas were indistinguishable from non-combatants.’⁶² This remains a serious concern in Afghanistan, Pakistan and elsewhere, but the advocates of today’s remote operations claim the issue has been resolved through the introduction of a new political technology of vision.⁶³

In South Vietnam the areas that required the closest surveillance were allocated two Bird Dog flights a day to cover around 300 square miles in

⁶¹ McGovern’s speech was delivered on 14 December 1971 and is excerpted in ‘Automated warfare’ (January 1972) p.2, Folder 01, Box 02, Douglas Pike Collection: Unit 03 - Technology, The Vietnam Center and Archive, Texas Tech University.

⁶² Schlight, War, p. 258. When Schell asked a group of Forward Air Controllers how they distinguished Viet Cong from Vietnamese civilians, apart from the straightforward ‘if they shoot at you’, he was given a range of dispiriting answers: ‘anything out in the open is friendly, so anything you see in the trees you suspect is unfriendly’; ‘if they run is one way [you can tell]... So you make a couple of passes and one of them makes a break... So you look where he goes and call in an air strike.’ And yet, as Schell noted, almost all the houses were built in the shade of tree lines, and most ordinary Vietnamese had every reason to flee American planes: Schell, War, pp. 285, 302-6.

⁶³ Although there are continuing experiments in detecting voice signatures and chemical signatures (emitted by IED factories) the sensors used in today’s remotely piloted aircraft are not primarily acoustic or seismic but optical; the advocates of these platforms make much of their capacity to make the battle space ‘transparent’, and it is this political technology of vision that I focus on here.

three to four hours; most had to make do with just one a day. In contrast, the crew flying a Predator or Reaper changes at the end of every eight-hour shift so that the aircraft can remain on station for 24 hours or more to conduct persistent surveillance. The aircraft use a multi-spectral targeting system, including an infrared sensor, a daylight TV camera and an image-intensified TV camera, to stream full-motion high-resolution video across the network and provide a real-time view of the conflict zone. The introduction of augmented wide-area technologies like the ‘Gorgon Stare’ and ARGUS-IS promises to resolve the old scale/resolution problem of the Lightning Bugs by quilting images from multiple feeds into a tiled mosaic covering an area of 100 square kilometres (58).⁶⁴ This will enhance the ability of analysts to track multiple individuals through different social networks to establish a ‘pattern of life’ consistent with the paradigm of activity-based intelligence that forms the core of contemporary counterinsurgency. The intention is to bring enemies ‘out from the shadows’ and illuminate the infrastructure in which they are embedded.⁶⁵

But this solves one problem by introducing another. Petabytes of data are collected each day, and the Air Force is acutely aware of the danger of ‘swimming in sensors and drowning in data’, and so, unlike the intuitive readings of the Bird Dog pilots and FACs, much of the analysis is highly formalized. Archived images are scanned to filter out uneventful footage

⁶⁴ The Gorgon Stare and the ARGUS-IS are designed for the Reaper, but the sensor system designed for the RQ-4 Global Hawk, a high altitude, unarmed remotely piloted aircraft, can cover more than 100,000 square kilometres in a day. The Global Hawk is manufactured by Northrop Grumman, which purchased the company that made the original Lightning Bugs in 1999.

⁶⁵ Michael Flynn, Rich Juergens and Thomas Cantrell, ‘Employing ISR: SOF Best Practices’, *Joint Forces Quarterly* 50 (3) (2008) 56-61: 58.

and to distinguish ‘normal’ from ‘abnormal’ activity in a sort of militarized rhythm analysis that is increasingly automated. The programs include modified television software that can tag and retrieve video imagery and GeoTime, a system that fuses and visualizes data from multiple sources (‘combining the where, the when and the who’) as a three-dimensional array that mimics the time-geography diagrams developed by Swedish geographer Torsten Hägerstrand in the 1960s.⁶⁶ In addition to this forensic monitoring, live video feeds are scanned to push time-critical information to flight crews and ground commanders responding to emergent events. The development of ‘persistics’ algorithms is seen as particularly promising because these allow surveillance to continue uninterrupted while ‘automatically searching [the image stream] with unsurpassed detail for anomalies or preselected targets.’⁶⁷ The ultimate objective is the provision of a God’s eye view, securing a new condition of what Gordon calls ‘hypervisibility’ that ‘abolishes the distinctions between “permission and prohibition, presence and absence”’.⁶⁸

This may be moonshine, but these new technologies – together with advances in precision weapon systems – have transformed targeting. The US invasion of Afghanistan in October 2001 was spearheaded by a conventional high-altitude bombing campaign. Who can forget Rumsfeld’s callous jibe – greeted, incredibly, by laughter – just two days after the first

⁶⁶ Pat Biltgen and Robert Tomes, ‘Rebalancing ISR’, *Geospatial Intelligence Forum*, 8 (6) (2010) 14-16; Paul Richfield, ‘Intell video moves to a Netflix model’, *Government Computer News*, 6 April 2011; <http://www.geotime.com>.

⁶⁷ Arnie Heller, ‘From video to knowledge’, *Science and Technology Review* April/May (2011) 4-11: 6.

⁶⁸ Avery Gordon, *Ghostly matters: haunting and the sociological imagination* (Minneapolis: University of Minnesota Press) p. 16.

attacks: ‘We’re not running out of targets, Afghanistan is’? The bombing did not slacken, however, and as the post-invasion insurgency intensified the air war was ratcheted up by both the Bush and Obama administrations. But Obama has shown a marked predisposition for a less visible, less public war that has involved a dramatic increase in the use of remotely piloted aircraft. They operate in concert with conventional strike aircraft, but their distinctive contribution is to combine hunter-killer roles in a single platform. Predators and Reapers provide what is called ‘armed overwatch’ for combat troops – streaming live video to a Joint Terminal Attack Controller while maintaining the capacity to drop bombs or fire missiles if required – and close air support to troops in contact with the Taliban and other groups, when the aircraft are cleared to engage emergent targets. This has radically compressed the time taken to intervene in a fire fight: at the start of the Vietnam war it took on average 100 minutes for strike aircraft to respond to a request for assistance, whereas in Afghanistan the average response time is now around ten minutes.⁶⁹

This is a significant compression of the kill-chain (above, p.00), but it is the *transformation* of the kill-chain that is more far-reaching: so much so, in fact, that the criticisms of the electronic battlefield are not only reactivated but also redoubled. Just as the war in Vietnam spilled over into Laos and Cambodia, so the war in Afghanistan has spilled over into Pakistan. The borderlands are porous, and there is a complex web of interaction between the Afghan Taliban, the Pakistan Taliban and other insurgent groups, which have varying relations with al Qaeda and its affiliates in the region. Afghan

⁶⁹ Schlight, War, p. 37; Rebecca Grant, ‘Armed overwatch’, *Air Force Magazine* 91 (12) (2008) 40-44.

fighters regularly seek sanctuary in the Federally Administered Tribal Areas, and the supply lines that provide them with money, weapons and explosives snake across the border. But air power is no longer aimed exclusively at interdiction.⁷⁰ A core role is now *execution*. The US military uses a Joint Integrated Prioritized Target List to rank target sets in order of importance, but these are no longer limited to areas or boxes, or even physical objects like a training camp, an IED factory or a weapons cache. The targets are now often *individuals*. In Afghanistan the military maintains a subsidiary Joint Prioritized Effects List that identifies ‘insurgent leaders’ and ‘nexus targets’ (individuals like drug traffickers with ‘proven links to the insurgency’) who may be killed or captured. Each week a Joint Targeting Working Group reviews target nomination packets and establishes ‘High Value Targets’ in concert with judge advocates (military lawyers) and representatives from the CIA and other agencies. Some reports suggest that several hundred, others several thousand names had been put on the list by October 2009.⁷¹ Although Joint Special Operations Command (JSOC) usually takes the lead in these so-called ‘find-fix-finish’ missions, both conventional and remotely piloted aircraft are often involved too. The capacity for persistent real-time surveillance is key to ground operations, one Special Operations team explains, since it can be ‘tightly synchronized with

⁷⁰ Remotely piloted aircraft and helicopters are used to track and intercept vehicles for stop and search by ground troops: see, for example, <http://www.marines.mil/unit/mcascherrypoint/Pages/druginterdiction.aspx>. But this is not the equivalent of blind bombing the Ho Chi Minh Trail.

⁷¹ Col. James Garrett, ‘Necessity and proportionality in the Operation Enduring Freedom VII Campaign [February 2006–February 2007]’, US Army War College Strategy Research Project, 20 March 2008) pp. 19-25; Nick Davies, ‘Afghanistan war logs: Task Force 373 – Special Forces hunting top Taliban’, *Guardian* 25 July 2010. This is consistent with the most recent counterinsurgency doctrine; FM 3-24 calls this ‘personality targeting’ (§5-30).

a finishing force’, but the Air Force makes no secret of the fact that its single platform enables it to put ‘warheads on foreheads’ in its own right.⁷² This is a radicalization of the concentric circle model of air power proposed by John Warden. He had served as a FAC in Vietnam, and later argued that that the superiority of air power over land forces could be assured by striking an enemy system ‘from the inside out,’ decapitating the leadership and then bombing ‘infrastructural targets’ and other, successively less vital target sets. In effect the Air Force has adapted the model to fight a dispersed insurgency with no centralized or fixed command and control apparatus: exactly the situation it confronted in Vietnam, except that then it had no similar capacity to respond. This is not the only spur from that conflict, and the Special Forces operations, most particularly the night raids, have (too) much in common with the infamous Phoenix program that targeted the shadow political leaders of the Viet Cong between 1967 and 1975.⁷³

Those who champion these missions insist that they fall within the laws of armed conflict that govern the war in Afghanistan, but extending the kill-capture program into Pakistan is profoundly problematic because it is outside the war-zone. The Obama administration has argued that the United States is in armed conflict with al Qaeda so that the air strikes are consistent with the right to pre-emptive self-defence, but legal scholars differ sharply on the robustness of the argument. The situation is further complicated by the anomalous relationship between the Federally Administered Tribal Areas

⁷² Flynn, Juergens and Cantrell, ‘Employing ISR’, 59; Anna Mulrine, ‘Warheads on foreheads’, *Air Force Magazine* 91 (10) (2008) 44-47.

⁷³ For discussions of JSOC operations in Afghanistan, see Dana Priest and William Top secret America: the rise of the new American security state (New York: Little, Brown & Co., 2011) pp. 221-255; they claim that JSOC – which includes USAF components – ‘flies ten times more drones than the CIA’.

and the Pakistani state, and by uncertainty over whether the government in Islamabad has covertly consented to the attacks.⁷⁴ Legality is not the only issue, however, since serious questions have been raised about the propriety and effectiveness of targeted killings, and there is widespread public anger at the air strikes in Pakistan. These seem to have been inspired by the Israeli program of extra-judicial killings in the occupied Palestinian territories.⁷⁵ Although the United States originally condemned Israel's assassinations, in November 2002 the CIA used a Predator to kill a suspected al Qaeda leader in Yemen, and eighteen months later it launched a systematic program ('Sylvan Magnolia') directed at killing High Value Targets in Pakistan.⁷⁶ Here too the target list has been extended, and the list includes a congeries of militant groups as well as al Qaeda. The nerve centre of the program is the Pakistan-Afghanistan Department at the CIA's Counterterrorism Center, which prepares target nomination packets for those who are held to present 'a current and ongoing threat to the United States'. The final lists, which are reported to contain two to three dozen names at any one time, are scrutinised

⁷⁴ Cf. Sean Murphy, 'The international legality of US military cross-border operations from Afghanistan into Pakistan', George Washington University Law School, Public Law and Legal Theory Working Paper, 451/Legal Studies Research Paper 451 (2009); Mary Ellen O'Connell, 'Unlawful killing with combat drones: a case study of Pakistan, 2004-2009', Notre Dame Law School, Legal Studies Research Paper 09-43 (2009); Jordan Paust, 'Self-defense targetings of non-state actors and permissibility of US use of drones in Pakistan', University of Houston Public Law and Legal Theory Series 2009-A-36; forthcoming in *Jnl. Transnational Law and Policy* 19 (2010).

⁷⁵ Eyal Weizman, 'Thanato-tactics', in Adi Ophir, Michal Givoni and Sari Hanafi (eds), *The power of inclusive exclusion: anatomy of Israeli rule in the occupied Palestinian territories* (New York: Zone Books, 2009) pp. 543-573. Weizman reports that airborne assassination started as a 'rare and exceptional emergency method' but has since become a standard operating procedure, particularly in Gaza, where most killings were carried out by conventional aircraft or helicopters until 2004 when the Air Force started to use swarms of remotely piloted aircraft.

⁷⁶ Brian Glyn Williams, 'The CIA's covert Predator drone war in Pakistan, 2004-2010: the history of an assassination campaign', *Studies in conflict and terrorism* 33 (2010) 871-892.

by Agency lawyers, endorsed by the CIA's General Counsel, and reviewed every six months.⁷⁷ The program had a slow and uncertain start under the Bush administration, but it has been accelerated by Obama. Soon after taking office he doubled the CIA-controlled Predator fleet to over 40 aircraft, and the number of strikes rose from 35-38 in 2008 through 53-55 in 2009 to 117-128 in 2010.⁷⁸ This is not a standalone program. Most clandestine operations in Pakistan still seem to be controlled by the CIA, but JSOC has operated across the border since 2006 and one source claims that many air strikes attributed to the CIA, especially those with high civilian casualties, were in fact carried out by JSOC.⁷⁹ The CIA also collaborates closely with the Air Force, which sometimes supplies ('loans'), maintains and arms the aircraft, which are flown from Creech AFB, perhaps by Air Force crews. In addition, the Air Force has recently positioned more of its own aircraft close to the Afghan side of the border so that the CIA can 'hand off' targets to them as they cross over from Pakistan.⁸⁰

We are assured that both military and CIA operations take great pains to minimize civilian casualties, and the numbers certainly do not come close

⁷⁷ Tara McKelvey, 'Inside the killing machine', *Newsweek* 13 February 2011; Mark Hosenball, 'Secret panel can out Americans on "kill list"', Reuters, 5 October 2011; Partha Chatterjee, 'How lawyers sign off on drone attacks', *Guardian* 15 June 2011; Priest and Arkin, *Top secret America*, pp. 202-11.

⁷⁸ I have taken the lower estimates from the Long War Journal at <http://www.longwarjournal.org/pakistan-strikes.php>, and the higher estimates from the Bureau of Investigative Journalism at <http://www.thebureauinvestigates.com>.

⁷⁹ Jeremy Scahill, 'The secret US war in Pakistan', *The Nation*, 23 November 2009; idem, 'The expanding US war in Pakistan', *The Nation*, 4 February 2010.

⁸⁰ Adam Entous, Julian Barnes and Siobhan Gorman, 'CIA escalates in Pakistan', *Wall Street Journal*, 2 October 2011; Priest and Arkin, *Top secret America*, pp. 202-3; Greg Miller and Julie Tate, 'CIA shifts focus to killing targets', *Washington Post*, 1 September 2011; Adam Entous, Siobhan Gorman and Julian Barnes, 'US tightens drone rules', *Wall Street Journal*, 4 November 2011..

to the totals killed by bombing in the Second World War or the air wars in Indochina. But it is equally clear that civilians continue to be the innocent victims of air strikes – and, it must be said, of ground attacks from militaries and insurgents – on both sides of the border. The numbers are difficult to verify, and all estimates are dogged by controversy: most rely on local press reporting, which is highly uneven, and even the detailed field surveys are inevitably bedevilled by the difficult distinction between combatants and non-combatants.⁸¹ I cannot adjudicate these questions here, but I can show how casualties continue to be caused by what the United States calls ‘the most precise weapon in the history of warfare’.⁸²

How might such a claim be judged? The accuracy of a weapon is given by the Circular Error Probable (CEP), which is measured under ideal experimental conditions and defines the radius from the aiming point within which a missile or bomb will land 50 per cent of the time. The Predator carries two laser-guided Hellfire missiles, with a CEP of 3-8 metres, and the Reaper can carry fourteen Hellfire missiles or four Hellfire missiles and two

⁸¹ In Afghanistan civilian casualties are recorded by the United Nations Assistance Mission to Afghanistan; important field work has been done by Human Rights Watch – see *Troops in Contact: Airstrikes and civilian deaths in Afghanistan* (2008) – but this has been criticized by Marc Herold who has maintained a sobering dossier of civilian victims of US Bombing in Afghanistan since 2001: see <http://pubpages.unh.edu/~mwherold>. In Pakistan estimates have been compiled from press reports by the New America Foundation, the Long War Journal and the Bureau of Investigative Journalism, but the best work has been done on the ground by the Campaign for Innocent Victims in Conflict, which, in addition to identifying the multiple actors causing harm to the civilian population, also gives the victims a voice as well as a number: see Christopher Rogers, *Civilian harm and conflict in North West Pakistan* (Washington DC: CIVIC, 2010).

⁸² Michael Hirsh, ‘Slow dance: Obama’s romance with the CIA’, *National Journal*, 11 May 2011; Chris Woods, ‘The CIA drone strike that rewrote the rules’, at <http://www.thebureauinvestigates.com/2011/07/18/the-cia-drone-strike-that-rewrote-the-rules>.

500lb GPS-guided JDAM bombs, with a CEP of 10-13 metres. If all the conditions are satisfied, these are certainly much more accurate than the bombs used in the Second World War, whose CEP was often far in excess of 1000 meters, and in Indochina, where conventional bombs had a CEP of 130-140 meters and laser-guided bombs 22 meters.⁸³ Yet this cannot be what American officials mean when they invoke unparalleled ‘precision’ to endorse the use of remotely piloted aircraft to carry out targeted killings because conventional aircraft use the same weapons. In any case, the most accurate weapon in the world is useless if the target has not been correctly identified and located, and this inevitably becomes much more difficult as targeting contracts from an area or a box to a person. This is the heart of the matter. An editorial in the *Wall Street Journal* trumpeted that ‘never before in the history of warfare have we been able to distinguish as well between combatants and civilians as we can with drones,’ and it is surely this – the principle of *distinction* used to secure a claim to the moral high ground – that the protagonists of the program seek to emphasize.⁸⁴ ‘Distinction’ is thus more than a military-strategic or even an ethical-juridical concept; it is also a political-cultural construct that is made to do political and cultural work. The advocates of these new platforms insist that they alone make possible the networked fusion of persistent surveillance and high-resolution

⁸³ The CEP assumes that ordnance will be normally distributed around the target, so that with a CEP of n meters, 50 per cent will be within n meters of the aiming point, a further 43 per cent within the range $n-2n$, and less than 7 per cent within $n-3n$. This is an assumption – it is not always met – and neither are the controlled conditions under which the CEP is determined realized in practice. See Carl Conetta, *Disappearing the dead: Iraq, Afghanistan and the idea of a ‘new warfare’* (Cambridge MA: Commonwealth Institute, Project on Defense Alternatives, Research Monograph, 2004) p. 25.

⁸⁴ *Wall Street Journal*, 9 January 2010; even if this claim can be sustained, its ethical implications – ‘Smarter weapons like the Predator make for a more moral campaign’ – are not quite so straightforward: see Maja Zehfuss, ‘Targeting: precision and the production of ethics’, *European journal of international relations* 17 (2010) 543-66.

that at last enables – even compels – those involved in the kill-chain to spare innocent civilians. As I want to show, this is too glib by far. It jibes against the common criticism that drone wars are ‘videogame wars’ which inculcate a ‘Playstation mentality to killing’, but I think this is a superficial view too because it fails to engage with the political technology involved in sighting the enemy in this way.

Sighting the enemy

These new technologies require many of the skills used in videogames – including rapid hand-eye coordination, multi-tasking and visual acuity – but this does not automatically reduced war to a videogame. To explain the continued threat to civilians posed by this political technology of vision, I distinguish between near sight, far sight and top sight.

Most of the USAF Predator and Reaper flight crews are in the United States, from where they control aircraft over Afghanistan via a transatlantic fibre optic cable to Germany and a Ku-band satellite link; the exceptions are the forward-deployed Launch & Recovery crews that use a line-of-sight data link.⁸⁵ But the flight crews repeatedly insist that the real-time video feeds bring them right into the combat zone: that they are not 7,000 miles away but just eighteen inches, the distance from eye to screen. Insofar as this is a ‘videogame war’ then it shares in the extraordinary immersive capacity of

⁸⁵ The aircraft are stationed and maintained at bases in Afghanistan – until recently some CIA-controlled Predators were also based in Pakistan – but the distance from the United States imposes a 1.8 second delay in control inputs (‘latency’) that makes it impossible for pilots in Nevada to perform take-offs and landings. This delay also reinforces the importance of using guided weapons.

the most advanced videogames. This is significantly different from the detachment – the ‘distance and blindness’ – experienced by bomber crews over Germany or Vietnam. And yet the reality-effect this produces may be sufficiently powerful where remotely piloted aircraft are providing armed overwatch or close air support to convert proximity not distance, visibility not blindness into a serious problem. In such cases remote vision is limited, paradoxically, by *near sight*. Persistent surveillance means that flight crews come to ‘know’ their areas of operation in a particular way; they interact regularly with troops on the ground through live video feeds and online communications, and the intimacy created by these new forms of military-social networking can predispose them to interpret the actions of others in the vicinity as a threat to their comrades and to precipitate lethal action. ‘There’s no detachment,’ one officer explained. ‘Those employing the system are very involved at a personal level in combat. You hear the AK-47 going off, the intensity of the voice on the radio calling for help. You’re looking at him, 18 inches away from him, trying everything in your capability to get that person out of trouble.’⁸⁶ This is version 2.0 of the ‘personalized’ war described by FACs in Vietnam now transformed by new communications technologies and the formalized process of image analysis. From Nevada knowledge of the war zone is indexed by frequency not familiarity – it comes from ‘actuarial surveillance’⁸⁷ – and Afghanistan remains an alien landscape where common ground is confined to the virtual presence of coalition troops on the screen and in the online chat-rooms. An

⁸⁶ Megan McCloskey, ‘Two worlds of a drone pilot’, *Stars & Stripes*, 27 October 2009.

⁸⁷ Tyler Wall and Torin Monahan, ‘Surveillance and violence from afar: the politics of drones and liminal security-scapes’, *Theoretical criminology* 15 (2011) 239-254: 240; cf. Allen Feldman, ‘On the actuarial gaze: from 9/11 to Abu Ghraib’, *Cultural studies* 19 (2005) 203-226, who emphasizes ‘the hierarchical distance [of the actuarial gaze] from everyday life structures’ (p. 206).

example will illustrate what I mean. In the early morning of 21 February 2010 a Predator was tasked to track three vehicles travelling down a mountain road in Uruzgan province in central Afghanistan, several miles away from a Special Forces unit moving in to search a village for an IED factory. The Predator crew in Nevada had radio contact with the Special Forces Joint Terminal Attack Controller and they were online with image analysts at the Air Force's Special Operations Command headquarters in Florida.⁸⁸ At every turn the flight crew converted their observations into threat indicators: thus the two SUVs and a pick-up truck became a 'convoy', adolescents 'military-aged males' and praying a Taliban signifier ('seriously, that's what they do'). After three hours' surveillance two Kiowa helicopters were called in, and during the attack at least 23 people were killed and more than a dozen wounded. Only after the smoke had cleared did the horrified Predator crew re-cognize the victims as civilians, including women and children. Two military inquiries faulted the flight crew, but the incident was more than a matter of individual responsibility. It was also a structural effect of a culturally-divided visual field: a visual interpellation that made it extremely difficult for the crew to see the subjects of the surveillance as anything other than insurgents until it was too late.⁸⁹ It is hard to know how

⁸⁸ That this was a JSOC operation presumably explains why there is no trace of the Predator mission in the daily airpower summaries issued by US Central Command.

⁸⁹ I provide a fuller discussion in Derek Gregory, 'From a view to a kill: drones and late modern warfare', *Theory, culture and society* 28 (6) (2011) pp. 00-00; for the raw account, and a redacted transcript released under a Freedom of Information request, see David Cloud, 'Combat by camera: anatomy of an Afghan war tragedy', *Los Angeles Times*, 10 April 2011. The only known case of US troops being killed by friendly fire from a Predator – in Helmand province on 6 April 2011 – has been attributed to the same combination of misidentification and miscommunication; image analysts had doubts about the targets but 'did not believe they should intervene to block an airstrike' if there were a potential threat to ground troops'. This was compounded because in the Upper Sangin Valley the Marines had revised their procedures to speed up Predator strikes to

common this is, but the risk to civilians in such situations resides not only in the pressures of time-sensitive targeting – which is widely acknowledged⁹⁰ – but also in the video feeds from the Predator immersing its operators in, and to some substantial degree rendering them responsible for, the evolving situation on the ground. High-resolution imagery is not a uniquely technical capacity but part of a techno-*cultural* system that renders ‘our’ space familiar even in ‘their’ space – which remains obdurately Other.⁹¹

Where hunter-killer missions do not involve close contact with ground forces then different considerations apply. In these situations attacks depend on airborne surveillance and signals intelligence, and in a remark that echoes the controversy that swirled around the electronic battlefield, John Nagl, one of the architects of the current US counterinsurgency doctrine, declared that ‘we’re getting so good at various electronic means of identifying, tracking, locating members of the insurgency that we’re able to employ this extraordinary machine, an almost industrial-scale counterterrorism killing machine that has been able to pick out and take off the battlefield not just the top level al Qaeda-level insurgents, but also increasingly is being used to target mid-level insurgents.’⁹² Just as the critics of the electronic battlefield predicted, a reliance on ‘target signatures’ substitutes for local knowledge of the cultural landscape, but now aggravated by the use of formalized methods

prevent ‘delay of missions by injection of comments’ from image analysts. See David Zucchino and David Cloud ‘U.S. deaths in drone strike due to miscommunication, report says,’ *Los Angeles Times*, 14 October 2011; David Cloud and David Zucchino, ‘Multiple missteps led to drone killing US troops,’ *Los Angeles Times*, 5 November 2011.

⁹⁰ Troops in Contact, p. 30.

⁹¹ Gregory, ‘From a view to a kill’, pp. 00-00.

⁹² *Frontline* (PBS), ‘Kill/Capture’, 9 May 2011 (written and produced by Stephen Grey and Dan Edge).

of analysis that compound the distance effect. Again, an example will clarify the situation. On 2 September 2010 ISAF announced that a ‘precision air strike’ earlier that morning had killed the Taliban deputy shadow governor of Takhar province in northern Afghanistan and ‘nine other militants’. The target had been under persistent surveillance from remote platforms – what General Petraeus later called ‘days and days of the unblinking eye’ – until two strike aircraft repeatedly bombed the convoy in which he was travelling. Two attack helicopters were then ‘authorized to re-engage’ the survivors. The victim was not the designated target, however, but the election agent for a parliamentary candidate; nine other campaign workers died with him. A painstaking analysis by Kate Clark clearly showed that one man had been mistaken for the other, which she attributed to an over-reliance on ‘technical data’. Special Forces had concentrated on tracking cell phone usage and constructing social networks. ‘We were not tracking the names,’ she was told, ‘we were targeting the telephones.’⁹³ This is a standard operating procedure, part of the militarized rhythm analysis that I described earlier, and it is not confined to the US military or to Afghanistan. The CIA has been authorized to use lethal force against un-named individuals in Pakistan on the basis of their suspicious ‘pattern of life’. These people – at best ordinary foot soldiers, at worst innocent civilians that ‘walk off the straight line’ (above, p. 00) – are known as ‘signature targets’, and in their anonymity and abstraction they are ghostly traces of the target signatures that animated the electronic battlefield. Since the air strikes intensified one source estimates that 12 times more low-level fighters than mid- to high-level Al Qaeda or Taliban leaders have been killed, and reports claim that the ‘vast majority

⁹³ Kate Clarke, ‘The Takhar attack: targeted killings and the parallel worlds of US intelligence and Afghanistan’, Afghan Analysts Network Thematic Report 5 (2011);

have been individuals whose names were unknown or about whom the [CIA] had only fragmentary information'.⁹⁴ Takhar was a Special Forces operation, but the lesson is a general one. Here too the visual field is divided, with abstracted US intelligence separated from what Clark calls knowledge of 'the everyday world of Afghan politics', but the problem was primarily one of *far sight*. Even where there are no ground forces to engage the sympathies of flight crews, the inability to read the intimate textures of the landscape – what Petraeus calls the absence of 'a granular understanding of local circumstances' – turns out to have catastrophic consequences for the innocent.⁹⁵

Horrors like these are supposed to be prevented, or at least mitigated, by the introduction of a normative armature to targeting: near sight and far sight modulated by *oversight*. In Vietnam 'collateral damage' – the term was invented during that war – was limited by a political calculus. Johnson boasted that the Air Force could not bomb an outhouse in the North without his approval, and air strikes in the South required at least nominal clearance from provincial political leaders. But in both cases there were few legal restrictions. International law was conspicuously silent about air war, not least because the process that produced the Geneva Conventions in 1949 was dominated by the states that had the most experience of bombing, while those with the most experience of being bombed – Germany and Japan –

⁹⁴ David Cloud, 'CIA drones have broader list of targets', *Los Angeles Times* 5 May 2010; Adam Entous and Siobhan Gorman, 'CIA strikes strain ties with Pakistan further', *Wall Street Journal* 29 August 2011; Charlie Savage, 'White House weighs limits of terror fight', *New York Times* 15 September 2011. Similar questions have been raised about night raids in Afghanistan too: Alex Strick van Linschoten and Felix Kuehn, 'A Knock on the Door', Afghan Analysts Network Thematic Report 10 (2011).

⁹⁵ Clarke, 'Takhar attack', p. 5.

were excluded. Operational law remained strikingly undeveloped, and apart from one judge advocate in Thailand who scrutinised target lists in North Vietnam, military lawyers were not involved in the targeting process.⁹⁶ The situation changed dramatically after Vietnam, however, and today the risk of civilian casualties is a vital consideration throughout the kill-chain, driven by the requirements of international law, notably the Additional Protocols to the Geneva Conventions (1977), and the prospect of international scrutiny.

USAF targeting is now a quasi-judicial process in which visibility is a central modality. Targets must be positively identified from more than one source, and can only be attacked if a visual ‘chain of custody’ is maintained. Continuous observation is thus mandatory, so that the persistent presence of a remotely piloted aircraft becomes indispensable. A pattern of life analysis is conducted not only to acquire individual targets but also to determine the presence of civilians; collateral damage estimates are made using a classified ‘physics-based’ program integrated with the RainStorm precision targeting system; casualties may be mitigated by changing or modifying the ordnance to be used (‘weaponeering’).⁹⁷ This refined process retains the objectivist, calculative logic of earlier kill-chains, but its language shows that it has become a quasi-judicial exercise too. Judge advocates are now stationed on the combat operations floor of the CAOC in order to provide expert counsel

⁹⁶ Terrie Gent, ‘The role of Judge Advocates in a Joint Air Operations Center’, *Air Power Journal*, 13 (1) (1999) 40-55. Discussions of the legality of the air war were retrospective and confined to Rolling Thunder and Linebacker.

⁹⁷ Joint Targeting Cycle and Collateral Damage Estimation methodology, Joint Chiefs of Staff General Counsel, 10 November 2009; this briefing was made public following a FOIA request from the American Civil Liberties Union. ‘Sensitive targets’, including attacks where the collateral damage estimate exceeds 35 deaths, require approval from the Pentagon: Priest and Arkin, *Top secret America*, p. 214.

to commanders on the ‘prosecution’ of the target. They are required to consider international law, the Rules of Engagement and any special instructions, but they also have their eyes on the screen, monitoring up to 20 different chat windows at any one time and reviewing onscreen target folders containing imagery and other intelligence (Figure 6).⁹⁸ Here at least justice is not blind. According to Schmitt, persistent surveillance ensures ‘a significantly reduced risk of misidentifying the target or causing collateral damage to civilians and civilian property’, while Beard claims that these virtual-visual technologies introduce ‘unprecedented levels of transparency’ to the killing space, ‘eliminating some of the key excuses that states have long used to escape responsibility for attacks that appear to cause excessive civilian casualties.’⁹⁹ In these ways, the high resolution-level of the imagery is translated directly into a refined legal calculus that can supposedly make equally fine-grained distinctions between military and civilian targets and between combatants and non-combatants. Indeed, while he was serving as the staff judge advocate at the CAOC Colonel Gary Brown claimed that airborne intelligence, surveillance and reconnaissance ‘gives us the ability to actually apply [laws of armed conflict] principles (with almost mathematical precision) that were originally just concepts.’¹⁰⁰

⁹⁸ Garrett, ‘Necessity and proportionality’; Chatterjee, ‘Lawyers’; Priest and Arkin, *Top secret America*, p. 215; Beard, ‘Law and war’; Col. James Bitzes, ‘Role of an Air Operations Center Legal Advisor in Targeting’, presentation to *Drones, targeting and the promise of law*, New America Foundation, Washington DC, 24 February 2011.

⁹⁹ Michael Schmitt, ‘Drone attacks under the *Jus ad bello* and the *Jus in bello*: clearing the “fog of law”’, in Michael Schmitt (ed), *Yearbook of international humanitarian law* 13 (2010) pp. 311-26: 320; Jack Beard, ‘Law and war in the virtual era’, *American Journal of International Law* 103 (2009) pp. 409-45. Beard may well be right, but the only video records of questionable strikes have been released by Wikileaks.

¹⁰⁰ Col. Gary Brown, quoted in Charles Dunlap, ‘Come the Revolution: a legal perspective on air operations in Iraq since 2003,’ in Raul Pedrozo (ed), *The war in Iraq: a legal analysis* (Newport RI: Naval War College, 2010) pp. 139-154: 141.

What protocols the CIA follows for its targeting process in Pakistan are unknown – though Etzioni describes what he calls ‘a secret matrix’ and claims that it offers ‘robust oversight’¹⁰¹ – but if they are similar to the Air Force, then the protection afforded to civilians will be conditional. This is not to say that legal advisers do not intervene to prevent strikes where there is a risk of civilian casualties; they do. But international law allows for civilians to be killed in attacking a military target (‘discrimination’) so long as their deaths are outweighed by military advantage (‘proportionality’). This means that sometimes civilian deaths are accidental – the system is far from perfect – but in others they are *incidental* to what is deemed to be concrete and direct military advantage, in which case they have been anticipated and endorsed by judge advocates.¹⁰² When legalisms take centre stage in cases like this Tom Engelhardt advises us ‘to think of magicians’, and Brown’s invocation of ‘mathematical precision’ is pure sleight-of-hand; this has to refer to the process of collateral damage modelling rather than legal judgement since elsewhere he concedes that proportionality is ‘not a mathematical formula or anything like that’ and that the laws of armed conflict contain some ‘very wiggly concept[s].’¹⁰³ Indeed they do, but the still sharper point is that the legal armature that secures the process of target validation is not above the fray but is embedded within it. To refer to the ‘prosecution’ of the target is to concede that judge advocates are not

¹⁰¹ Amitai Etzioni, ‘The “secret” matrix’, *The world today* 66 (7) (2010) 11-14: 14.

¹⁰² Beard, ‘Law and war’, p. 438; see also Patricia Owens, ‘Accidents don’t just happen: the liberal politics of high-technology “humanitarian” war’, *Millennium: Journal of International Studies*, 32 (2003) pp. 595-616.

¹⁰³ Tom Engelhardt, ‘America’s permanent robot war’, *Guardian*, 4 October 2011; Transcript, Department of Defense Bloggers Roundtable with Col. Gary Brown, 27 May 2009.

impartial tribunes, still less defence attorneys, and when Beard asks ‘where now is the [military] lawyer’s client?’ his answer is unequivocal: Creech or the CAOC.¹⁰⁴ The incorporation of judge advocates into the kill-chain evidently does not diminish the privilege accorded to the military in the determination of military advantage; as Orford emphasizes, the relevant body of international law ‘immerses its addressees in a world of military calculations’ and ensures that proportionality will always be weighed on the military’s own scales.¹⁰⁵

The death of distance

Our understanding of bombing has been dominated by political and military historians who focus on strategy and social historians who recover the experiences of those who were bombed. These are vital contributions, but the gap between the two – the kill-chain – is too important to be left to buffs and geeks. Too often, focusing on strategy can make air war seem as clinical as its ‘progressive’ proponents proclaimed, and yet by the time we crouch under the bombs and give voice to the victims it is too late. We need to understand not only why the thing was done and with what consequences, but also *how*.

In tracing the twisting lines of descent from the Second World War through Indochina to Afghanistan and Pakistan, I hope I have not minimized

¹⁰⁴ Beard, ‘Law and war’, p. 419.

¹⁰⁵ Anne Orford, ‘The passions of protection: sovereign authority and humanitarian war’, in Didier Fassin and Mariella Pandolfi (eds), *Contemporary states of emergency: the politics of military and humanitarian interventions* (New York: Zone Books, 2010) pp. 335-356: 339.

the differences between them. Swift's descendants of the Lancaster bomber are not being used to destroy cities, and their targets are not the victims of the 'faceless' war described by Deighton – at least not where they seek out known and named individuals. The same cannot be said of those who carry out the attacks, however, and in a powerful critical commentary on the drone strikes in Pakistan two counterinsurgency proponents, David Kilcullen and Andrew Exum, described 'a frightened population' living under a constant threat from 'a faceless enemy that wages war from afar.'¹⁰⁶ Their point is a double one. They allude to the perpetual envelope of terror under which ordinary people are obliged to live (and die), and when we read accounts of air raids during the Second World War – the wail of the sirens, the crowded shelters, and the thud of the anti-aircraft guns – we should remember that the people of the borderlands hear no warning, have no place of refuge, and have no means of defence. Kilcullen and Exum also invoke a peculiar horror that is seemingly attached to war from a distance. And yet air wars have always been fought from a distance, and war more generally has a complex, developing relation to the spaces through which it is fought. By its very nature, bombing produces an alternation between different spaces. In his classic account of *The Command of the Air*, published in 1921, Giulio Douhet noted that 'by virtue of this new weapon, the repercussions of war are no longer limited by the farthest artillery range of guns, but can be felt directly for hundreds and hundreds of miles.' He predicted that in the future 'the battlefield will be limited only by the boundaries of the nations at war, and all of their citizens will become combatants, since all of them will be exposed to the aerial offensives of the enemy. There will be no distinction

¹⁰⁶ David Kilcullen and Andrew Exum, 'Death from above, outrage down below', *New York Times*, 16 May 2009.

any longer between soldiers and civilians.’¹⁰⁷ These were prophetic words, and that last sentence has haunted the wasteland of bombing for more than ninety years. And yet, even as it transformed the reach of military violence and rewrote the geography of armed conflict, dissolving the old boundaries between the front-line and the home front, when air war was conducted from ground stations rather than aircraft carriers it also re-established a distance between the relative security of the bases from which aircraft took off and the targets that they attacked. Pilots and their crews were hardly commuters to war, and they faced extraordinary danger as they flew through hostile air space, but if they returned safely it *was* usually to relative safety. Critics make much of today’s Predator and Reaper crews driving from home to the (remote) killing zone every day, but this is not the complete break from the past that they imagine it to be.

In short, I think it is a mistake to turn distance into a moral absolute. Pilots and crews in Nevada are 7,000 miles from their targets, but is this experientially any more remote than the B-52 crews flying from Guam to bomb targets five miles below them in South Vietnam? If distance is the issue (and I’m not sure that it is) at what point does wartime killing become acceptable? In posing these questions I don’t mean to say that nothing has changed since Vietnam either: Predators and Reapers do not carpet bomb whole landscapes. To be sure, many writers have drawn parallels between Vietnam and Afghanistan – and, again, there are differences too – but if Vietnam was a quagmire then Afghanistan-Pakistan threatens to become a vortex. If the battle space is now global, and if the United States claims the

¹⁰⁷ Giulio Douhet, *The command of the air* (trans Dino Ferrari) (Tuscaloosa AL: University of Alabama Press, 1998) (first published in Italian, 1921) pp. 9-10.

right to use lethal force against its enemies wherever it finds them, then what happens when other states claim the same right? And when non-state actors possess their own remotely piloted aircraft?

I began with Virginia Woolf's thoughts during an air raid. She ended her essay with these lines: 'Let us send these fragmentary notes to the huntsmen who are up in America, to the men and women whose sleep has not yet been broken by machine-gun fire, in the belief that they will rethink them generously and charitably.' I hope that fragments of this essay might give pause for thought to today's huntsmen and the masters of war busily cocking their Predators and Reapers.

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