

Visualities of strategic vision: Lookout Mountain Laboratory and the deterrent state from nuclear tests to Vietnam

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This article considers two visual cultures of America's deterrent state in the Cold War, the cinematic and cybernetic, by following the history of the 600th Photographic Squadron of the United States (US) Air Force in Vietnam and its 1950s progenitor, the 1352nd Motion Picture Squadron, or Lookout Mountain Laboratory. We argue that cinematic and cybernetic visual cultures were at the heart of a Cold War visual alliance that was also a Cold War visual contest, and cameras were situated at the centre of the contest. Specifically, the cinematic and the cybernetic represent two distinct visualities of vision, as the Cold War cameras of the Air Force assumed either transcendental or transcendent positions. The former, in keeping with a cinematic visuality, was oriented towards casting America as a sight to see in the context of its war on communism, with cameras operating as a condition of possibility for the construction of the 'image', whereas the latter, in keeping with a cybernetic visuality, was oriented towards the American appetite to see, to monitor and survey the world over, with cameras operating as processors of 'information'. The history of the 600th Photographic Squadron and its progenitor, Lookout Mountain Laboratory, suggests that the transition from cinematic to cybernetic visualities of vision was part of a broader transformation in the US Cold War state from a nuclear deterrent state to a supra-nuclear deterrent state.

(1) B-29s scramble; two atomic bombs are dropped, one on Hiroshima, the other on Nagasaki. (2) Churchill, at an outpost in rural Missouri, describes 'an iron curtain'. (3) Kennan's long telegram, followed by his 'X', establishing a strategy of containment. (4) Zhdanov describes a 'crusade against Communism' originating in America, one that uses 'diverse means' like 'the cinema, the radio, the church and the press'. (5) A thermonuclear device ignites in the Pacific; word gets out by means of errant radio signals. (6) A *coup d'état* in Guatemala – led by the CIA, for President Eisenhower,

against President Árbenz. (7) Mao Zedong launches a Great Leap Forward. (8) A fizzle at Novaya Zemlya, an archipelago in the north of Russia where, in 1958, 24 nuclear weapon tests took place, 23 successfully. (9) A wall is built in Berlin. People cry. (10) U-2 photographs show missiles in Cuba. The world scrambles.

And so the Cold War tick-tocked, year-by-year, right up to an end. But this end, the End, was too horrible to contemplate, as Kennedy and Khrushchev saw with Cuba. And so the United States (US) got into the business of 'safeguarding credibility' by sending combat troops and warplanes to deter communist aggression in what Kennedy's secretary of state, Dean Rusk, referred to as the 'periphery' (Gaddis 2005, 201, 239). '[I]f you don't pay attention to the periphery', Rusk warned, 'the periphery changes. And the first thing you know the periphery is the center. ... [W]hat happens in one place cannot help but affect what happens in another' (quoted in Gaddis 2005, 201). In the ensuing war in Vietnam, it was as if the strategic scriptwriters reached a bargain: instead of a cataclysmic end, let us make the real surreal, history a loop rather than a dead end, and war an ad hoc exercise in new operational idioms and management techniques aimed at saving face, rather than the means of global annihilation. And so innumerable sorties flew daily from airfields called Udorn, Ubon, Bien Hoa, Nha Trang, Tan Son Nhut and other transliterations of names otherwise exotic and illegible to the American ear. The sorties dropped explosives, chemicals and chemical explosives on the dense wood of 'the jungle', and took pictures as they did – the cameras often triggered by the same device that triggered the arms. The pictures were still and in motion; pilots reviewed them with professional interest; Air Force commanders watched them with cynical impatience; and publics occasionally saw them on the nightly news (but only occasionally). Meanwhile, virtually everyone agreed that Vietnam was an 'unwinnable' war (what does it mean to 'win' a war?), but this did not keep it from being the most thoroughly filmed and

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photographed war the US had ever fought, at least from the vantage point of the air.

In this article we follow the story of the Air Force unit responsible for most of those aerial films and photographs, the 600th Photographic Squadron of the US Air Force. We say *follow* because there is, frankly, no other adequate means by which to recount the story of the 600th and its labour. That work, like the war in Vietnam itself, was so diffuse and varied that neither its ‘motives’, nor its ‘mission’, nor its ‘effects’ are sufficient narrative devices. Rather the 600th offers a history of activities, and those activities are its story. Still, the activities of the 600th Photographic Squadron tell a story not only about the unit itself, but also about the unit’s progenitor, the 1352nd Motion Picture Squadron – or Lookout Mountain Laboratory – and, more broadly, about America’s Cold War. Specifically, we will argue in this article that they tell a story about the transformation of the American national security state from a *cinematic* strategic visuality to a *cybernetic* one.

At the heart of the story we tell, and of the distinction we draw between cinematic and the cybernetic, are two visual cultures of America’s Cold War. On the one hand, America’s strategists cast the nation as a *sight to see* in the context of its war on communism. More than ‘a city on a hill’, America was envisioned as a global force with which to reckon, a power that could purportedly, as President Kennedy declared in 1961, ‘deter all wars, general or limited, nuclear or conventional, large or small’ (quoted in Gaddis 2005, 213). American power, as the strategists said using a cinematic metaphor, could be *projected* onto the world so as to manage international affairs. America was here an ‘image’. On the other hand, America’s Cold War gave rise to an insatiable American appetite *to see*, to monitor and survey the world over and render all actions and events as ‘data’ or ‘information’ to be processed. Here computation more than cinematic projection was the central strategic metaphor, as America was a global monitor of world events. As we will show, these two visual cultures, the cinematic and cybernetic, constituted a Cold War visual alliance that was also a Cold War visual contest, and cameras were situated at the heart of the contest.

In a seminal essay in visual studies, Hal Foster presents ‘visuality’ as the social, historical and discursive dimensions of the visual, as distinguished from its ‘physical operation’ or what Foster refers to as ‘vision’ (1988, ix). In a more recent work, Nicholas Mirzoeff, drawing from the work of Thomas Carlyle, recounts visuality as ‘the making of the process of “history” perceptible to authority’ (2011, 3). Visuality therefore entails the social construction of perception *and* power.

But as Foster stresses, visuality and vision ‘are not opposed as nature to culture: vision is social and historical too, and visuality involves the body and the psyche’ (ix). Indeed, visuality is both configured with and within the physical mechanisms of sight. Hence, we can learn a great deal about the visual by attending to the *visuality of vision*: that is, the relative visibility or invisibility of technologies of vision within a given way of seeing, as well as how these technologies are seen or not seen to be seeing.

Cameras play a central role in the visuality of vision. Cameras make images not only appear to spectators who sit at a spatial and temporal remove from the events filmed or photographed, but authorise by means of their mechanical, electrical and chemical bases the significance of the image as variously ‘authentic’, ‘real’, ‘artistic’, ‘staged’, ‘candid’, ‘spectacular’ and so on. Cameras here are instruments of representation and appear to possess an immediate relationship to their subjects, a relationship that brings new intensities to the representation of fantasy and reality alike. Importantly, within the field of representation cameras do not themselves typically appear to the viewers of images. Rather, they stand in a transcendental relationship to the image, constituting the condition of its possibility and forming the assumed basis of its authority. (Thus, Metz [1982, 49–50] writes of the spectator’s ‘identification with the camera’.) Here the visuality of vision consists of the presumption of both the power and prestige of cameras to frame a scene, record an event, shoot a portrait, tell a story or construct an image, even as the camera is *not to be seen* – it is ‘invisible’. As we will discuss later in this essay, both the ‘big-screen’ productions of Hollywood in the 1940s and 1950s and the spectacle of nuclear deterrence put cameras in a transcendental position and participated in what we call a cinematic strategic visuality. Indeed, we show how ‘big-screen’ film and nuclear deterrence collaborated together to help constitute the US national security state of the 1950s as a nuclear-deterrent state.

Cameras, on the other hand, can appear in a very different manner as they give way to the flow of images. Surveillance images, for example, often lack visibility altogether, seen by few or none, except when representing the record of extraordinary, exceptional events. Even so, surveillance cameras exist *to be seen* – their physical operations are themselves, we might say, representations. Here the visuality of vision is centred on less *what* the camera sees and more *that* it always sees. Hence, while still participating in a representational regime, surveillance approaches the status of statistics, becoming one of the state’s tools ‘for rendering the

invisible visible, for making that which one could formerly only imagine into something factual and manageable' (Peters 1988, 14). Here cameras are less transcendental, a condition of possibility for the image, and more tools of *transcendence*, offering a 'god's eye' view of a realm, a 'panoramic *tour d'horizon* of a world far too vast for mortal eyes' (Peters 1988, 14). Indeed, cameras were used widely in the Vietnam War as a means of surveillance, statistics and analysis, and helped give rise not only to what we refer to as a *cybernetic* strategic visuality, but with it a diffuse deterrent state in which the strategy of deterrence functioned apart from the 'nuclear'.

A key concern in this article, therefore, is the strategy of deterrence. Generically, 'deterrence' is the intention of one agent to discourage or prevent another agent's acts, and even attitudes, by means of a threat. Deterrence has therefore been theorised as 'a form of coercion' (Powell 1990, 7; see also Freedman 2004; Lebow and Stein 1994). Indeed, deterrence is a mode of instrumental action, specifically *communicative* instrumental action, as seen in the threat. But deterrence is not just a threat; it is a threat intended to dissuade others from acting, feeling or believing in certain ways so as to limit or bound the behaviour of those others. Hence one dictionary (Deterrence 2014) tortuously defines deterrence as 'the act of making someone decide not to do something'. Again: the *act* of *making* someone decide *not* to do something. How do you act so as to make someone else not just decide, but to decide *not*? Deterrence is convoluted, and such convolutions may be why deterrence never gained robust status as a defence strategy until the Cold War and the advent of the most convoluted of weapons, nuclear weapons.

Strategy, as Lawrence Freedman (2013) reminds us, is a script, a preset rationality and routine that state actors seek to carry out. As a script, strategy is often unresponsive to new events, information or situations. Freedman recounts how the social scientist Robert Abelson, who had been working in the 1950s on the problem of influencing human behaviour, landed on the idea of a 'script' as a way to account for the ways in which new information fails to impact human plans, attitudes and beliefs (2013, 598–599). Most social situations come with corresponding scripts, Abelson reasoned. When the situations do not fit the accompanying script, he observed, social actors still tend to stick to the script. Strategies, Freedman argues, often function as scripts writ large: overall plans of action that end up anticipating the actions and attitudes of others to the point that new information or events often prove powerless to change routines or outlooks.

Deterrence, as convoluted as it was, became a central script in America's Cold War, beginning as *nuclear* deterrence. Deterrence was initially formulated under the doctrine of what Eisenhower's Secretary of State John Foster Dulles called in 1954 'massive retaliation'. Dulles's script was criminal (O'Gorman 2011, 75–121): 'We keep locks on our doors', Dulles explained in the speech outlining the doctrine, 'but we do not have an armed guard in every home. We rely principally on a community security system so well equipped to punish any who break in and steal that, in fact, would-be-aggressors are generally deterred'. Deterrence was for Dulles both preventative (locks on doors) and punitive (punishment). However, for Eisenhower, Dulles and others on Eisenhower's national security team, the idea of punishing an adversary with nuclear weapons, purely as a punitive measure in a tit-for-tat manner, challenged narrative plausibility. The scale and scope of nuclear weapons seemed to prohibit such measured responses. Rather, the administration came to think asymmetrically: nuclear weapons would be used not just in a retaliatory manner, but in a 'massive retaliatory' one in response to provocations from the Soviets, the Chinese or other adversaries (Gaddis 2005, 125–126, 148–149). Or such was the threat.

As a script, nuclear deterrence spawned new forms of routine action and reaction in the national security state. The rationalisation of human labour amidst the nuclear deterrent state gave rise to new visualities of vision, new ways of seeing the operations of sight. Most significantly, two older visualities were combined into one system, spectacle and surveillance (Foucault 1977). The spectacle of nuclear destruction, widely circulated in still photographs and motion pictures, not to mention in the cultural imagination, represented both the threat – the sign of an intention to destroy if provoked by the Soviets or another adversary – and the fantasy of national survival amidst a nuclear holocaust (Vanderbilt 2002; Oakes 1994; Masco 2014). Surveillance, conducted by means of aerial photography, radar, seismology and other forms of electrified vision, was a means of gauging provocations and of constructing the fantasy of a shield around the homeland. Amidst the national preoccupation with nuclear deterrence in the 1950s, both spectacle and surveillance drew on cameras as representative tools of 'vision'.

Hence, images of nuclear tests took on major strategic significance, quite apart from any technical or scientific data they might offer, for deterrence made the display of American power central to its exercise of power (Figure 1). Such display was not mere propaganda. Rather, display was integral to the



FIGURE 1. Staging a nuclear test. The 1352nd at work in the Pacific. Photo courtesy of Ken Hackman, formerly of Lookout Mountain Laboratory.

structure and direction of the script of nuclear deterrence. Tests were means of establishing the credibility of the overwhelming nuclear threat before the adversary and of communicating before the same adversary American competence and control. And these displays of American nuclear power were not for America’s adversaries alone: throughout the advent of the nuclear age, nuclear tests were used to quiet the worries of US government officials, America’s geopolitical allies and citizens in the US and abroad about the capacity of the US to control its daunting new atomic arsenal. Nuclear tests were intended to ‘prove’ such control, and as Joseph Masco has recently argued, summon the sorts of affective states among the citizenry that would be ‘politically useful’ (Masco 2014, 47).

In an essential and not merely propagandistic manner, therefore, nuclear tests were scripted *for and by cameras* as tools of both spectacle and surveillance. Every nuclear test America staged in the 1940s and 1950s was enveloped by electrified image machines, themselves part of broader political and cultural networks of image and story production. In the context of nuclear deterrence, cameras functioned as the transcendental condition of strategic possibility. Cameras did not come

to nuclear tests from the ‘outside’, so to speak, merely to ‘document’. Rather, they were integral to the strategy of the tests and were subject to, and indeed sometimes the explicit subjects of, the strategic visuality of nuclear testing.

In 1947 the Air Force established Lookout Mountain Laboratory, or the 4881st Motion Picture Squadron of the US Air Force (redesignated the 1352nd in 1952), to provide ‘specialized photographic documentation of atomic weapons tests’ (Outline 1953, 1). Based in Hollywood, Lookout Mountain began primarily as a film production unit, taking film footage shot by other government units at nuclear tests and producing out of it ‘documentary’ films about these operations. However, within a short time its mission expanded to include on-site photographic shooting of nuclear tests. It became at once a global camera operation and a full-scale, Hollywood-style film studio. As such, Lookout Mountain was particularly suited to the representation and performance of spectacle and surveillance that was integral to the nascent strategy of nuclear deterrence. It also offered the state, via the Air Force and the Atomic Energy Commission (AEC), a means by which to *tell the story* of American nuclear power, and by extension nuclear deterrence.

The Air Force's use of cameras, of course, was not new. It relied heavily on reconnaissance and combat camera units in the Second World War for intelligence and documentation. But the Air Force's relationship with Hollywood was not new either. In 1942 Army Air Force Chief 'Hap' Arnold, who had himself considered a Hollywood career earlier in his life, worked with Hollywood professionals, above all Jack Warner, to establish the Army Air Force's First Motion Picture Unity (FMPU) in Culver City, California. Its explicit mission was to produce 'training, operational, and inspirational films' concerning Army Air Force activities in the Second World War. But, as Douglas Cunningham has argued, the implicit mission of the FMPU was to forge a distinct Air Force identity for Army Air Force personnel, government officials and the publics who would watch the Air Force on the big screen at home (Cunningham 2005). The FMPU – which incorporated into its operations everything from writing and shooting to animation and special effects – produced over 300 films during the war. Indeed, in 1944, at the height of the war, it made more films than any other Hollywood studio (More Films 1944, 24). The sheer proliferation of FMPU films during the war helped forge for the Air Force, as Cunningham argues, 'a cinematic sense of Air Force identity' (96). The Air Force's cinematic identity would revolve around a combination of heroic actors, above all airmen, and technological spectacle, in the form of both bombs and planes. The FMPU – which distributed its films throughout not only its own forces at home and abroad but throughout the home front to war plants, town theatres and civic organisations – allowed the Air Force to construct its story and identity on and for the big screen.

But the Air Force's cinematic identity would also entail forms of narrative and visual control over the meaning of its central strategic practice in the Second World War, so-called 'strategic bombing' (Lewis 2007, 45–56). A controversial new war tactic, made possible by technological advancements in airplanes and bombs, strategic bombing used heavy aerial bombardment to destroy not only enemy forces, but war production facilities, lines of transportation and communication and, above all, enemy 'morale'. Curtis Lemay, who would gain infamy in the 1950s as the firebrand leader Strategic Air Command's nuclear deterrent force, gained special notoriety in the Second World War for his ruthless and belligerent leadership of strategic bombing operations in Europe and especially the Pacific. Lemay, Arnold, and other Army Air Force leaders in 1940s trumpeted the advent of the 'air age' and 'total war' and argued for the centrality of air operations in the future of warfare.

The advent of atomic weapons only strengthened their case.

Lookout Mountain set up its operations in the Hollywood hills in 1947 and 1948 amidst the planning period for Operation Sandstone, the second major post-war nuclear test. Sandstone, like the first post-war nuclear test, Operation Crossroads, was set in the Pacific and aggressively filmed and photographed. But whereas primary photographic responsibilities for Crossroads had been the Navy's, the newly independent Air Force was given the responsibility for photography at Sandstone and put under the command of Brigadier General P.T. Cullen (Outline 1953, 2). Cullen split photographic responsibilities at Sandstone into two principal wings: Los Alamos Laboratory, operating under the auspices of the newly formed AEC and the Air Force. Los Alamos would oversee scientific photography, and the Air Force, led by the 311th Air Reconnaissance Division, would do both technical and documentary film and photography. Lookout Mountain, meanwhile, was charged with motion picture production using footage shot by the 311th Reconnaissance (Hull 1948, 4).

Assigning key photographic work to a *reconnaissance* division at Sandstone was in part due to the Air Force's experience at Crossroads, where Army Air Force airplanes under Cullen's command shot some of the most spectacular footage of the atomic blast and began to refine aerial photographic techniques that would prove useful at later tests. Indeed, Cullen's planes at Crossroads were so heavily rigged with cameras that they were dubbed 'flying cameras' (Hull 1948, 4; History of 58th Wing, n.d., 10). But the reconnaissance assignment also had strategic significance, as it indicated the acceleration of America's nuclear weapons programme. Whereas Crossroads had been designed to test the effects of 1945-era atomic weapons on naval ships, largely to 'demonstrate' US naval fortitude beneath atomic weapons like the ones Los Alamos had built in the Second World War (Atkinson 2011), Sandstone was explicitly aimed at making atomic weapons more efficient and destructive. Atomic bombs, one might say, were becoming 'nuclear weapons', and were moving in a decidedly more *strategic* direction. Reconnaissance, which during the war had been central to the assessment and planning of strategic bombing campaigns, seemed well suited to the strategic assessments needed to guide nuclear weapons development. As the official report on photography at Sandstone stated, the 311th's photography was meant to 'gather scientific data and operational facts upon which an Atomic striking force must be built' (Hull 1948, 1).

A number of photographers affiliated with Lookout Mountain were present at the test. Lookout Mountain’s work, however, was focused on the post-test ‘informational’ effort of the testing operation. Prior to the test, the AEC, the Navy, the Army and the Air Force agreed on the production of multiple films about Sandstone, produced at various levels of classification and with various subjects and audiences in mind (Hull 1948, 4, 10). Their goal was no doubt propagandistic: film represented a powerful means by which to display the accomplishments of the newly formed AEC-Department of Defense nuclear testing regime. But the significance of these films was not strictly propagandistic, for in them Lookout Mountain was given the unique responsibility of telling the story of Operation Sandstone to an array of official and public audiences. (Official written reports were kept classified and journalists, unlike at Crossroads, were prohibited from being present at Sandstone [Hull 1948, 10].) Thus in literal fashion, Lookout Mountain was granted the power to write the still-nascent script of American nuclear power.

Over the next several years, as more destructive weapons were designed, Lookout Mountain’s photographic responsibilities at nuclear tests grew substantially. Whereas the studio was seen primarily as a motion picture production unit at Sandstone, by the time of Operation Greenhouse – nuclear tests held in 1951 in the Pacific – Lookout Mountain was seen as a full-scale nuclear testing shooting and production unit. It was moved by the Air Force and the AEC to the centre of photographic operations at Greenhouse, displacing the 311th Air Reconnaissance Division and made responsible for all ‘documentary’ still and motion picture work at the blast. Photographers from the AEC and its contractors, to be sure, still covered scientific photography, but Lookout Mountain was the most prominent photographic agency at the test.

Indeed, but a year later, at Operation Ivy – the first test of a thermonuclear device, massively more destructive than any prior type of device – Lookout Mountain was reassigned to the *scientific* division of the test task force, encroaching even on the domain of AEC photographers (O’Gorman and Hamilton, [forthcoming](#)). Lookout Mountain, however, was not seen as threatening the work of the AEC, but rather as serving it, for the *story* of ‘scientific progress’ and the *spectacle* of nuclear weapon detonations were becoming more and more important to elites in the AEC, the Pentagon and the White House. That is, Lookout Mountain’s growing role was correlated with a growth in the power of both national and more broadly western ideologies in and around nuclear

weapons development. Indeed, Lookout Mountain’s leadership recognised the new centrality of story and spectacle. Lt. Col. James Gaylord explained to his Air Force superiors when reviewing the studio’s activities at Operation Ivy, ‘[i]t is in the Scientific Program that the heart of the documentary story lies’, and therefore it is the scientific program that the 1352nd should cover (Gaylord 1953). Lookout Mountain was assuming its place in the emergent age of nuclear deterrence, where nuclear weapons, propelled by ‘science’, were becoming of such destructive scale that their actual use in anything resembling a ‘conventional’ war looked more and more absurd.

Hence, Lookout Mountain worked closely with AEC scientists at Operation Ivy to tell the story of science and the dawn of the new thermonuclear age. The motion picture film Lookout Mountain produced, *Operation Ivy*, told this story in epochal terms: the thermonuclear detonation was described as ‘the largest explosion ever set off on the face of the earth’, ‘one of the most momentous events in the history of science’, and ‘the most powerful explosion ever witnessed by human eyes’. And yet *Operation Ivy* was also about American technological competence and control in the face of this new spectacular age of massive nuclear destruction. Central to its narrative and visual focus were all the test’s instruments of surveillance, not least the cameras and the men operating them (O’Gorman and Hamilton 2011). *Operation Ivy* thus offered a story of American leadership and control in the advent of an epochal transformation in science and defence (O’Gorman and Hamilton, [forthcoming](#)).

Operation Ivy, in fact, put into the form of narrative film the emergent script of nuclear deterrence. Even more, in certain respects the film performed the script of nuclear deterrence: by covering through hundreds of cameras hidden from the screen’s view the full scene of a massive state operation, and by offering, in turn, the image of a future End in the form of the ‘the largest explosion ever set off on the face of the earth’, *Operation Ivy* performed both surveillance and spectacle, and produced in cinematic form the convoluted rhetoric of dissuasion that typifies nuclear deterrence. Indeed, American nuclear deterrence, as it developed in the 1950s, rested not only on the visualities of surveillance and spectacle, but also on the ability of the US to control the story, and to do so indefinitely. Formally speaking, the major motion documentary picture, produced in the idiom of the Hollywood spectacle, enclosed into a singular aesthetic system each of these components: surveillance, spectacle, story and epochal temporalities. Nuclear deterrence, we might say, was a ‘big picture’ strategy that found an aesthetic counterpart in the

big picture cameras and screens of Hollywood, and had found its place within a cinematic visuality.

By the late 1950s, the US, with the Air Force at the lead, was fully organised around the strategy of nuclear deterrence. Strategic Air Command, under the command of Lemay, stood at the centre of an overwhelming nuclear striking force, ready to act upon the president's command (and even, quite possibly, apart from that command). Meanwhile, above-ground nuclear tests, which a few years earlier had been the most complex and spectacular of state operations, were increasingly routine. Though nuclear scientists and other engineers of cold war saw nuclear tests as indispensable to the further advancement of these weapons of mass destruction, Eisenhower became willing to dispense with them if a testing moratorium could be used as a bargaining chip in diplomatic negotiations with the Soviets. Conditions were ripe, it seemed, for nuclear weapons development to stabilise, and for nuclear deterrence to become the economical basis for the 'long-haul' approach to national security that Eisenhower had desired since taking office in 1953 (Gaddis 2005, 125–161).

But it would not be so: far from stabilising, deterrence would undergo significant transformations in the next decade. First of all, America's nuclear weapons capabilities would continue to grow. Both the US and the USSR were building ever-growing 'triad' nuclear forces, combining land-based strategic bombers with intercontinental missile forces and submarine-based nuclear arsenals. The result was a combined nuclear striking force capable of exterminating most species on Earth, all in the name of national security. The expansion of nuclear forces under the auspices of deterrence would eventually be codified as Mutual Assured Destruction, or MAD. It 'guaranteed' reciprocal destruction if either side launched a first strike. According to the theory of Nash's equilibrium, the 'guarantee' would prevent either nation from precipitating a nuclear attack upon the other (Tadelis 2013, 163–164). And so the world was left looking headlong into an apocalyptic End to keep the peace.

The second transformation in deterrence was far less dramatic, but just as consequential: *deterrence* supplanted *nuclear* deterrence to frame a subtler but more generalised American approach to cold war, and indeed to the horrible 'counter-insurgency' war in Vietnam. The idea of coercion by means of threat became an overarching script for American war, as in the 1960s not only cold war but the more notorious 'hot war' in Vietnam were made in the image of deterrence. For the explicit goal in Vietnam for Presidents Kennedy

and Johnson, with their Secretary of Defense Robert McNamara, was not to conquer the adversary, but rather to compel them to behaviour amenable to US interests. War, especially aerial bombing, was seen as a *communicative* means by which to do this.

Kennedy's – and then Johnson's – approach to Vietnam was premised on the idea of 'flexible response' and the methods of 'systems analysis' to calibrate responses (Gaddis 2005, 224–226; Freedman 2000, 13–26). Rather than commit to one or several courses of action, McNamara, acting in the vein of the corporate executive he had been with Ford Motor Company, used weekly meetings in the Pentagon and White House to gauge and adjust the progress of the war in Southeast Asia, right down to selecting particular bombing targets. Throughout, McNamara and his advisors approached warfare as a form of message sending not only to their immediate adversaries, the North Vietnamese and Vietcong, but also to the broader world. US offensives in Vietnam were understood as essentially communicative, means of asserting American prestige, compelling compliance and above all deterring enemy aggression and expansion through the display of American military force.

Yet, as John Lewis Gaddis writes of the relationship between 'flexible response' and America's humiliating defeat in Vietnam, 'rarely have accomplishments turned out so totally at variance with intended objections' (Gaddis 2005, 235). While many factors contributed to the futility, and indeed absurdity, of the US war on Vietnam, Gaddis explains it in terms of a curious fixation on the part of McNamara and his team with 'process'. They assumed,

that the defense of Southeast Asia was crucial to the maintenance of world order; that force could be applied in Vietnam with precision and discrimination; that means existed to evaluate performance accurately; and that success would enhance American power, prestige, and credibility in the world. These assumptions in turn reflected a curiously myopic preoccupation with process – a disproportionate fascination with means at the expense of ends – so that a strategy designed to produce a precise correspondence between intentions and accomplishments in fact produced just the opposites. (Gaddis 2005, 236)

Indeed, a preoccupation with process was a major feature of the US war in Vietnam, at least as it was operationalised from above. But Gaddis too hastily concludes that this was at the expense of ends, for it is clear that the goal of the war for the White House was to

coerce the North Vietnamese, and secondarily the Vietcong, into a particular behaviour pattern for rhetorical reasons, namely the maintenance on a global scale of US prestige and credibility. As Gaddis himself writes of the assumptions guiding the Kennedy and Johnson administrations in Vietnam and elsewhere, ‘Power, they believed, was as much a function of perceptions as hardware, position, or will; minute shifts in distribution – or even the appearance of such shifts – could cause [they believed] chain reactions to sweep the world, with potentially devastating consequences’ (Gaddis 2005, 200–201). Indeed, when it came to the US war in Vietnam *perception* was the end in sight, and the preoccupation with *process* became the means by which to structure perception.

Again, there is both an Air Force bombing and an Air Force camera story to be told here. Throughout the war in Vietnam, the Air Force and McNamara incessantly argued over the nature and extent of the air attack. The Air Force pushed for an aggressive assault on North Vietnam, meant to utterly disable and destroy the enemy. McNamara, on the other hand, insisted on restraint. From McNamara’s perspective, as the infamous Pentagon Papers summarise,

The air war against the North was launched in the hope that it would strengthen GVN [South Vietnam] confidence and cohesion, and that it would deter or restrain the DRV [North Vietnam] from continuing its support of the revolutionary war in the South. There was hope also that a quite modest bombing effort would be sufficient; that the demonstration of US determination and the potential risks and costs to the North implicit in the early air strikes would provide the US with substantial bargaining leverage; and that it would redress the ‘equation of advantage’ so that a political settlement might be negotiated on acceptable terms’. (Secretary of Defense 1969, IV.C.3, i)

In McNamara’s thinking, the air campaign ‘should be structured to capitalize on fear of future attacks. At any time, “pressure” on the DRV [North Vietnam] depends not upon the *current* level of bombing but rather upon the credible threat of *future* destruction which can be avoided by agreeing to negotiate’ (Secretary of Defense 1969, IV.C.7, 15). Warfare had thus not only become primarily a form of instrumental communication, or message sending, but also the fine-tuning of messages: just as McNamara sought to calibrate nuclear deterrence through the imposition of ‘systems analysis’ and game theory, culminating in MAD, so too he sought to calibrate his deterrent ‘messages’ to the North Vietnamese via the

air war, and it was here that he butted heads with the Air Force.

Yet, both the Air Force and McNamara saw air war as means of demonstrating to the adversary American power and resolve, and both conceived of the air war as always entailing as a *threat of future attack*, not only on the North Vietnamese, but on other adversaries in the world. The Air Force simply wanted to do the threatening by means of big bangs, shock and awe, and spectacle. Lemay ‘called for an end to the policy of sending “messages” in the form of the low-level military actions, in the hope that Hanoi would change its policy... It was time to convey a “message” sharply and directly’ (Van Staaveren 2002, 43). Habituated to the ‘money shot’, the Air Force wanted to go big, but McNamara and his civilian advisors held tightly to the reins of the air war (especially early on), pursuing ‘perceptions’ that were indiscernible to the big screen, requiring instead finely tuned forms of statistical analysis to see.

For the Air Force, the detachment of the ‘nuclear’ from ‘deterrence’ was entwined with a shift in photographic labour, technologies and circulation patterns. A small crew of photographers – numbering less than 10 – was sent from the 1352nd to Vietnam in 1962. This seemingly minor episode, however, would represent the beginning of the dramatic transformation of Lookout Mountain’s activities and a transformation in Cold War visuality with implications across the armed forces. While the camera in service of *nuclear* deterrence borrowed from cinematic techniques to establish authority for the image as *witness*, deterrence in Vietnam required a different sort of camera, a cybernetic camera. This new camera served not the spectacle of potential massive destruction, but the calculus of measured threat; it served not as a transcendental condition for witness, but as a node in the system of state power. If the cinematic camera in nuclear deterrence lent authority, in transcendental fashion, to the image, the cybernetic camera lent the authority of transcendent vision to its impersonal, institutional bearer.

Indeed, the human bearers of these cybernetic cameras became hard to see. Within the older regime of nuclear deterrence, the camera operator was a craftsman and a *flâneur*. As a valued, if often silent, expert, the photographer under nuclear deterrence was cast as an adventurer in the construction of the image of America. Under the regime of supra-nuclear deterrence, however, the engineer and the manager surpassed the photographer in importance. The resulting images’ ability to incriminate, demonstrate or threaten was dependent not on the artistry of the camera, but on the analytic system of which the camera was but a part. In the context

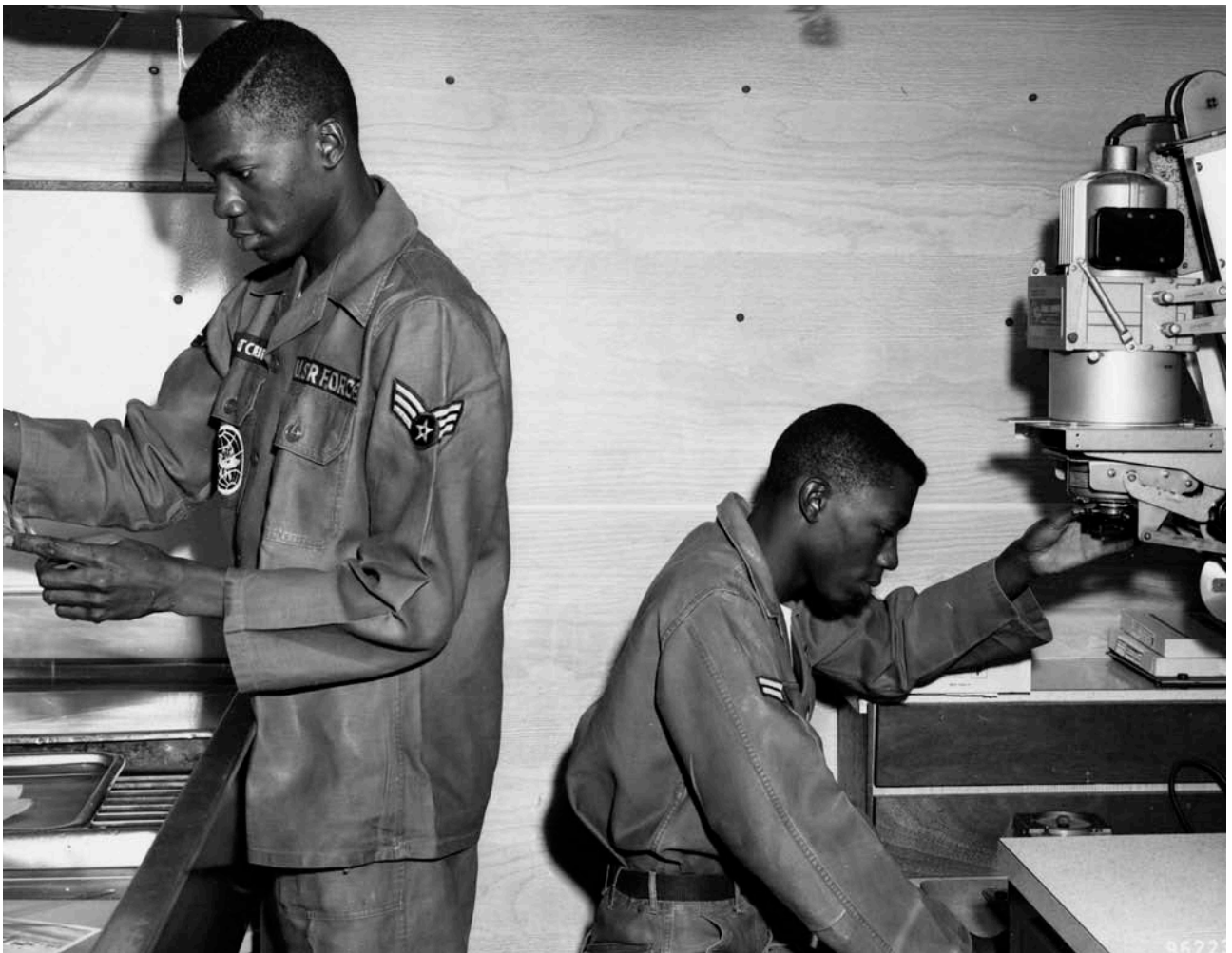


FIGURE 2. Brothers Richard Gatcher (left) and Robert Gatcher, stationed with Detachment 5 of the 1352nd Photographic Squadron, print photographs in a mobile darkroom at Tan Son Nhut Air Base in December 1965. Source: National Archives and Records Administration.

of this diffuse deterrent state, the cybernetic photographic system included not only the regimes and cycles by which the camera captured data, but also the labour that managed it, ensuring visual truth through the guarantee of regularity and precision. Spectacle lost primacy – indeed, the image itself did not speak in the cybernetic regime, but had meaning only as part of larger set of nested systems processing inputs and outputs.

The organisational conditions for the Air Force transition from cinematic to cybernetic visualities were already stirring in the early 1950s, when managers began to weigh the inefficiencies of the decentralised, improvisational managerial style of cinematic labour at the squadron level against its benefits. 1951 saw the creation of the Air Pictorial Service (APS), given a mission to ‘control and supervise all Air Force activities in the fields of photography and television’ (History of the Aerospace Audio-Visual Service 1 January 1967 to June 30 1968, 1970, 145). By all accounts, however, the APS (later termed the APCS after the addition of charting and aerial

mapping to its mission) assumed little of its mission in the first decade of operations. Rather, photographic squadrons continued to rely on the decentralised, improvisational approach with relatively little interference from management above. Meanwhile, non-photographic units in the Air Force – which were often tightly managed – hardly noticed the relative freedom of the photographic and motion picture units. Though cinema was central to the Air Force’s public identity, non-photographic units in the Air Force saw photography as a mere materiel or logistical concern that could be procured and employed as needed, and thus not in need of centralised supervision (History of the Aerospace Audio-Visual Service 1 January 1967 to 30 June 1968, 1970, 146). Thus despite the establishment of the APS, in the 1950s specialised photographic units continued to rely on improvisational techniques that did not translate particularly well into centralised, hierarchical systems.

Lookout Mountain was a case in point. In serving the nuclear testing regime in the 1950s, the 1352nd had

drawn from whatever film production and photography techniques and technologies were available, and when no suitable techniques and technologies were to be found, they invented new ones. When the first Lookout Mountain personnel arrived in Vietnam in 1962, it was this ethos of expertise, adventure and improvisation that they self-consciously brought with them. They shot and produced ‘Fact Finder’ films meant to orient Air Force headquarters back in the US on Air Force ‘ordinance, personnel and training needs’ in Vietnam, and built and ran experimental, mobile, trailer-based film processing labs to process aerial footage of potential targets, landing spots and strike damage photographed by pilots (History of 1352d, 1 July 1962 to 31 December 1962, 63).

Assessment of strike damage, however, would become more and more central to Lookout Mountain’s work in Southeast Asia. On 1 January 1963 the still small Lookout Mountain crew in Vietnam was given its own designation as Detachment 3-1 of the 1352nd Photographic Group, and officially attached to the Second Air Division of the Air Force (later in the Vietnam War known as the Seventh Air Force), which was providing air support to the armed forces of the Republic of Vietnam. Detachment 3-1 spent much of its energies in 1963 working on equipping American-made aircraft with Republic of Vietnam markings – in fact, sometimes flown by American pilots – with camera devices to record bombardment successes and failures. The footage was developed in the mobile darkrooms Detachment 3-1 had built, and sent back to the wings for review (Figure 2).

As in their work on mobile darkrooms, this new combat aerial camera project started as a deviation from standard practice – fighter wings had in the past taken care of their own aerial photography. Detachment 3-1 stepped in to help the fighter wings by building a few different remote pod and wing bracket camera assemblies for strike aircraft and helicopters (Figure 3), using primarily 35mm motion picture cameras and 70mm sequence cameras (History of 1352d Motion, 1 January 1964 to 30 June 1964, 84). Pilots were to trigger the cameras remotely upon striking targets. However, Detachment 3-1 quickly learned what they would relearn over and over again in Vietnam: pilots are not very good cameramen. They would sometimes forget to switch the cameras on, or – as frequently – they would accidentally run the cameras at the wrong time, wasting all the film stock on useless subjects (History of 1352d Motion, 1 January 1964 to 30 June 1964, 84). Before long, Detachment 3-1 photographers – renamed Detachment 5 in 1964 to reflect their growing responsibilities – found themselves in the exceptionally



FIGURE 3. Staff Sergeant Jack Schaefer of the 1352nd mounts a B1A motion picture camera with a motor drive on a rescue helicopter for combat documentation in Vietnam in 1965. Source: National Archives and Records Administration.

uncomfortable confines of the backseat of fighter aircraft, shooting strikes by hand with long-lensed cameras as pilots pulled away from their targets. This footage, too, proved unsatisfactory: even these expert cameramen could not hold the camera steady amidst the aerial convolutions of Vietnam (History of 1352d, 1 January 1965 to 30 June 1965, 8–9).

Detachment 5 struggled with airborne photography in Vietnam for nearly two years. Back in Hollywood, Lookout Mountain engineers and photographers tried to problem solve. They eventually landed upon a solution, designing and building from scratch camera ‘pods’ that would be mounted on an airplane’s wing or belly (where ordnance would usually be) and wired such that the 16mm Milliken high-speed cameras inside – typically stocked with colour film – would be automatically triggered upon the pilot firing ordnance. As of March 1965, the 1352nd had installed 10 of these ‘Type IV’ camera pods (Figure 4), as they called them, on propeller-driven aircraft, all of which operated smoothly (History of 1352d, 1 January 1965 to 30 June 1965, 11).

Indeed, the Type IV camera pods returned footage of strikes that the Air Force described as ‘spectacular’ (History of 1352d, 1 January 1965 to 30 June 1965, 11).



FIGURE 4. General Howell Marion Estes II, Commander of the Military Air Transport Service, inspects a newly engineered Type IV Camera Pod upon its arrival in Vietnam. Source: Personal Collection of Al Holman.

The success of the Type IV program created an insatiable appetite at all levels of the Air Force for more ‘spectacular’ footage from the skies above Vietnam, and as the 1352nd was not just responsible for building and installing the pods, but also for processing, storing and distributing the film footage, the pressures on the unit became extraordinary. Whereas at the beginning of 1964 Lookout Mountain considered its most significant work to be missile and other nuclear weapons-related activities (including space launches), by the beginning of 1965 the 1352nd would report that the air war in and around Vietnam was so taxing that the unit had to abandon or neglect these other significant projects. By the middle of 1965, the 1352nd reported that both its civilian and military personnel ‘expended thousands of hours of unpaid overtime to fulfil emergency requirements’ of its Southeast Asia activities (History of 1352d, 1 July 1965 to 31 December 1965, 3). Over the first half of 1965, Detachment 5 of the 1352nd, based at Tan Son Hut, exposed 82 855 feet of 16mm colour film, a staple of the new pods (History of 1352d, 1 January 1965 to 30 June 1965, 153). In the second half of that year, amidst the rollout of the Rolling Thunder ‘calibrated’ aerial bombardment campaign against North Vietnam, over double that amount was exposed, 204 644 feet (History of 1352d, 1 July 1965 to 31 December 1965, 249). Thus whereas in 1963 Detachment 5 did not even exist, by 1965 it was the most significant and sizeable detachment in the 1352nd.

Meanwhile, Air Force command back in Washington, DC began to worry that the Air Force was not getting enough nightly news coverage on television. Hence, in August 1965, headquarters launched what they referred

to as the Skypoint program. Among other things, this initiative required that the 1352nd begin to ‘receive, process, cull, print and ship to the USAF Command Post, Washington, D.C. all pod motion picture film within an 18-hour period from time of receipt to time of shipment’ (History of 1352d, 1 January 1965 to 30 June 1965, 10). Consequently, even as it was rapidly processing aerial bombardment photography, Lookout Mountain had to learn the new temporality of the small screen: whereas *Operation Ivy*, the 1953 big-screen film, was a two-year project for the studio, Vietnam coverage was being demanded on a *daily* basis. The 18-hour schedule was made to do double duty as pilots, too, were demanding rapid turnaround of the pod footage, anxious to know if they hit their targets and, if so, how well (History of 1352d, 1 January 1965 to 30 June 1965, 18). Lookout Mountain devised a system of processing and distribution that would turn out hundreds of feet of new footage some nine times a week. They made it their priority to get this footage back to the field in Vietnam as quickly as possible, sending additional copies to headquarters in Washington DC, the office of Air Force information, the Pacific Air Force and APCS (History of 1352d, 1 January 1965 to 30 June 1965, Appendix IV).

Thus by 1966, the use of cameras in Air Force Vietnam operations was becoming so ubiquitous as to render film footage the ‘raw material’ of war. ‘A great deal of emphasis has been placed on obtaining over-the target motion picture coverage’, Col. Frank R. Amend at Air Force Command Post wrote to his subordinates in September 1965: ‘[T]his type of photography is used in a number of ways and is the raw material from which a number of valuable end-products are produced’. Henceforth, Amend ordered, it was essential that ‘a high degree of control, accessibility and identification’ be established over the raw photographic material of the war (History of 1352d, 1 July 1965 to 31 December 1965, attached letter Col. Frank R. Amend to MATS and CINCPACAF, 16 September 1965). Command wanted the film footage upon demand, ready to do whatever bidding was deemed necessary, be it propaganda, instruction or, as it seems the footage increasingly served, a means of constructing data for the Pentagon to review in its ongoing efforts at calibrating this war of non-nuclear deterrence.

The demand for data from a centralised photographic service found institutional form in the re-designation of Detachment 5 as a full-blown squadron at the start of 1966. As part of an effort called ‘Operation Morepix’, the new 600th Photographic Squadron, based at Tan Son Nhut and supervising nine



FIGURE 5. President Lyndon B. Johnson convenes a 'Tuesday Cabinet' meeting in the White House Dining Room in October of 1967. Pictured left to right are Press Secy. George Christian, Walt Rostow, Secy. Robert McNamara, Tom Johnson, Richard Helms, Secy. Dean Rusk and the President. Source: Lyndon Baines Johnson Presidential Library.

detachments across Southeast Asia, would carry photography ever deeper into the technological and strategic mechanisms of aerial warfare. As the planners behind Rolling Thunder increased bombings in their careful calibrations, the 600th worked with the 1352nd to develop a whole new suite of cameras on board planes. In the hands of Lookout Mountain's specialists, armament recording expanded to include not only pods mounted below the planes, but smaller 'blister' pods integrated into the body of plane fuselages, gun cameras to capture strafing and plane-to-plane combat, scope cameras to record the on-board radar throughout each mission, and strike cameras that captured 180-degree views of bombing targets before, during and after attack.

Operation Morepix added 199 new personnel to inaugurate the 600th in January 1966, a threefold increase over Detachment 5's personnel the month prior. By July of that year, their numbers had leaped to 417. The Air Force also placed one of their top photographic commanders in charge of the new squadron, Colonel James P. Warndorf. Warndorf had led Lookout Mountain for six years during the height of

nuclear testing in the 1950s, before being moved up to headquarters of APCS, where he became an advocate for consolidation of photographic responsibilities across the Air Force. (In 1965, the Department of Defense had charged him with leading a study of consolidating audiovisual needs across *all* the armed forces.)

Still, the 600th struggled to meet the demands of McNamara's efforts to make the national security state more streamlined, efficient and flexible. Amidst the continued Rolling Thunder campaign in 1966 and 1967, 600th personnel were worked to the maximum. Its photographic labs operated on a 24-hour basis, seven days a week. Some personnel did not get a day off for three or four months (Warndorf 1968, 18). 1966 saw the total amount of film processed by the 600th and 1352nd jump to 2 million feet for the year – a total that held steady, and even increased, right up to the end of Rolling Thunder.

But there was something more than new management techniques and metrics at work in the 1352nd's push towards centralisation and systematisation: the *image* was also undergoing a profound change. Television, to be sure, was part of this change. The small screen, with its already incessant demand for content, meant visual

power would be measured by the likes of Air Force brass less in terms of spectacle and more in terms of quantity of coverage. ‘Air time’ was the new metric. Skypoint’s emphasis on ever-refined cycles of exposure, development and distribution meant, as well, that unedited aerial footage, processed and prepared at great speed, was eventually available to pilots within as little as 40 to 60 minutes of hitting the lab (Warndorf 1968, 11). As Warndorf later recounted,

It got to the point where the pilot did not know what cameras he had aboard his aircraft, because everything worked automatically. When he [dropped his bombs], cameras started running. Consequently, we devised a form in Thailand that when the pilot landed we’d say, ‘You exposed ninety-seven feet on your strike camera. It operated satisfactorily. You used your guns, and your gun camera magazines are empty, not empty’. We’d tell him what he had done photographically; and that form went into the debriefing; and the debriefing officers were aware that there was photographic evidence now being processed, in a lab, of what this particular aircraft had done on his mission. (Warndorf 1968, 34)

Indeed, the so-called ‘single management’ approach to Air Force photography that Warndorf championed and helped develop may have had as its chief achievement a situation where neither the cameraman nor the cameras were visible to those up the chain of command: ‘there was photographic *evidence*...of what this particular *aircraft* had done on *his* mission’. Here the image collapsed into process, the photographer into photographic structure and the camera into a system of data collection. At the same time, the pilots themselves were integrated into a disciplinary regime made possible by the transformation – at the hands of the 600th – of their fighter planes into ‘flying cameras’.

Whereas in the nuclear deterrence regime, an affectively potent still or moving image was often the end goal, this new deterrence regime – based on ‘flexible response’ and ‘calibration’ – treated affectless ‘information’ as an end goal. The war’s planners did not need images – they demanded information. As part of the management and training of pilots, affectless images served to ensure the precision needed for a calibrated deterrent war. To be sure, morale also remained an instrumental goal: aerial camera footage was regularly edited into ‘highlight’ films, screened for commanders in the field and at headquarters overseas. The Air Force Office of Information, too, tried to make effective use of these highlight shots, albeit to little effect. Ultimately, however, such highlight reels were peripheral to the deterrent war

in Vietnam – they often functioned as inputs with no clear outputs. Rather, the chain of nested systems that began with cameras in cockpits ended not with affective ‘money shots’ on movie screens, but in a well-lit room in the White House, where the Johnson administration planned the war from week to week. On Tuesdays, a small group of men would convene for lunch in the president’s dining room, the same room where Johnson’s family ate their daily meals. At these ‘Tuesday Cabinet’ meetings, as the gatherings came to be known, men would fine-tune the deterrent war in Vietnam. Johnson, McNamara and their advisors kept the future tense of the spectacle of nuclear deterrence in place: they sought to stimulate the imagination of the North Vietnamese and Vietcong with respect to future destruction so as to steer them to the negotiating table. But even more, the surveillance of nuclear deterrence took hold for McNamara and his advisors. They wanted their war games to be full-information games.

Official photographs of these deliberative sessions portray the group seated in a well-lit room before open windows, papers interspersed with the remnants of lunch (Figure 5). The Tuesday Cabinet meetings took place apart from any darkened visual-presentation space. The setting for these critical conversations was seemingly epochs away from the screen-oriented operations centres that dominated depictions of decision-making bodies throughout the Cold War. Though images of potential bombing targets likely lay buried amongst other dossiers and papers full of statistics, there were no visible images of the war in Vietnam before this executive deliberative body. Rather, the dominant image in the room was a nineteenth-century panoramic landscape depicting Virginia’s Natural Bridge and Revolutionary War scenes, put there by Jacqueline Kennedy. Thus, while Johnson and his men sat amidst the images of war, it was war rendered nostalgic, pastoral and pure.

REFERENCES

- Atkinson, N. S. 2011. “Newsreels as Domestic Propaganda: Visual Rhetoric at the Dawn of the Cold War.” *Rhetoric & Public Affairs* 14 (1): 69–100. doi:10.1353/rap.2011.0003.
- Cunningham, D. 2005. “Imaging/Imagining Air Force Identity: ‘Hap’ Arnold, Warner Bros., and the Formation of the USAF First Motion Picture Unit.” *The Moving Image* 5 (1): 95–124.
- “Deterrence.” Merriam-Webster.com. Accessed December 1, 2014. <http://www.merriam-webster.com/dictionary/deterrence>
- Dulles, J. F. 1954. “Evolution of Foreign Policy.” Council on Foreign Relations, New York, January 12, Dulles Papers, Mudd Library, Princeton University, Box 322.
- Foster, H., ed. 1988. “Preface.” In *Vision and Visuality*. Seattle, WA: Bay Press.
- Foucault, M. 1977. *Discipline and Punish*. New York: Vintage.

- Freedman, L. 2000. *Kennedy’s Wars: Berlin, Cuba, Laos and Vietnam*. New York: Oxford University Press.
- Freedman, L. 2004. *Deterrence*. Malden, MA: Polity Press.
- Freedman, L. 2013. *Strategy: A History*. New York: Oxford University Press.
- Gaddis, J. L. 2005. *Strategies of Containment: A Critical Appraisal of American National Security Policy during the Cold War*. Revised and expanded edition. New York: Oxford University Press.
- Gaylord, J. L. 1953. “Operation Ivy, Report to the Scientific Director, Documentary Photography.” Department of Energy OpenNet, Document Number WT612EX. Accessed June 20, 2014. https://www.osti.gov/opennet/detail.jsp?osti_id=16071445
- “History of 1352d Photographic Group, 1 January 1964 to 30 June 1964.” 1964. Air Force Historical Research Agency, Maxwell Air Force Base.
- “History of 1353d Photographic Group, 1 January 1965 to 30 June 1965.” 1965. Air Force Historical Research Agency, Maxwell Air Force Base.
- “History of 1352d Photographic Group, 1 July 1962 to 31 December 1962.” 1962. Air Force Historical Research Agency, Maxwell Air Force Base.
- “History of 1352d Photographic Group, 1 July 1965 to 31 December 1965” 1965. Air Force Historical Research Agency, Maxwell Air Force Base.
- “History of the 58th Wing Air Photo Unit, Crossroads.” n.d. Internal document published 58th Wing Air Photo Unit personnel. Personal collection.
- “History of the Aerospace Audio-Visual Service, 1 January 1967 to 30 June 1968.” 1970. Air Force Historical Archives, Maxwell Air Force Base.
- Hull, J. E. 1948. “Photographic Report.” In *Atomic Weapons Tests, Eniwetok Atoll, Operation Sandstone: Report to the Joint Chiefs of Staff*, Joint Task Force Seven, Volume One, Annex 1. Accessed April 8, 2015. https://www.osti.gov/opennet/detail.jsp?osti_id=16131190
- Lebow, R. N., and J. G. Stein. 1994. *We All Lost the Cold War*. Princeton, NJ: Princeton University Press.
- Lewis, A. 2007. *The American Culture of War: The History of U.S. Military Force from World War II to Operation Iraqi Freedom*. New York: Routledge.
- Masco, J. 2014. *The Theater of Operations: National Security Affect from the Cold War to the War on Terror*. Durham, NC: Duke University Press.
- Metz, C. 1982. *The Imaginary Signifier: Psychoanalysis and the Cinema*. Translated by Celia Britton and Annwyl Williams. Bloomington: Indiana University Press.
- Mirzoeff, N. 2011. *The Right to Look*. Durham, NC: Duke University Press.
- “More Films Produced by AAF than by Big Studios.” 1944. *The Billboard* 56.36, September 2, 44.
- O’Gorman, N. 2011. *Spirits of the Cold War: Contesting Worldviews in the Classical Age of American Security Strategy*. East Lansing: Michigan State University Press.
- O’Gorman, N., and K. Hamilton. 2011. “At the Interface: The Loaded Rhetorical Gestures of Nuclear Legitimacy and Illegitimacy.” *Communication and Critical/Cultural Studies*, 8 (1): 41–66. doi:10.1080/14791420.2010.543986.
- O’Gorman, N., and K. Hamilton. Forthcoming. “The Sensibility of the State: Lookout Mountain Laboratory’s Operation Ivy and the Image of the Cold War ‘Super’.” *Rhetoric and Public Affairs*, 19:1.
- Oakes, G. 1994. *The Imaginary War: Civil Defense and American Cold War Culture*. New York: Oxford University Press.
- Office of the Secretary of Defense. 1969. *United States-Vietnam Relations, 1945–1967*. 47 volumes. <http://www.archives.gov/research/pentagon-papers/>
- “Outline of History of Lookout Mountain Laboratory.” circa 1953. Internal document published at Lookout Mountain Air Force Station, Hollywood, CA. Personal collection.
- Peters, J. D. 1988. “Information: Notes toward a Critical History.” *Journal of Communication Inquiry* 12 (2): 9–23. doi:10.1177/019685998801200202.
- Powell, R. 1990. *Nuclear Deterrence Theory: The Search for Credibility*. New York: Cambridge University Press.
- Tadelis, S. 2013. *Game Theory: An Introduction*. Princeton, NJ: Princeton University Press.
- Van Staaveren, J. 2002. *Gradual Failure: The Air War Over North Vietnam, 1965–1966*. Washington, DC: Air Force History and Museums Program.
- Vanderbilt, T. 2002. *Survival City: Adventures Among the Ruins of Atomic America*. Princeton, NJ: Princeton Architectural Press.
- Warndorf, J. P. 1968. “United States Air Force Oral History Interview: Colonel James P. Warndorf.” (November 13, 1968) Air Force Historical Research Agency, Maxwell Air Force Base.