The second crucible

The evolution of aircraft carrier doctrine during the Korean War

June 1950–July 1953

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Introduction

In a war that never ended the repetition of history can seem almost predestined in its exactness. The visitor of a news website in the spring of 2017 might find the same headline as his grandfather reading a paper in the summer of 1950: "US Carrier Strike Group enters Korean Waters".

It is no coincidence that with tensions again riding high on the Korean peninsula, an aircraft carrier, not a battleship or a cruiser, would be sent by the United States Navy to spearhead their efforts. In the sixty-four years since the signing of the Armistice Agreement between the forces of North and South Korea, this unique type of ship has become the dominant and most successful tool for global strategic force projection. Without it the British would never have been able to wrest back the Falkland Islands from Argentina. But above all it became a symbol of American naval hegemony, and perhaps the only means of conducting long-range, limited conventional wars, in an age where the nuclear alternative proved to be unthinkable. An important part of these developments can be traced back directly to the carrier's role in the Korean War of 1950-1953.

As seen from our modern day perspective, with US ships once again serving as floating airfields off Korean shores, and projecting power as their predecessors did, we may be tempted to think of the advent of the carrier as an unbroken rising line. After all, had this type of ship not proven itself above and beyond all expectations in the Pacific theatre of operations against the Japanese during World War II? With the benefit of hindsight, it is easy for both laymen and naval experts to view the performance of this then unproven, almost experimental weapon in a very favourable light. A testament to this success was the gradual disappearance of its main competitor, the battleship, from the navies of the world in the years to come. Yet somehow the fierce test constituted by this war, this first crucible, turned out to be insufficient. A myriad of factors conspired to threaten the future of the aircraft carrier, and with it the entire concept of naval aviation, in the late forties. Ironically, the ascending line of the aircraft carrier was almost broken, only years after its initial success. Why did this happen and how could this challenge be overcome? There would have to be another test, another war, but of a different nature, to finally silence the opponents of the carriers. Beginning in June 1950, the Korean War would serve as this test, as a second crucible.

It is this 'coming of age' moment in the history of carrier warfare that sparked my interest. How could a weapon system, that seems so axiomatic and ubiquitous today, have been under such a cloud of suspicion and doubt? And how were these challenges overcome? It is my belief that the Korean War can be pinpointed as the exact moment of transition in this matter, and that this moment had far greater consequences for the accessibility and feasibility of conventional naval power

projection than evidenced by the popular perception of carrier warfare in Korea. This perception, reflected in many historical works on the war, holds that carriers, while important in a supporting role, were far from decisive. According to this narrative the carriers' actions were only crucial during select moments of the campaign, such as the early defence of the Pusan Perimeter and the Inchon landings. After these early victories, the Allied naval air forces, though contributing greatly to the war effort, were never able to effectively interdict communist supplies and troops, at least not to the extent that would have prevented the eventual stalemate. Seventeen United States carriers, eleven large types and six smaller models, along with several from other nations, saw action in Korea.[1] This constitutes a greater carrier force, at least numerically, than is maintained by all the world's navies in present time. Yet this massed force of naval aviation could not break North Korean and Chinese resistance any better than the United Nation troops on land, or the efforts of the U.S. Air Force. This observation would be impossible to refute, the present day situation in Korea is a direct result of it. My intention in this paper is not to aggrandise the success of the aircraft carrier in the Korean War, but to examine how this war led to the carrier's success. I find it an interesting historical paradox that a weapon system like the carrier could be exempt from praise after the resounding victory of World War II, yet emerge vindicated from a conflict that ended in an uncomfortable stalemate.

Although my research is largely based on primary sources, and literature on the subject of carriers in Korea is somewhat limited, a small summation of works that touch on the subject is in order. I will also use some secondary sources for aspects which are peripheral, but nonetheless important to my subject. For instance, for general reference on the history, development and technical aspects of aircraft carriers I will be using a comprehensive two-volume work by Norman Polmar, *Aircraft carriers. A history of carrier aviation and its influence on world events*.[2] Additionally for basic facts on individual carriers Stefan Terzybaschitsch's, *Aircraft carriers of the US Navy*, as well as *Aircraft carriers of the Royal and Commonwealth Navies* by David Hobbs.[3] On the subject of carriers as hazardous environments and the development of on board safety protocols I read 'Aircraft flight and hangar deck fire protection: history and current status', a collaborative work headed by Robert L. Darwin.[4] For the more specific subject of escort carriers, which are

1 Gordon L. Rottman, *Korean War order of battle. United States, United Nations, and communist ground, naval, and air forces 1950-1953* (Westport 2002) 106-114.

2 Norman Polmar, *Aircraft carriers. A history of carrier aviation and its influence on world events. Volume I, 1909-1945* (Washington 2006); Norman Polmar, *Aircraft carriers. A history of carrier aviation and its influence on world events. Volume II, 1946-2006* (Washington 2008).

3 Stefan Terzybaschitsch, *Aircraft carriers of the US Navy* (Greenwich 1980); David Hobbs, *Aircraft carriers of the Royal and Commonwealth Navies* (London and Mechanicsburg 1969).

4 Robert L. Darwin et al., *Aircraft carrier flight and hangar deck fire protection: history and current status* (China Lake 2005).

central to my thesis, literature is limited, although Polmar in particular does pay attention to it. The only dedicated article on the subject, 'The development of the escort carrier' by Henry M. Dater, was written between World War II and the Korean War.[5] It does nevertheless give a good account of the circumstances which led to the genesis of this ship type, and provides pertinent technical information, since the escort carriers used in Korea were all built before the article was written.

Essential for my investigation is an understanding of initial evolution of doctrine during the early stages of carrier development, culminating in the ship type's first major test during World War II. For this period I will supplement Polmar's books with two publications, 'Replacing battleships with aircraft carriers in World War II', by Thomas C. Hone and 'Evolution of the attack aircraft carrier: a case study in technology and strategy', by Desmond Porter Wilson Jr.[6] For information relating to the 1949 Revolt of the Admirals, the internecine ideological conflict between branches of the U.S. Military and the role of the atom bomb with regard to the future of carriers, I will consult the following articles and a dissertation: 'The nuclear taboo: the US and the normative basis of nuclear non-use' by Nina Tannenwald, 'The 1949 Revolt of the Admirals' by Keith McFarland, 'The Revolt of the Admirals' by Andrew L. Lewis and 'Death and rebirth of the supercarrier' by Andrew Toppan.[7] Of course knowledge of the Korean War in general is important, and for this I used *The forgotten war* by Clay Blair, *The coldest winter* by David Halberstam, *The Korean War* by Max Hastings, *Korea: the war before Vietnam* by Callum MacDonald and *Korea. The peninsular origins of the war*, by John Merrill.[8] Additionally, expanding on the theme naval interdiction in the Korean War, I consulted 'MacArthur's blockade proposals against Red China' by John Norman.[9]

Most importantly, on the specific intersection of my subject only six works qualify. Two of these, *The sea war in Korea* by Malcolm W. Cagle and Frank A. Manson and *A history of United States naval operations. Korea* by James A. Field, are not exclusively concerned with carrier warfare, but do give it its due, albeit in the form of a military chronicle with little specifics on day to

5 Henry M. Dater, 'The development of the escort carrier', *Military affairs* vol. 12 (1948) 79-90.

6 Thomas C. Hone, 'Replacing battleships with aircraft carriers in the Pacific in World War II', *Naval War College review* vol. 66 (2013) 56-76; Desmond Porter Wilson Jr., *Evolution of the attack aircraft carrier: a case study in technology and strategy* (Cambridge [Mass.] 1966).

7 Nina Tannenwald, 'The nuclear taboo: the US and the normative basis of nuclear non-use', *International organization* vol. 53 (1999) 433-468; Keith McFarland, 'The 1949 Revolt of the Admirals', *The US Army War College quarterly. Parameters* vol. 11 (1981) 53-63; Andrew L. Lewis, *The Revolt of the Admirals* (Montgomery 1998); Andrew Toppan 'Death and rebirth of the supercarrier', *https://www.hazegray.org/navhist/carriers/supercar.htm*, consulted January 2017-October 2018.

8 Clay Blair, *The forgotten war. America in Korea 1950-1953* (New York and Toronto 1987); David Halberstam, *The coldest winter: America and the Korean War* (New York 2007); Max Hastings, *The Korean War* (London 1987); Callum MacDonald, *Korea: the war before Vietnam* (Basingstoke and London 1986); John Merill, *Korea. The peninsular origins of the war* (Newark, London and Toronto 1989).

9 John Norman, 'Macarthur's blockade proposals against Red China', *Pacific history review* vol. 26 (1957) 161-174.

day operations.[10] The third book by Douglas Campbell, *U.S. Navy, U.S Marine Corps and MATS aircraft lost during the Korean War*, serves as an excellent inventory of U.S. naval aircraft shot down in Korea. It also covers those lost in crashes and other accidents, and can be used to compare with primary sources.[11] Additionally, Gordon L. Rottman's *Korean War order of battle* serves as an extensive reference work for both ships and planes involved in the war, and is likewise useful for crosschecking the relationships between carriers and their assigned squadrons against information in the primary sources. It also provides the duration of their respective tours of duty.[12] Finally, the works written by Warren Thompson and Richard P. Hallion are the only books dealing specifically with carriers in Korea. Both are informative, but both are also heavily slanted towards the aerial component of carrier warfare. Thompson's book, *Naval aviation in the Korean War*, is somewhat anecdotal in nature and of limited use.[13] Hallion's work, *The naval air war in Korea*, is the more scientific, based in part on the same primary sources I intend to use.[14] Still, even this book is focused primarily on planes as opposed to ships. It also omits the exploits of the smaller escort carriers on the west coast of Korea, a part of history which I consider for several reasons to be relevant to my questions. Hallion does hold the premise that the Korean War was an important moment in the development of modern carrier doctrine, yet he omits the dataset of the escort carriers on the West Coast, whose efforts most closely foreshadowed the modern methods of force projection by aircraft carriers. I believe that this is an unfortunate oversight, since it weakens the support for the argument of Korea as a seminal time in carrier history. In addition I believe the escort carriers' experiences to hold extra relevance, both because of their ground-breaking cooperation with other navies and because their limits as ships made the dimensions of modern naval warfare and the challenges of Korea more visibly outlined.[15]

Another crucial dimension is military and academic thought on the future of aircraft carriers, their perceived superiority and their possible vulnerability in both the light of historic challenges and present day threats. These facets are explored in three recent articles, 'The combat utility of the US fleet aircraft carrier in the post-war period' by Ben Wan Beng Ho, 'At what cost a carrier?' by Henry J. Hendrix and 'The future of aircraft carriers' by Robert C. Rubel.[16] Of these the work by

10 Malcolm W. Cagle & Frank A. Manson, *The sea war in Korea* (Annapolis 1957); James A. Field Jr., *History of United States naval operations. Korea* (Washington 1962).
11 Douglas E. Campbell, *U.S. Navy, U.S. Marine Corps and MATS aircraft lost during the Korean War* (Washington 2013).
12 Gordon L. Rottman, *Korean War order of battle. United States, United Nations, and communist ground, naval, and air forces 1950-1953* (Westport 2002).
13 Warren Thompson, *Naval Aviation in the Korean War* (Barnsley 2012).
14 Richard P. Hallion, *The naval war in Korea* (revised edition; Tuscaloosa 2011).
15 Hallion, *The naval air war*, 191.
16 Ben Wan Beng Ho, 'The combat utility of the US fleet aircraft carrier in the post-war period', *Journal of military and strategic studies* vol. 16 (2016) 67-105; Henry J. Hendrix, 'At what cost a carrier?', *Center for new American*

Hendrix is especially interesting, since it is purposefully written as a contrarian anti-carrier polemic, by an author who has an extensive background in naval aviation. His view that carriers have not been seriously tested since World War II, and that this had led to complacency and vulnerability is especially thought provoking in the case of the Korean War, the period in which carriers finally established their dominance and developed their modern doctrine. Hendrix omits specific historical examination from his work, but I think his central tenet is important to keep in mind for my investigation.

The problem with the historiography of this subject is perhaps best illustrated by an analogy. Let's say that an aircraft carrier is like a gun, and that its planes are like bullets. Writers on this subject tend to overemphasise the ' bullets', at least in the case of the Korean War, possibly because they are what eventually hit the target, or because of the perceived glamour and courage of aviation. I posit that the 'gun', the platform, is equally if not more important. Also, most works on the subject tend to emphasize the carriers' role in important historical actions, such as the Inchon landing, while glossing over the more routine aspects of day to day carrier operations. We will often read about a carrier arriving at a certain place and launching a successful strike, but the less glamorous, yet incredibly complex shipside efforts and logistics to make such a strike possible is glossed over, even by the more specialised literature. So, to find answers to questions about the seemingly mundane, but equally fascinating and infinitely more complex day to day operations of aircraft carriers as ships in themselves, we will have to consult primary sources.

Thankfully the Naval and History Heritage Command, an official historical branch of the U.S. Navy, have provided a comprehensive digitised version of authorised Naval Action Reports for all U.S. carriers participating in the Korean conflict. These documents take the form of detailed descriptions of day to day operations, and general activity aboard a carrier during a certain circumscribed period, usually a combat patrol of around nine to fifteen days. Such reports were dictated and countersigned personally by the ship's captains, and because they follow a set template, are excellent material for comparison. For reasons that I will further explore in my main text, I have chosen to limit myself to the study of action reports from the six smaller aircraft carriers, and will only sporadically reference the larger ones.[17] A smaller set of photographic sources also exists, in the form of a collection of commemorative cruise books. These will occasionally provide additional background information.[18]

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security (2013) 1-12; Robert C. Rubel, 'The future of aircraft carriers', *Naval War College review* vol.64 (2011) 13-27.

[17] https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat.html, consulted January 2017-October 2018.

[18] https://www.navysite.de/cruisebooks/#cve, consulted January 2017-October 2018.

So why are the smaller escort carriers, also known by their class designation as CVE's, worth studying? In almost every conceivable way they were inferior to the larger fleet carriers. They were smaller, more cramped, slower, carried only one squadron of aging planes, were not adaptable to the jet age and had many other drawbacks which will be explored. Perhaps the most important reason to study these ships in their twilight was the exact location of their deployment during the Korean War, namely on the western coast of the peninsula and the instructive nature of the operations they took part in. Of course, their role could have been filled by larger more modern carriers, and probably with greater efficiency, but the fact remains that with the short exception of the period around the Inchon landings, the provision of naval airpower on the west coast was left to these smaller carriers. And the west coast was an important testbed for future naval operations. First of all, it was the place were naval cooperation under the United Nations aegis was at its peak and ships from many nations had to learn to conduct operations in unison. Secondly, the geographical layout of this coast necessitated a style of carrier operation, which was new at the time and is sometimes colloquially known as 'floating airfield'. In contrast to World War II' dynamic operations, in Korea aircraft carriers had were not limited by the enemies threats, but by fuel and supplies. Almost all subsequent deployments of carriers after Korea conformed to this pattern of maximal rationalisation and optimisation of flight schedules, steadily sailing of an enemy's coast. This is now seen as the quintessential role of the aircraft carrier. If we discard the experience of the escort carriers as peripheral we run the risk of ignoring one of the great examples of doctrinary invention. Of course the larger *Essex*-class fleet carriers on the east were the obvious inventors of modern doctrine in Korea, since only they carried the jet fighters that would form the paradigm of the future. But they did not operate on the west coast where carrier operations most resembled those we see today. The lessons of the west coast were unique and different, and they were learned partly through the deployment of escort carriers. To ignore a large proportion of carrier operations in Korea, because these ships became obsolete soon thereafter, seems wasteful. Perhaps a part of the escort carrier lives on in modern day doctrine, for better or for worse.

So what does the historical literature I have read have to say on naval aviation during the Korean War in general, and escort carriers specifically? Of the general works on the war, only Max Hastings has a significant passage on the role of naval airpower, conceding that carriers were a great asset, identifying the origins of their current role as 'floating airfields' and linking this development to lack of communist attacks.[19] Clay Blair's work acknowledges the various United Nations navies as important in his foreword, but holds the view that Korea was primarily a land war, the outcome

[19] Hastings, *The Korean War*, 320-321.

of which hinged on the army. In his voluminous work naval exploits are mentioned only on a handful of pages, and naval air efforts hardly at all, although he does pay some attention to the disastrous budget cuts, which hit the Navy especially hard after World War II. Halberstam has even less. The focus of these general historians of the war on the terrestrial operations seems somewhat lacking, considering Korea's geography and its implication for littoral warfare, supply chains and potential amphibious operations. Of course they recognise the Inchon landing as an important moment, but even here Blair is not very forthcoming with praise on this massive naval achievement.[20]

The next group of works is formed by those that are carrier-specific, but not exclusively focused on the Korean War. Even within these works references to escort carriers are relatively scarce. Hone, for instance, does not mention them at all. However, he does describe the way in which Close Air Support doctrines were created by carriers in cooperation with ground troops (especially Marines) during World War II. This is relevant because this relationship between naval air and land was emphatically continued by escort carriers during the Korean War.[21] Dater's work, written in 1948, could be considered obsolete in the light of historical developments, but his optimistic conclusion on the future of escort carriers posed an interesting question. He believed escort carriers would stay relevant because of their potential as a training platform, as transports for aircraft, to support amphibious operations and to protect convoys. He also noted that escort carriers were a good base for improvisation.[22] By far the most comprehensive and modern work of this group is the two volume general history of aircraft carriers by Norman Polmar. He definitely recognises the importance of Korea, stating: "The Korean War would mark the rebirth of the aircraft carrier as the mainstay of Allied military might." However, in his subsequent chapter on the war, the role of escort carriers is only summarily discussed, and usually only in the context of spectacular actions, such as the Inchon landing. He notes that CVE's 'served valiantly' and 'performed vital services', but does not go in to detail on how these smaller carriers managed a successful blockade of one of the coasts for years on end.[23]

Finally we have the works that are set on the direct intersection of these former two groups, namely works that focus on naval action in Korea, and especially naval aviation. Of these Thompson is the least interesting for my inquiry. He focuses exclusively on the larger fleet carriers, and claims the fact that the planes on the smaller carriers were piloted by Marine airmen instead of Navy pilots as adequate reason for this omission. He also seems to be unsure of the exact number of

[20] Blair, *The forgotten war*, foreword page X, 17, 87-88.
[21] Hone, 'Replacing battleships', 72.
[22] Dater, 'The development', 90.
[23] Polmar, *Aircraft carriers. Vol II*, 51, 65, 75, 82.

smaller carriers participating, and mislabels the *USS Bataan* as a Commencement Bay-class escort carrier.[24] Campbell has good short biographies on each individual carrier during the war, but this is purely chronological, non-analytical in nature. His work is also completely focused on the aerial side of the equation and deals mostly with losses of planes.[25] Field's book is an extensive chronical of all naval operations during the war. In this work escort carriers are sporadically mentioned. Field usually mentions CVE's during heavy close air support missions and does discuss other roles they filled, such as ocean transport for planes. However the book is very short on their role as blockaders of the west coast, their routines and the sustained bombing they maintained there.[26] Cagle and Manson wrote another general history of naval operations during this war. Unsurprisingly these two naval officers hold a very different view from Clay Blair. They contend that naval forces were essential in Korea, that 'Korea was a proving ground' and that it 'revitalized naval aviation'. In their conclusion they state that without the Navy the war would have been lost, and they stringently warn against short-sighted budget cuts. The work describes a lot of the carriers' actions, but once again focuses on the exploits of the air arm and treats the ships as mere delivery systems. The aspect of routine day-to-day operations holds my interest because I believe it to be an important moment for invention of doctrine, and this book too veers away from the more mundane facets of carrier deployment. It does however acknowledge the escort carriers to some extent, giving a good description of the difficult west coast circumstances, including the need for advanced cooperation between navies. It does not, however go into detail on how the limited escort carriers where able to overcome these problems. Interestingly, while the book ends on a direct quote from an admiral lamenting the lack of attention paid to the naval aspects of the war, it then itself commits a similar sin by leaving out all escort carrier air squadrons from their due place in the appendix.[27] Finally there is the most detailed work on naval aviation during the Korean War by Richard Hallion. Once again escort carriers are sparsely mentioned, and only when they appear to do something extraordinary, that is when their squadron saves the day. The reasons how and why they were able to punch above their weight is left largely unexamined. He acknowledged the new role that carriers took on in Korea. Interestingly it is one of the few passages in which the word CVE is used, and the fact that the entire west coast was the CVE's domain is mentioned. Yet in spite of this tacit admission that this lesser class of ship also participated in an important moment in carrier history, we are bereft of large portions of the possibly very interesting west coast carrier experience.[28]

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[24] Thompson, *Naval aviation*, 153-154.
[25] Campbell, *U.S. Navy*, 6-8, 10-12, 13-16, 73-74, 76.
[26] Field Jr., *Naval Operations*, 76, 129-130, 144-145, 157, 207-208, 214, 257, 266, 276-278, 347.
[27] Cagle & Manson, *The sea war*, VII-VIII, 61, 65, 169, 283, 292-296, 302, 370, 491, 493, 499.
[28] Hallion, *The naval air war*, 47-49, 50-51, 53-54, 57-65, 89, 191.

Using these works as additions to the primary sources, which form the backbone of my research, I intend to implement a four chapter structure in my paper. The first chapter will deal with the origin of the aircraft carrier, its role in the Second World War, and will try to answer the question of how a seemingly successful weapon almost lost its future. It will also examine some of the present day challenges to the carrier concept, and why Korea was a relevant but overlooked moment in the development of current doctrine. In the second chapter I want to examine how carriers, especially smaller escort carriers, performed their tasks in Korea, with a focus on the west coast. How did these operations differ from World War II and why they did foreshadow the modern role of these ships? The third chapter will deal with all challenges and disadvantages during the conflict. How were escort carriers able to survive this test, despite their weaknesses and vulnerabilities? Finally, in the fourth chapter I will try to answer the question of why the specific circumstances of the Korean War brought the advantages of the aircraft carrier to the forefront, and try to specify what these advantages were.

Hopefully, by juxtaposing the impact of negative and positive forces, a better explanation of how these ships and their doctrines were moulded by the crucible of the Korean War can be given. Since the Korean war is recognised as such a pivotal moment in the history of the aircraft carrier it seems important to examine all aspects of the carrier experience, including that of the humble CVE's. In doing so I hope to be able to answer the following question: "How were these smaller escort carriers used during the Korean War and did they make a meaningful contribution to the evolution of carrier doctrine during this last period of active service?"

Chapter 1

The equivocal dawn of the aircraft carrier

The first decades of the development of military naval aviation, that is to say the use of aircraft in combat roles using specialised ships as a mobile maritime base, were characterised by an unexpected central irony. These new ships, in tandem with the planes they carried, soon proved themselves far more useful and versatile than even their most enthusiastic proponents had imagined. In fact, the marriage of a sturdy vessel acting as launching platform and a swarm of increasingly sophisticated airplanes, turned out to be a one in a million bolt from the blue, an absolute stroke of military genius.[29] The evolutionary dead ends of the world's arms races litter military history, especially after the industrial revolution made man's destructive imagination ever more applicable. But among all these experiments, few caused a real shift in martial paradigm, and even fewer could lay claim to a future as what might be called a superweapon, a weapon which could shape the world for those that wield it. The aircraft carrier, in supplanting and almost directly dooming to obsoletion its predecessor, the large cannon battleship, became the dominant force in all the world's serious navies during World War II.[30] In the Pacific campaign against Japan, which operated a large carrier force of its own, the United States' naval aviation complex prevailed and arguably won the war, or at the very least formed the backbone of the fleets that threatened the Japanese with amphibious doom.[31] Carriers, though far from perfect, performed far above expectation, especially as new possible roles were discovered and doctrines were invented to match these.[32] Yet, despite this giant triumphant success, the vanquishing of this first crucible, the carriers ended the war with less glory attached to them than they deserved, and with a bleak and uncertain future. What developments can explain this contradiction, how did aircraft carriers survive this moment and what relevance could this hold for the future?

An even newer, even more experimental and spectacular weapon had dealt the final blow to the Japanese Empire, at least in the eyes of the world, but more importantly, in the eyes of many United States politicians. The successful deployment of the atomic bomb over the cities of Hiroshima and Nagasaki, seemed to foreshadow a new age of short, destructive and extremely

29 Hone, 'Replacing battleships, 56-58.
30 Wilson Jr., *Evolution*, 77-79.
31 Ibidem, 76.
32 Hone, 'Replacing battleships', 63-64; Lewis, *The Revolt*, 12-13.

decisive warfare.[33] As the Second World War ended, and with the Cold War still in its infancy, it appeared that the American nuclear monopoly would hold the key to eternal military domination. In this naive period of optimism over the advent of this superweapon, the major branches of the U.S. Military, especially the Navy and the relatively young Air Force (which saw much of its interests aligned with the Army), began a period of internecine conflict with each other and their political overlords over the right to be the primary holders and dispensers of the new weapon. Such was the belief in the atomic future that the successful application of the A-bomb became the only lens through which conventional forces could envision a future for themselves. Both ships and planes would be relegated to mere delivery systems, or risk being declared obsolete.[34]

Even the aircraft carrier, arguably a proven conventional superweapon after World War II, ran this risk. It was not helped in its case by the Navy's internal culture of independence and tradition and its external lack of effective lobbying and public relations.[35] At the conclusion of World War II the re-elected US president Harry Truman saw the enormous military expenditure and future upkeep of the military as unacceptable to the tax payers. He pushed for a rigorous reform by which all the three major branches would be unified under a single central command, and called for strict budget cuts.[36] In this climate of fiscal responsibility and focus on nuclear weaponry, the Air Force was at a great advantage versus the Navy. Its proposed delivery system for the atomic bomb, long-range land-based aircraft, was a fraction of the cost of the Navy's solution. The war had convinced the Navy of the eminent usefulness and future dominance of the aircraft carrier, and its triumph over the battleship. As the cutbacks were starting to be put into place, and a large portion of the remaining active World War II carrier fleet was placed in reserve or scrapped, there was an attempt to save the future of naval aviation, and indeed the entire blue water Navy, with an ambitious project, the supercarrier *USS United States*. This huge vessel and the prospected sister ships within its class would be able to launch strategic bombers carrying nuclear weapons from anywhere in the world, thus securing both the need for a strong independent Navy and the United States' hegemonic power projection.[37]

But in early 1949, when the keel of this massive ship was already laid, as in the present, a debate raged over the wisdom of aircraft carriers as the mainstay of American strategic capability.[38] Some argued against the concentration of so much power and prestige into a single vessel, the

33 Tannenwald, 'The nuclear taboo', 442-443.
34 Toppan, 'Death and rebirth; McFarland, 'The 1949 Revolt', 53-55.
35 Lewis, *The Revolt*, 20-22.
36 McFarland, 'The 1949 Revolt', 53-54.
37 Toppan, 'Death and rebirth'; Hallion, *The naval air war*, 10, 17.
38 Hallion, *The naval air war*, 10-11.

sinking of which would be a symbolic blow far beyond the significant actual loss.[39] Even then, before the age of guided anti-ship missiles, the war in the Pacific had proved carriers vulnerable to surprise attack and unconventional tactics.[40] But above all it was the immense financial burden of this ship type that gave ammunition to its detractors. The *USS United States* was to be a highly specialised, top of the line ship, very different from the wartime carriers, some of which were cheaply cobbled together from existing oiler or cruiser hulls. Its projected cost was almost two hundred million dollars, an unheard-of sum in 1949, especially during post-war austerity.[41] In April of that year, only five days after construction had entered its next phase, the supercarrier of the future was cancelled by Louis Johnson, the new Secretary of Defence, who had recently replaced the more Navy-minded James Forrestal, and who was considered a hatchet man for driving through Truman's military budget cuts.[42] These new policies, though popular with the electorate, were understandably hated by the military, which had more than proved its necessity in the recent war, and now saw the emerging communist threat as a legitimation for the foreseeable future. The larger problem was that Johnson, mostly for shallow financial reasons, was inclined towards favouring the younger Air Force over the Army, and especially over the fiercely independent Navy. When his order to cancel the *United States* came through it proved the last drop for a large part of the Navy establishment, which saw themselves betrayed by politicians, and its existence as a separate branch threatened. The cancellation set off a several months long period of Navy rebellion against both the politicians and the competing Air Force, an episode which became known as The Revolt of the Admirals, and which at times had insubordinate and even mutinous characteristics.[43]

At first the Navy came out swinging, levelling serious accusations at the projected costs and feasibility of the Air Force´s bomber program. However, over the course of 1949 there were several congressional hearings in which these allegations were examined and eventually dismissed. Many of the Navy´s top brass had stuck their necks out during these proceedings, and when they backfired instead of bowing out, they doubled down on their gamble and persevered in renouncing the actions of their political overlords.[44] The Revolt of the Admirals ended with several of the most senior and decorated naval officers of the United States outright fired, sent to early retirement, or diverted to positions of lesser influence. The Navy´s prestige and sway over public opinion and politics had sunk to an all-time low, and even within the Navy factional strife between submariners, battleship die-hards and naval aviation proponents continued over an ever shrinking pool of resources, as the

39 Dater, 'The development', 79.
40 Hone, 'Replacing battleships', 59-61.
41 McFarland, 'The 1949 Revolt', 57.
42 Toppan, 'Death and rebirth'.
43 McFarland, 'The 1949 Revolt', 58-60.
44 Lewis, *The Revolt*, 27-33.

cause of the Air Force seemed to dictate the future. Within this mess, the successful aircraft carrier of World War II languished, relegated to a limited supporting role without successors, and waited for some conflict to prove itself anew. In a further irony of the aircraft carrier´s historical career, it found new success, its most persistent doctrinal role and a budding status as a superweapon, not in a repeat of the type of memorable heroic battles against the Japanese, but in its pinch hitting insertion into a conflict, which is regarded by many as a forgotten war.[45]

The Korean War of 1950-1953, though limited to a relatively small geographical region, was a high intensity conflict, which drew in many nations and even the young United Nations, the first of numerous bitter disputes fought in the light of the budding Cold War. Though mainly enshrined in memory as a land war, which in some cases resembled the First World War more than the Second, this attempt to keep the North Korean communists and their Chinese and Soviet allies from overrunning the peninsula, had a significant aerial and naval component. At the intersection of these domains we find the aircraft carriers at work during the entire conflict, in as significant numbers as the austerity and mothballing measures of previous years permitted. And it is in this conflict, partly forgotten, and mostly remembered as a land war, that these vessels assumed the doctrinal role they fulfil to this day, that of quasi-permanent, yet mobile airfields, operating off an enemy coast and able to use their planes to first claim and then maintain air superiority, to act as a naval base or mother ship for the rest of the fleet and to project force deep into the enemy interior. This new quintessential role of the aircraft carrier, the role which we have seen off the coasts of Vietnam, Argentina, Libya, Iraq, Iran and once again North Korea, is the mode in which a useful dominant weapon managed to promote itself to a superweapon, of a political force beyond the military.[46] Although it is recognised in literature that this transformation took place during the Korean War, what is often neglected is that the clearest version of this new doctrine, the one which most resembled the form we see today, was not developed by the larger more modern carriers that operated on the eastern coast, but by the smaller more modest escort carriers of the west coast. These flawed vessels were disproportionately challenged by the circumstances of Korea, yet it was these small carriers that successfully carved out a new role for the aircraft carrier, including deeply integrated tactics within a multinational coalition fleet.[47] In a further irony, shortly after the Korean War, the escort carrier was phased out of almost every navy, after some experiments found them irrevocably obsolete.[48]

While aircraft carriers could not achieve total victory for the United Nations in Korea, they

45 McFarland, 'The 1949 Revolt', 61-62.
46 Rubel, 'The future', 15-18.
47 Hallion, *The naval air war*, 191; Rubel, 'The future', 18; Dater, 'The development', 90.
48 Polmar, *Aircraft carriers. Vol. II*, 157.

did play an important role during the very first days of the war, and during the Inchon landings. Afterwards they were a major factor in helping prevent the overwhelming Chinese forces from spilling out over the 38th parallel. Once again the achievements of the aircraft carrier were partially masked, this time by the failures on land, just as they had been by the success of the atomic blasts in World War II. But this time these ships had proved themselves in a limited conventional war, and politicians finally took note. Although it is untrue to say that the existence of the aircraft carrier had helped develop the so called 'nuclear taboo', which was a result of many complex factors, it cannot be denied that in the future this new mode of conventional global force projection, made it easier for the United States to wage war while keeping the unthinkable off the table.[49]

Former American president Bill Clinton was quoted as saying that the first question which popped up when an international conflict occurred was: “Where are the carriers?”.[50] Just like it was in Korea, aircraft carriers tend to be first responders, and can often ward off defeat, giving forces with a slower build-up, such as the land-based air force, the chance to enter the conflict zone.[51] Carriers have the additional advantage of using the highways of the free sea as route for deployment, while land and air forces are often dependent on negotiations over staging areas with neutral parties or fickle allies, in the absence of pre-existing bases, or in the worst case scenario on liberating their own overrun bases from the enemy, as was the case in Korea.[52]

But has this particular usefulness of carriers in the beginning stages of war exceeded their true military value and crossed over to a dogmatic tendency of politicians to use them?[53] An increasingly vocal school of critics seek to attack the viability of the carrier as a geopolitical panacea along two major axes: cost and vulnerability.[54] These critics, who can even be found among former naval aviators, argue that the carrier has reached the end of its natural lifespan, just like the battleship before it, and is ready to be replaced by something else (what that 'something' might be is of course another debate).[55] They tend to argue that the problem with the carriers consists of a lack of serious challenges in the high end of the violence spectrum since World War II.[56] They further tend to argue that the one time during this period carriers did operate in this spectrum, during the Falklands War, their survivability was on a knife's edge, and that since then far greater dangers have developed.[57] It is in the light of this uncertainty over the future of this weapon, that the nature of the

49 Tannenwald, 'The nuclear taboo', 438-441, 443-450, 453, 459.
50 Ho, 'The combat utility', 69.
51 Cagle & Manson, *The sea war*, 32-33; Thompson, *Naval aviation*, 13.
52 Ho, 'The combat utility', 70-77.
53 Ibidem, 70.
54 Hendrix, 'At what cost?', 4.
55 Ibidem, colophon, 3.
56 Ho, 'The combat utility', 67-68.
57 Ibidem, 82-84; Hendrix, 'At what cost', 8.

tests it has undergone since World War II must be examined. Arguably the most important of these tests was the war in Korea, where not only did the carriers reprove themselves, but took on their most lasting doctrinal role, and became the superweapons they still seem to be.

At least one constant of the aircraft carrier equation is the ever rising costs of this ship type. Early experimental carriers were often converted from other existing hulls such as oilers or cruisers. In World War II carriers benefitted from an economy geared towards war, some very efficient designs and scaling advantages.[58] Still, they were already by far the most expensive type of ship, and after the war, beginning with the scrapped *USS United States*, the building costs and upkeep of carriers truly started to reach astronomical figures. We have to take into account that a carrier is far more than its hull alone. It has a wing of ever more expensive planes, pilots whose training costs millions of dollars, a very large crew and a huge appetite for parts, fuel, food and other supplies.[59]

Another feature of carriers is their slow development cycle. This means they are always somewhat behind the times technologically at the moment they debut. Of course, lessons and technological advancements can still be implemented in the later models of a class, which can and do have some significant differences from the earlier ships, a situation which in turn can cause compatibility problems. All in all, carriers are the opposite of disposable, as they represent such a tremendous investment of capital that constant upkeep and modification are warranted, their lifespan sometimes approaching fifty years.[60]

And the costs of aircraft carriers are still rising. The last ship of the *Nimitz*-class was built for a sum of 7 billion dollars. Their future replacement, the new *Gerald Ford*-class carriers, have a current unit price of 13.5 billion dollars, larger than the GDP of many countries, and will expend 6.5 million dollars per day for the rest of their lives. But as critics have pointed out, this nearly doubled price tag does not translate into doubled striking power or accomplishments. In fact, looking at what a carrier's actual military purpose is supposed to be, the amount of money spent to project force, that is to hit an enemy target, seems almost ludicrous in the carrier's case.[61] Almost all other options are cheaper, and some have argued that economics will dictate the eventual abandonment of the carrier concept, or at least its adaptation to future unmanned technology. A drone carrier could be both cheaper and a less crippling loss during a war.[62]

But of course a carrier does not earn its price back through war alone, but in theory through the prevention of war, as a hegemonic symbol. Alas, the prevention of war, or even the containment

58 Polmar, *Aircraft carriers. Vol. I*, 271.
59 Hendrix, 'At what cost', 5-7.
60 Ibidem, 9; Terzibaschitsch, *Aircraft carriers US Navy*, 275-276; Polmar, *Aircraft carriers. Vol II*, 406-407.
61 Hendrix, 'At what cost', 5-7.
62 Ibidem, 9-10.

of conflicts is an empirically murky territory. Yet we can observe that American presidents have a high degree of belief in its efficacy. The willingness of smaller powers like France and Great Britain to keep operating at least one carrier, as well as the future ambitions of China and India, seem to indicate that even in a world without major wars, carriers are seen as the hallmark of a serious nation state.[63] The question still remains if a different symbol, perhaps a large assortment of smaller, cheaper vessels, could exercise the same sort of geopolitical authority on the seas. One advantage of such an arrangement would be greater global coverage, since even the ten active American carriers cannot be everywhere at once. Still, force projection also consists of literal 'projection', a visual component, and in this regard the large aircraft carriers, shooting swarms of predatory aircraft into skies around the world is an as of yet unmatched image.[64]

Besides the financial considerations, the other great threat to the aircraft carrier's future appears to be its increased vulnerability, or at least the perception thereof. After the Second World War, with the possible exception of the Falklands War, no aircraft carrier has been in serious danger of being sunk during a conflict. The large American carriers which did most of the fighting during these decades exemplified the term 'capital ship', incredibly important units within the Navy, the sinking of which could be a fatal blow. As such, a large part of the rest of the Navy's vessels were assigned to defending them. During the Korean War, for instance, even the smaller escort carriers were considered valuable enough to warrant a screen of at least three dedicated destroyers. Nowadays US aircraft carriers sail in large groups, protected by all sorts of vessels, including guided-missile cruisers, destroyers and occasionally submarines. In recent years one of these types of escorts, the guided-missile cruiser, has become by far the most important part of the carrier's armour.[65] This is because during all these decades of seemingly unopposed carrier activity, the potential enemies of the United States have not been idle. In recent year countries like Iran, but especially China, have put a lot work into ways of crippling or perhaps even sinking a US carrier. Most of the systems they have developed are missile based. China even owns a ballistic anti-ship missile system, but what the US Navy fears most are their advances in anti-ship cruise missile technology. These missiles are thought to be accurate and highly cost effective, especially when offset against the price tag of replacing a carrier. Unlike the Argentinians, who almost ran out of Exocets during the Falklands War and had to try to surreptitiously import them[66], the Chinese possess vast stockpiles of hundreds of cruise missiles. Only one would have to penetrate a carrier´s defences for a potential kill. American naval planners think that to increase the odds of this

63 Polmar, *Aircraft carriers. Vol II*, 334-338.
64 Hendrix, 'At what cost', 5-6.
65 Ho, 'The combat utility', 93.
66 Polmar, *Aircraft carriers. Vol II*, 321-322.

happening, an enemy would fire an enormous swarm of cruise missiles, steadily overloading the defences of the carrier and its cruiser escorts, until one slips through. At this moment in time a strategic counter in this scenario, except staying far out of range, has not been found.[67]

And although this is the greatest threat faced by modern carriers it is far from the only one. Submarines for instance, have shown an unnerving aptitude during war games and exercises for approaching carriers undetected. There are still the more traditional threats of torpedoes and missiles launched from planes and other surface ships. Flotillas of small speedboats, as employed by Iran, could hurt a carrier. There may be carrier-killing weapons in the world that intelligence services do not know about, and in the current world even factors as terrorism and drone attacks must be taken into account.[68] What is certain is that over seventy years of patrolling hostile coasts with impunity has painted a large target on the back of these ships. The development of this mode of naval aviation warfare finds its roots in the Korean conflict, and it is there that we must turn to find an explanation for both the carrier´s successes and flaws.

67 Hendrix, 'At what cost', 4, 8; Ho, 'The combat utility', 92-95.
68 Ho, 'The combat utility', 84-91.

Chapter 2

Cold seas or a warm bath?

Broadly speaking the carrier combat operations of the Korean War can be divided into two distinct phases. The first, significantly shorter, phase consisted of the first three months following the outbreak of the war and centered on the tenuous defense of the Pusan perimeter pocket. The immediate objective of South Korean and United Nations forces during this time was to avoid an all-out collapse and summary ejection from the peninsula. Carrier operations during this intense period were far more reminiscent of the Second World War, characterised by their heightened mobility, emphasis on tactical strikes and a relative scarcity of carrier units.[69]

In the course of the war, as increasing numbers of carriers joined the early fighters *Philippine Sea* and *Valley Forge*, the second phase set in, which solidified as the ground war drew to a stalemate around the 38th parallel.[70] This phase, which formed the bulk of the Korean War, started with the Inchon amphibious landing operations in September 1950, that relieved the most immediate communist pressure on the South, and lasted till the Armistice Agreement of 27 July 1953.[71] This period saw the establishment of new roles for aircraft carriers, and because of their consistent rotation and struggle to adapt, it gives a good window for comparison of the carriers, amongst themselves and against the operational norms of the past and the future. So what was the exact nature of carrier operations during the Korean War, how did they differ from World War II, and in what way did they foreshadow present day naval air warfare?

The carrier operations on the west coast of Korea are especially instructive with regard to this adaptation process. On the east coast the larger fleet carriers kept up a constant barrage against the communist armies.[72] The west coast became the relatively 'quiet' coast ('relatively' being the key word here), where the fleet carriers' smaller cousins, the escort carriers, joined ships from many nations to conduct blockading operations under the flag of the United Nations, the first naval task force under the blue flag in history.[73] While the massed force of 'eastern' United States carriers pounded away at North Korean and Chinese forces, the smaller 'western' carriers were developing a new modern doctrine that foreshadowed the way we see these ships used today.[74] Of course they

69 Cagle & Manson, *The sea war*, 47.
70 Field Jr., N*aval operations*, 75; MacDonald, *Korea*, 220-221.
71 Cagle & Manson, *The sea war*, 75; Blair, *The forgotten war,* 975.
72 Thompson, *Naval aviation*, 32.
73 Cagle & Manson, *The sea war*, 293-294.
74 Hallion, *The Naval air war*, 191.

also bombed the mainland, though severely limited by their allotment of only one full squadron of planes, usually operated by Marine pilots as opposed to Navy pilots on the larger carriers.[75] But during the three years of deployment to the west coast the humble escort carriers had to adapt to a myriad of new roles and difficulties, far beyond the scope for which this class of ships was envisioned during World War II. Escort carriers were significantly smaller and slower than the large fleet carriers, but cheap to build, often by converting other ship types, and were produced *en masse* during the Second World War for the purpose of defending equally slow convoys of cargo ships. They were crewed by around a thousand men, excluding its fighter squadron's pilots and ground personnel.[76] Of the seventeen US carriers in Korea, five, the USS *Badoeng Strait*, the USS *Bairoko*, the USS *Point Cruz*, USS *Rendova* and the USS *Sicily* were escort carriers that generally operated on the western coast.[77] Of these the *Point Cruz* did not see any substantive wartime action, but played a role directly after the armistice. During a period in which South Korean authorities forbade UN troops from crossing their territory, it served as a helicopter carrier during a massive logistical enterprise codenamed Operation Platform. More than six thousand Indian peacekeepers were successfully transported to the Demilitarized Zone from its deck in over twelve hundred separate helicopter flights.[78] A sixth ship, the USS *Bataan*, a converted cruiser that had already seen significant combat in the final year of the last war, was not technically an escort carrier, but a light carrier, having most characteristics of the escort carrier, but a speed more comparable to fleet carriers. Its deployment and experience in Korea was for all intends and purposes very similar to the other small carriers.[79] It is exactly through the lens of the limitations of these ships that we can most clearly see the contours of the challenge of the Korean War, and the way in which a new carrier doctrine was forged.

So what was expected of an escort carrier operating with Task Force 95 on the west coast? Circumstances on this side of the peninsula dictated a specific type of warfare. For one thing, the shallower waters, shoals and groupings of small islands in the area prohibited large ships from safely operating near the coast. West coast carriers were permanently restricted to patrolling at least fifty miles out from the shoreline, which automatically cut down the response time and operational range of their planes towards the mainland.[80] These limitations, combined with the already slim

75 Thompson, *Naval aviation*, 9.
76 Terzybaschitsch, *Aircraft carriers US Navy, 296; Polmar, Aircraft carriers. Vol. II*, 147-148, 268-270.
77 https://www.history.navy.mil/research/archives/digitized-collections/action-reports.html; https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/badoeng-strait-cve116.html 9-16 October 1952, 2.
78 https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/point-cruz-cve119.html 29 Oct 1953, 2-8.
79 Campbell, *U.S. Navy*, 13-14; Polmar, *Aircraft carriers. Vol. I*, 266-267.
80 Cagle & Manson, *The sea war*, 283, 295.

capacity of the escort carrier (one full squadron at best, and only one type of aircraft), forced the development of deeply specialised and rationalised flight schedules, ordnance load-outs, fuel schemes and operational roles.[81] For example, fairly early on we see the creation of specific mission types focusing on the reconnaissance of the estuary of particular rivers, such as the Han and the Taedong.[82] These are not ad hoc strikes of opportunity conducted by a vessel possessed of surplus time, capacity, targets and intelligence. Instead, they are the result of a force suffering from scarcity in all of these fields, trying to develop a rational timetable for maximum impact; the small escort carrier trying to punch above its weight.

Crucial to understanding the west coast experience of UN naval forces is an examination of their mission statement. Although similar in wording to that of the other allied forces in the region, this was above all a blockading force, and this overarching theme of blockade, as opposed to strike or attack, is omnipresent in the primary sources.[83] It was thought that cutting off any seaborne supply chain from North Korea's allies Russia and China would severely cripple its war effort.[84] To accomplish this at least one smaller carrier, usually alternating between a United States vessel and a British ship, would constantly patrol the western coast in two prescribed operational areas, named 'Nan' and 'Mike', with only slight deviations in latitude and longitude.[85] In these areas the escort carriers would form an air cover umbrella for all other UN ships operating in the area, from patrolling destroyers, to troop ships and big gun cruisers and battleships, minesweepers, convoys of bulk cargo ships, tankers and specialised logistical and intelligence vessels.[86] We can also see the mission statement evolving and expanding through time, eventually being formalised and standardised across the western carrier group. For instance, the first available document from the light carrier *Bataan*, for the first months of 1951, reflects a transitional, fluid phase of the war on the west coast, as the carrier is still required to provide naval air spotting for large battleships in the wake of the Inchon landing. Subsequently, its mission statement is very concise and tactically oriented, naming 'operations in support of UN troops in Korea' and nothing more.[87] The next document from April and May of the same year, is only slightly more precise, naming the blockade

81 Thompson, *Naval aviation*, 9.
82 https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/bairoko-cve115.html 5-14 July 1953, 24; https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/sicily-cve118.html 4-13 September 1952, 3.
83 https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/valley-forge-cv45.html 16-31 July 1950, 1-3; Naval History and Heritage Command (NHHC),*USS Badoeng Strait* (CVE 116), 29 October-12 November 1952, 2.
84 Cagle & Manson, *The sea war*, 292-293; Norman, 'MacArthur's blockade proposals', 166, 168-169.
85 Cagle & Manson, *The sea war*, 295; NHHC, *USS Badoeng Strait* (CVE 116), 17-28 December 1951, 2, 13; NHHC, *USS Sicily* (CVE 118), 4-13 December 1951, 2.
86 NHHC, *USS Badoeng Strait* (CVE 116), 19-29 November 1952, 2.
87 Field Jr., *Naval operations*, 212; https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/bataan-cvl29.html 15 January-7 April 1951, 2, 4.

of the west coast as primary mission, then the protection of communications in the Yellow Sea and finally support of ground troops.[88] This hierarchy continued throughout the war, but was greatly expanded upon. The first document of the *Bataan's* following tour, in April and May of 1952, contains a mission statement consisting of seven points for the task force element and eight more for the carrier specifically.[89] By this time the same operational template had been more or less standardised and adapted by all west coast carriers.

As more and more carriers joined the fray and as the fighting drew to a bloody, but geographically static, stalemate in the summer of 1951, the rotation of escort carriers on the west coast was solidified into an iron regime. Typically a carrier would serve a tour of duty consisting of several months, subdivided into combat patrols lasting around eleven days, of which nine were spent in various operations in the assigned blockade area, and two for sailing from or towards its home base.[90] Sometimes, this was the port of Yokosuka, located near Tokyo on the main Japanese island, which had functioned as a small American naval and logistics center since the Second World War, and has grown to harbor the US Seventh Fleet in present time. More often the port of Sasebo, located closer to Korea, on the southwest coast of the main island, was used as a base.[91] Here, during time between combat patrols, the carriers would be moored, usually for about a week, while the ships' supplies were replenished and necessary repairs carried out as far as the local facilities permitted. The optimal crew complement of the escort carriers was slightly over a thousand men, and a majority of them, who were not needed for tasks like loading and belting ammunition, would use downtime in Yokosuka or Sasebo port for recreational purposes, as sailors have done through the ages.[92]

The trip from Sasebo port to the area of operations on Korea's west coast could be completed in a brisk 14 hours.[93] The prevalence of typhoons, cyclones and other types of weather anomalies could create extremely rough conditions on the sea, which could cause even a large ship like an aircraft carrier significant delays.[94] Even in ideal circumstances this voyage to the combat zone was no idle cruise, and every minute was spent usefully by the carrier crew. First of all, the carrier usually left port without its full complement of planes on board. The rotation of new fighter

88 NHHC, *USS Bataan* (CVL 29), 8 April-11 May 1951, 4.
89 NHHC, *USS Bataan* (CVL 29), 29 April-11 May 1952, 2.
90 NHHC, *USS Bairoko* (CVE 115), index.
91 Field Jr., *Naval Operations*, 46.
92 NHHC, *USS Badoeng Strait* (CVE 116), 19-29 November 1952, 21; NHHC, *USS Bataan* (CVL 29), 6-16 March 1953, 16; NHHC, *USS Bairoko* (CVE 115), 5-14 July 1953, 16; https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/rendova-cve114.html 23 September-9 December 1951, 5; NHHC, *USS Badoeng Strait* (CVE 116), 29 October-12 November 1952, 26.
93 NHHC, *USS Badoeng Strait* (CVE 116), 17-28 December 1951, 2.
94 Field Jr., *Naval Operations*, 188; NHHC, *USS Bairoko* (CVE 115), 5-14 July 1953, 2, 4.

squadrons, which were not tied to a particular carrier, but also the need replenish total losses and severely damaged planes from previous patrols, meant that carriers would have to execute a difficult logistical dance while on the move.[95] While the ship sailed along the coast of Japan towards Korea, multiple planes, sometimes an entire squadron, would take off from various airfields and land on the carrier. Of course these landings on the traveling carrier were a great testament to its mobility and flexibility, but they were inherently dangerous, especially when green Marine pilots would make their first qualifying sea landings.[96] Add in the possibility of bad weather, and we see how a combat patrol could turn grim, even before reaching the war zone itself.

Another aspect of the efficient use of time in transit was the prevalence of drills, especially Anti-Air (AA) exercises. Other drills included firefighting, evacuation and General Quarter combat training, but the AA drills were almost always conducted, with very few exceptions, both heading for the west coast and on the return trip.[97] They required the services of what has to be, even in the realm of military endeavors, one of the riskiest professions: the target tug pilot. The target tug plane would take off from an inland Japanese airport, since the smaller escort carriers did not carry this specialist service themselves. He would fly dragging a long cable with a towed sleeve, a sort of target made from fabric, behind him, while the more than fifty guns and cannons of the carrier's anti-aircraft defense batteries pounded away at the sky.[98]

The vulnerability of carriers from air attack was a hard learned lesson from the Pacific theater of World War II, when many of the American and Japanese carriers lost had been the victim of airborne torpedoes or kamikaze planes.[99] Generals always fight the last war, and this is no different for admirals. To them the threat of Korean, Soviet or Chinese air attacks on the carriers was far from imaginary, and it was prudent to prepare for this eventuality, especially during the relatively short period when the new MIG jet models actually outclassed their western competition.[100] The fact that, apart from a few scattered incidents, the carriers were never seriously threatened from the air in Korea, does not negate the impact on carrier operations and their crews. The Action Reports are rife with false alarms and misidentification of friendly aircraft. This was an era when Identification Friend or Foe (IFF) systems were still under development, and naval operations within a multinational force made sorting the friends from the enemies even more difficult. Sometimes this led to real 'scares', periods of prolonged false alarms and nervous evasive

95 NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 21; NHHC, *USS Badoeng Strait* (CVE 116), 11-21 January 1953, 3.
96 NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 5.
97 NHHC, *USS Bairoko* (CVE 115), 22 March-1 April 1952, 3; NHHC, *USS Bataan* (CVL 29), 12 May-13 June 1951, 3, 6; NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 14.
98 NHHC, *USS Bataan* (CVL 29), 15-26 February 1953, 2-3, 7.
99 Polmar, *Aircraft carriers. Vol. I*, 529-530.
100 Hallion, *The naval air war*, 172-173.

maneuvering.[101]

Another vital component of the carrier's security was the so-called destroyer screen, a group of varying numbers of these smaller, more agile ships, usually between three and four, but with notable exceptions below and above those numbers.[102] At least one destroyer would also accompany a carrier to and from its base in Japan, and would often take part in the firing drills en route.[103] They served a myriad of roles around the carrier mother ship, while it was in the operational area, including patrolling, serving as a forward radar and listening post for the carrier group and interception of illegal fishing vessels and other shipping that was prohibited under the blockade.[104] Furthermore, they provided extra protection for the carrier, both in their primary role as anti-submarine warfare ships, and also as an extra component of the carrier group's anti-air umbrella. From time to time the lead destroyer, or screen commander, a position that was constantly rotated, would also take over the mundane control of the carrier's standard Combat Air Patrol, when other more offensive missions inland were threatening to overload its command and control capacity. Finally, each night a destroyer would detach from the carrier group and patrol the many islands of the west coast, which were tenuously held by allied Korean guerrillas and Partisan Regiments and constantly under threat of North Korean invasion.[105]

While the carriers on the west coast were mostly American and British, with the exception of one Australian ship, the destroyers were the true embodiment of the international United Nations naval effort in Korea.[106] In addition to the three aforementioned nations, ships from the navies of Canada, Columbia, The Netherlands, Thailand, New Zealand and South-Korea enforced the blockade and defended the carriers.[107] A funny example of this pluralism saw the Australian destroyer HMAS *Bataan* sailing in the same formation as the carrier USS *Bataan*, a situation which would fly in the face of naming conventions within a single navy.[108] On the whole this international conglomerate gave off a strong signal of unity towards the communist enemy, and in time its members learned to work well together. Still, there were times when differences in procedures, signaling, IFF application and general offensive, technological and seafaring capabilities between

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101 NHHC, *USS Badoeng Strait* (CVE 116), 26 December 1952-5 January 1953, 31; NHHC, *USS Bairoko* (CVE 115), 17-26 June 1953, 16; NHHC, *USS Sicily* (CVE 118), 13 June-16 September 1951, 19-20; NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 6-11.

102 NHHC, *USS Bairoko* (CVE 115), 5-14 July 1953, 2.

103 NHHC, *USS Sicily* (CVE 118), 13 June-16 September 1951, 8.

104 NHHC, *USS Bataan* (CVL 29), 18-30 May 1952, 1; NHHC, *USS Bataan* (CVL 29), 6-16 March 1953, 3; NHHC, *USS Sicily* (CVE 118), 13 June-16 September 1951, 13-14.

105 Field Jr., *Naval operations*, 320; NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 16; Ibidem, 28; NHHC, *USS Bataan* (CVL 29), 8 April- 11 May 1951, 26; NHHC, *USS Sicily* (CVE 118), 4-13 September 1952, 2.

106 NHHC, *USS Badoeng Strait* (CVE 116), 17-28 December 1951, 2.

107 NHHC, *USS Point Cruz* (CVE 119), 29 October 1953, 3.

108 NHHC, *USS Bataan* (CVL 29), 12-23 July 1952, 6.

the ships of these nations caused headaches for the carrier captain, who had to oversee the delicate naval ballet of his destroyer screen.[109] The relation between carriers and destroyers was complex even without the international component, as destroyers weaved in and out of the area in a never ending dance of changing assignments and nighttime patrols.[110] While they provided useful secondary services for the carrier, such as the delivery of mail, transitional notes and personnel, including visiting admirals, and often served as an invaluable midway station for the return of rescued downed pilots, they marred this perfect symbiosis with some parasitic aspects.[111] Most important of these, in the frequent absence of dedicated tanker and supply vessels, was the need for destroyers to refuel and replenish from the carrier, an operation that had to be frequently repeated and could consume multiple days of a carrier's allotted time in operational area, during which no offensive operations could be flown.[112] Also the carrier often became a victim of its own scaling advantages, as it had to share its religious, recreational, communicative, transporting (its helicopter), and especially its medical functions and facilities with all the smaller vessels in the wider area. The captain's remarks however, bear out that they gladly payed these prices, since their reports often list an undermanned escort screen as one of their gravest concerns.[113]

Once the carrier and its conglomerate of accompanying vessels was in place along the west coast and sailing in relative safety, it was time for the most daunting of tasks: the continuous launching of various combat operations, day after day, interrupted only by the refueling and replenishing of other ships, and the fading of the light (specialised nighttime aircraft were only available on the larger east coast carriers and on land bases).[114] Although the mission was primarily to blockade, this task consumed only a small portion of the ship's capacity for action, and the small escort carriers, even at the suboptimal aircraft availability that was the norm, made good use of their time.[115] In addition to some variations and specialisations, at least six operational roles were filled by the carrier´s aging but reliable Vought F4U Corsair propeller planes.[116] Of these roles only the Combat Air Patrol, or CAP, consisting of two to four planes circling the carrier overhead, ready

109 NHHC, *USS Badoeng Strait* (CVE 116), 7-16 January/25 January-6 February 1952, 15-16.
110 NHHC, *USS Sicily* (CVE 118), 6-16 October 1952, 5-6.
111 NHHC, *USS Bairoko* (CVE 115), 17-26 June 1953, 5; NHHC, *USS Bairoko* (CVE 115), 15-26 February 1952, 5; NHHC, *USS Bataan* (CVL 29), 15-26 February 1953, 5-6; NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 33.
112 NHHC, *USS Rendova* (CVE 114), 23 September- 9 December 1951, 21.
113 NHHC, *USS Badoeng Strait* (CVE 116), 17-28 December 1951, 10; NHHC, *USS Badoeng Strai*t (CVE 116), 28 January-6 February 1953, 13; NHHC, *USS Bairoko* (CVE 115), 14-21 May 1953, 14; NHHC, *USS Sicily* (CVE 118), 13 June-16 September 1951, 4.
114 Hallion, *The naval air war*, 165.
115 NHHC, *USS Badoeng Strait* (CVE 116), 29 October-11 November 1952, 3.
116 Thompson, *Naval aviation*, 125-128; NHHC, *USS Bairoko* (CVE 115), 15-26 February 1952, 2; NHHC, *USS Bairoko* (CVE 115), 14-21 May 1953, 15.

to intercept threats, had a purely defensive role.[117] In fact, as the war progressed, CAP planes were increasingly redesignated as TARCAP, with TAR standing for ´target´. This was indicative of both the carrier commanders' aggressive stance, as well as the need for every plane to do their part. They would now orbit the carriers in a far greater circle, they would carry offensive air-to-surface weaponry and their pilots would be supplied with a large list of pre-briefed targets, which they could attack when the carrier's safety was not in question.[118]

This development only added to the carrier´s array of attacking mission roles. Various types of reconnaissance missions followed the path of Korean rivers and their estuaries searching for any and all targets of opportunity including boats and gun emplacements hidden in caves near the coast.[119] Another form of attack was the so called CAS, or Close Air Support mission. This advanced and complicated concept, only recently born in World War II´s island campaigns, saw the carriers' planes directly responding to the needs of NATO ground forces in dire straits, and dropping their bombs in tactical battlefield situations.[120] Alas, as shall be explored later, many factors made these CAS missions among the least successful naval aviation operations in Korea. Naval Air Spotting on the other hand was usually a resounding success, as the carriers' planes could observe the trajectory and impact of bombardments by huge battleships and smaller gunboats. They relayed the results and corrected firing solutions, serving as a flying ´gunsight´, able to peak far inland over hills and obstacles, where the ships themselves could not see.[121]

But by far the most common, and most successful type of operation, based on sheer damage inflicted on the enemy, were the various bombing missions on North Korean and Chinese targets, both on the surrounding islands and the mainland coast, but also regularly quite far into the interior. In the Action Reports these usually come under the header `Strike´.[122] The targets were pre-briefed, meaning that the pilots had attended a conference prior to launch in which the whereabouts, local defenses and nature of their targets were discussed, often based on intelligence from friendly Korean Partisan Regiments or prior aerial reconnaissance.[123] This knowledge in advance also made it possible for the squadron's ground crew to select a loadout of weaponry and fuel allotment tailor-made to the needs of the mission.[124] As was the pattern with an escort carrier forced into the fleet carrier role, there were always limitations to the amount of ordnance its small group of fighter-

117 NHHC, *USS Bairoko* (CVE 115), 9-18 April 1952, 11.
118 NHHC, *USS Sicily* (CVE 118), 4-13 September 1952, 5.
119 NHHC, *USS Badoeng Strait* (CVE 116), 28 January-6 February 1953, 5.
120 Hallion, *The naval air war*, 42-44; NHHC, *USS Bataan* (CVL 29), 15 January-7 April 1951, 2.
121 Field Jr., *Naval operations*, 436; NHHC, *USS Bataan* (CVL 29), 15 January-7 April 1951, 4.
122 NHHC, *USS Sicily* (CVE 118), 4-13 September 1952, 4.
123 NHHC, *USS Bataan* (CVL 29), 12 May-13 June 1951, 15; NHHC, *USS Badoeng Strait* (CVE 116), 28 January- 6 February 1953, 12; NHHC, *USS Bairoko* (CVE 115), 30 May-8 June 1953, 3.
124 NHHC, *USS Bairoko* (CVE 115), 15-26 February 1952, 11.

bombers could carry to the enemy. However, especially with these limitations in mind, it is truly amazing, and sometimes horrifying, what one small aircraft carrier could inflict on an enemy army and infrastructure in the space of ten days.

Almost every Action Report submitted by carrier captains contains an extensive list of targets that were damaged and destroyed during the relevant patrol.[125] The lack of dedicated photo planes on board of escort carriers meant that damage assessment was usually the result of a combination of a pilot's best guess made in haste over the target, and later reports, usually from friendly Korean guerrillas.[126] Of course these methods lent themselves to some measure of exaggeration, and an aggressive captain wanting to show off his planes' destructive potential could add to this by creative categorisation of targets (for instance the tallying of individual pack animals) and other administrative flourishes.[127] But given the specificity of the breakdown of targets within the lists and the general consistency of damage application (variations did occur, sometimes because of particularly bad weather conditions or a very ambitious captain) in reports by different carriers, it is safe to say, that the usually less than twenty operational planes aboard a single escort carrier could be a significant thorn in the enemy's side.[128] Nearly every damage list records the death of large numbers of enemy troops as a direct result of the carrier planes' actions, usually listing numbers above a thousand, and regularly approaching two thousand. Troops were in most cases only secondary targets of opportunity, or killed as collateral with the bombing of infrastructure, rolling stock and other larger targets. This meant that the carrier, simply by virtue of executing its normal tactical and strategic bombing schedule, would knock out up to two full battalions of enemy forces per patrol.[129]

But the main emphasis of the naval bombing campaign lay not with enemy manpower, of which, after the Chinese entry into the war, there was an endless supply.[130] Instead it was focused on infrastructure, rare heavy weaponry, supplies and in general all means by which the enemy army could sustain itself and move across the peninsula. Roads, bridges and especially the railroad network were vehemently attacked, as well as every vehicle, motorised or not, down to carts drawn by oxen. When a road or railway was cut, but not effectively destroyed beyond repair it was listed as special category between ´damaged´ and ´destroyed´, lending some extra veracity to the diligence of the carrier's assessments. Local communist party headquarters, sometimes nicknamed 'Little

125 NHHC, *USS Badoeng Strait* (CVE 116), 7-17 December 1952, 24.
126 NHHC, *USS Sicily* (CVE 118), 4-13 September 1952, 11-12; NHHC, *USS Bataan* (CVL 29), 12 May-13 June 1951, 15.
127 NHHC, *USS Bairoko* (CVE 115), 5-14 July 1953, 14.
128 NHHC, *USS Bataan* (CVL 29) , 12 May-13 June 1951, 8-9; NHHC, *USS Bairoko* (CVE 115), 15-26 February 1952, 2.
129 NHHC, *USS Bataan* (CVL 29), 8 April-11 May 1951, 23.
130 Hastings, *The Korean War*, 156; Halberstam, *The coldest winter*, 401-402.

Moscow´ in the sources, were struck repeatedly by carrier planes, as were boats, power stations and a host of other targets.[131]

The image of naval aviation in the Korean War emerging through the lens of these carrier Action Reports is regretfully one that mirrors the reputation of the barbarity of the ground campaign, and even supersedes it. Of course, it is inherent to the very nature of air to ground warfare, characterised by distance to the target and relative safety for the attacker, to dehumanise the enemy and think in terms of pounds of ordnance dropped.[132] Also it is important to remember that the west coast with its many islands, rivers and estuaries was more suited to guerrilla type warfare, and therefore by default drifted towards the dirtier, more unregulated aspects of warfare.[133] Finally, the escort carrier's limitations with respect to numbers and types of planes meant that it was more likely to attack local, militarily dubious targets, than say a large factory deep within North Korea of strategically clear importance. But it is still jarring, especially considering these escort carriers were part of the only United Nations Navy ever to exist, to see the callous way in which the communist enemies' gruesome demise was recorded. The wartime mentality of Korea, specifically the home front's attitude towards collateral damage, was clearly more akin to World War II than Vietnam. Hatred of communism was at its peak, including of communist civilians. There were hardly any reporters embedded with the US Navy, and those that were mostly toed the line of a just war without moral ambiguity. The Action Reports of the carriers are highly reflective of the malleable ethics of the time and a 'let God sort them out'-attitude. For instance, napalm, which causes terrible and indiscriminate destruction, and has been effectively banned since the Vietnam War, was widely used. Carriers shared and perfected methods for mixing this cruel weapon on their decks, prior to loading it onto planes in large drop tanks and carrier captains were unashamedly enthusiastic about its merits.[134] The damage lists also hints towards other atrocities. The reports often mention attacks on villages, which were left burning in the wake of strafing runs and rocket attacks by carrier planes. The presumable justification of enemy troop presence (which is not even always explicitly mentioned) cannot explain the gusto with which these attack were carried out, without any consideration for the civilian population. Attacks on rice staples, water treatment plants, pack animals and other targets, which could not possibly exclusively affect the enemy military are frequent throughout the sources. On the other hand civilian casualties as a result of all these strikes are never mentioned, even though they must have been significant. The benign explanation for this

131 NHHC, *USS Bataan* (CVL 29), 8 April-11 May 1951, 23.
132 NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 24-25.
133 Field Jr., *Naval operations*, 422; Cagle & Manson, *The sea war*, 259.
134 NHHC, *USS Bairoko* (CVE 115), 9-18 April 1952, 7; NHHC, *USS Badoeng Strait* (CVE 116), 17-28 December 1951, 7, 14-15.

is that there was at least a sense of shame for the way in which the bombing campaign was conducted. But it is also possible to imagine that not even the cynical concept of collateral damage was of importance when it came to communists.[135]

Ethical or not, it is very clear that the captains of the small west coast carriers preferred bombing targets of opportunity, all along the coast and on the islands, to close air support for the regular armies.[136] Their blockading mission was fulfilled by default, by their mere presence, and actually enforced more by roving destroyer groups, than by the carrier or its planes.[137] At the same time the carrier, sailing a significant distance from the coast, avoided mines, was safe from land based artillery, and for most of the war was in no danger from the classical twin threat of airplanes and submarines, even though a healthy fear of these had to be factored in. US carriers of World War II had to contend with skies full of kamikazes, which could cripple a ship with one hit, and opposing carrier groups' large squadrons of torpedo bombers, fighting of all these and other dangers, while sailing far from their base and its potential for repair and aircraft replacement, all the while supporting ground troops in the island hopping campaign.[138] In contrast, the carriers near Korea were relatively safe and free to conduct maximal rationalisation of their flight schedules and bombing efforts.[139] Somewhat ironically, this period in the early fifties was one of the few points in the Cold War when communist aircraft technology could contend, and in the case of the MIG-15 even surpass, allied warplanes in performance. But a series of factors, including the inexperience of North Korean pilots, large preemptive strikes on the northern airfields and communist fears of escalating the war, precluded a concerted air attack on allied carriers.[140]

Since the Inchon landing had secured the southern west coast of Korea for the allies, a considerable number of small airfields became available.[141] Because the carriers off both coasts and the planes of the regular US Air Force controlled southern air space, these airfields, some of them located on small islands, became a source of invaluable synergy.[142] They served as hubs for transportation of personnel, for Carrier On-board Delivery planes delivering special emergency supplies like small electronic part to the ships, for flying replacement fighters to the carriers, and for receiving and repairing damaged planes that were beyond their squadrons' capacity for shipboard

135 NHHC, *USS Bairoko* (CVE 115), 30 May-8 June, 5, 7; NHHC, *USS Bataan* (CVL 29), 15-26 February 1953, 10; NHHC, *USS Badoeng Strait* (CVE 116), 7-17 December 1952, 24.
136 NHHC, *USS Bairoko* (CVE 115), 17-26 June 1953, 15.
137 NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 6-9.
138 Polmar, *Aircraft carriers. Vol. I*, 529-530.
139 NHHC, *USS Bairoko* (CVE 115), 9-18 April 1952, 8.
140 Hallion, *The naval air war*, 70-72; Thompson, *Naval aviation*, 31.
141 Blair, *The forgotten war*, 272-273.
142 Cagle & Manson, *The sea war*, 71.

repair.[143] They also crucially served as a lifeline for a resource even more valuable and scarcer than aircraft: the men who flew them. When their mother ship was out of reach, it was often on these very limited airstrips that naval pilots parked their smoking machines, after being riddled with anti-aircraft artillery fire.[144] In the more severe case of a bailout and subsequent rescue, the so called K-sites, as these small airfields were designated in the Action Reports, where the first link in the chain of transport bringing a downed pilot back to his ship, often in record time.[145]

It was in these relatively ideal circumstances of air superiority, stable supply chains and surrounding support structures on land, that the aircraft carrier transitioned into the jet age during the Korean War. The humble escort carriers did not partake in this particular new development, which came with its own set of problems, but the other challenges posed by the grueling schedule of the war hit this limited class of ships all the more. The nature of these trials needs to be examined further, especially with regard to the qualities and detriments of these unique ships and their ability to adapt. Still, some questions will remain unanswered, the most pressing being: "Was this Korean War a strong indicator of the carrier's enduring future superiority?" Or was this second crucible after the great war, actually a soft test, the outcomes of which have to be mistrusted even now, at the height of carrier dominance. We have seen shades of this possibility in the Falklands war, when supply lines for the two British carriers became dangerously stretched, naval air losses could not be easily replaced and large vessels proved vulnerable to Exocet anti-ship missiles.[146] The outcomes of that war still favored the carrier, but there are warning signs on the horizon. Since then many nations, including China and Iran, have developed ways of attacking large enemy ships. In this day and age the giant nuclear carriers of the United States represent such a concentration of manpower and financial investment, as well as military and symbolic political force, that the loss of only one of these ships could lose a war outright, or at the least severely cripple the effort.[147] Even in the relatively ideal circumstances of Korea the carriers would sometimes struggle. How will they fare under less fortunate circumstances?

143 NHHC, *USS Bataan* (CVL 29), 18-30 May 1952, 6; NHHC, *USS Bairoko* (CVE 115), 17-26 June 1953, 5, 18; Ibidem, 16-17; NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 14.
144 NHHC, *USS Bataan* (CVL 29), 6-16 March 1953, 3; NHHC, *USS Bairoko* (CVE 115), 17-26 June 1953, 8.
145 NHHC, *USS Bairoko* (CVE 115), 4-14 March 1952, 3, 4, 6, 7.
146 Polmar, *Aircraft carriers. Vol. II*, 317-328.
147 Polmar, *Aircraft carriers. Vol. II*, 407-411.

Chapter 3

Limits of a superweapon

When reading the Action Reports of United States carrier captains in Korea, it is quite possible to describe their sum total as one long and very complicated exercise in problem solving and efficiency maximisation. A myriad of challenges and problems, some small and temporary, others large and systemic, stood between ship, crew and captain, and the ultimate purpose, the effective application of force on the enemies´ assets. The carriers were presented with an ever changing puzzle of shifting logistical and military dimensions, in which small anomalies could trigger cascading difficulties. In fact the propensity for creating bottlenecks and the engendering of one problem by another, seems to have been an inherent challenge, stemming from the carriers´ complexity versus others ships.

However, the pieces in this huge puzzle of forces opposing the carriers´ optimal functioning were very different in size and nature, some incidental, some fundamental, some easily overcome with human ingenuity, some seemingly beyond problem solving capacity. Some of the challenges and problems were overcome during the Korean War, and the way in which this was achieved made modern carrier doctrine possible.[148] As we shall see the specific problems faced by the somewhat primitive, 'out-of-its-depth' escort carrier, and its methods for overcoming these, seem particularly instructive for understanding the limitations and possibilities of carriers in our own time. Ironically, this special class of carrier did not survive far beyond the Korean War, but because of its inherent limitations, the test of Korea was felt deeper aboard these smaller ships, and the lessons learned were more profound.[149] The question if Korea was a strong enough challenge for the robust evolution of the modern doctrine of aircraft carriers, and led to the subsequent perceived superiority of these vessels, remains unanswered till this day. We can, however, ask questions about the nature of this challenge. What were the specific problems and disadvantages faced by escort carriers in Korea? And how did they endure this trial despite inherent limitations and weaknesses?

To avoid the proverbial Homeric catalogue of shipping problems, and to provide a workable framework, the problems and challenges facing the carriers in Korea can be divided into three categories. They are designed to share some overlap, as they level down from the general to the specific like a Matryoshka doll, but they are definitely not arbitrarily chosen, as they represent not

148 Hallion, *The naval air war*, 197.
149 Polmar, *Aircraft carriers. Vol II*, 157-160.

only three levels of problems, but three modes in which these challenges were met in Korea and codified into doctrine, or left open a question for the future.

The first tier of problems are what might best be described as the existential challenges of the aircraft carrier ship type. For instance, the need for a very large specialised crew, the enormous dollar cost of production and the possibly dangerous concentration of symbolic force in a single vessel. Problems of this nature were not solved during the Korean War, and perhaps never can be. In fact, it can be argued that some of these problems were exacerbated later on. In modern times crews have got even larger and carriers more expensive.[150] The carrier, never a safe working environment to begin with, suffered significant blows in this area *after* the Korean War, especially during the three large fires that took place in the sixties.[151]

The second category is formed by challenges suffered by all types of aircraft carriers in Korea. These include such problems as delays caused by the extreme winter conditions and typhoons, but also personnel shortages and the limits of self-repair capabilities at sea.[152]

Finally, there is a third category of problems, exclusive to escort carriers, relating for instance to their lack of photo planes, their lower speed and general level of technology, their shortage of space on board and their single undiversified and meagre attack squadron.[153]

Because of the layered nature of this categorisation some of the carriers' challenges can be placed and examined on all three levels, though often a gradually weighted trend towards one category becomes visible. A good example is the problem of on board safety and danger mitigation on carriers. This can easily be described as an existential problem. Historically, aircraft carriers, and especially the decks of these ships, have been hazardous environments for human beings. They combine an abundance of fast moving planes and heavy machinery in a cramped space with often difficult sea and weather conditions, and a propensity for human error from an overworked crew and stressed out pilots. Add to this the elements of live ammunition, bombs, napalm (which had to be mixed on the deck) and copious amounts of fuel and a literal powder keg is formed.[154]

Of course, over time new precautions and procedures have evolved, as has shipboard

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150 Ibidem, 321, 408.

151 Terzybaschitsch, *Aircraft carriers US Navy*, 179, 235, 271; Polmar, *Aircraft carriers. Vol. II*, 253-255; Darwin, *Aircraft carrier flight and hangar deck*, 72-80.

152 https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/leyte-cv32.html 5-30 November 1950, 8; https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/princeton-cv37.html 28 September-18 October 1952, 37; https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/boxer-cva21.html 14 September–5 October 1950, 11-12; *USS Valley Forge* (CV 45), 3 March-4 April 1952, 11.

153 NHHC, *USS Bairoko* (CVE 115), 4-14 March 1952, 11; NHHC, *USS Sicily* (CVE 118), 6-16 October 1952, 12; NHHC, *USS Bataan* (CVL 29), 12 May-13 June 1951, 17; Thompson, *Naval aviation*, 9.

154 NHHC, *USS Sicily* (CVE 118), 13 June-16 September 1951, 16; NHHC, *USS Badoeng Strait* (CVE 116), 17-28 December 1951, 14-15; Darwin, *Aircraft carrier flight and hangar deck*, 21, 40-41.

firefighting equipment and safety training, though often only after very costly lessons. At the time of the Korean War there had already been some progress, as World War II losses had demonstrated the need for effective firefighting and overall on board safety. Yet some of the greatest peacetime carrier disasters still lay in the future, and the Action Reports bear witness to an imperfect system, with regular safety drills and a dedicated on board fire brigade on the one hand, but constant barrier crashes, fires, exploding ordnance and all sorts of other major and minor accidents on the other.[155] And even in today's computerised, fly-by-wire world, the most advanced United States carriers still experience crashes on deck, even as their modern nuclear mode of propulsion brings with it problems of its own.[156]

Now how did this existential danger manifest itself aboard the small escort carriers during the Korean War, and were they at a disadvantage dealing with it compared to the large fleet carriers? In one way the escort carriers were at a distinct advantage. The jet fighter had only recently made its debut in the arsenal of US naval aviation, and in Korea it tore up the wooden decks of the older fleet carriers and made the already unsafe working environment extra dangerous with its propulsion's blast waves. Their small size, in itself a defect, worked in favour of the escort carrier here, as they were mercifully spared the possibility of jet planes flying from them.[157] However, the single squadron of propeller planes was more than capable of causing significant danger to ship and crew. The Action Reports are rife with dry, matter of fact descriptions of horrific crashes onto the flight deck, and sometimes the carriers' superstructure, often one after another in rapid succession, as well planes being catapulted into the sea and other accidents, which would be deemed completely unacceptable to civilian standards of aviation safety. One such series of crashes occurred during the *USS Sicily*'s patrol between June and September of 1951. In this relatively short span of time there were eleven incidents. These included six 'standard' barrier crashes, in which the planes missed the arresting cables strung across the deck while landing and came to an abrupt halt in one of the four barrier nets, which were only present during landing, and could be folded down to the deck at other times. Such an event usually, though certainly not always, spared the pilot from injury. Planes, however, were invariably mangled by barrier crashes, and received a unique classification of "A", "B" or "C", based on the severity of the damage. The other five incidents were even more serious. These consisted of one plane flipping over upon landing, another catching fire after landing, a third ploughing into the carrier's superstructure and a fourth crashing on the deck as a result of enemy

155 NHHC, *USS Bairoko* (CVE 115), 15-26 February 1952, 5; NHHC, *USS Bairoko* (CVE 115), 22 March-1 April 1952, 3; NHHC, *USS Bairoko* (CVE 115), 30 May-8 June 1953, 4; NHHC, *USS Bataan* (CVL 29), 5-16 June, 1952, 9; NHHC, *USS Bataan* (CVL 29), 18-30 May, 1952, 14.

156 Polmar, *Aircraft carriers. Vol. II*, 409-410; Darwin, *Aircraft carrier flight and hangar deck*, 81-89.

157 https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/philippine-sea-cv47.html 22 September-4 October 1950, 7.

fire. Finally, and most tragically, a plane received a 'wave-off' during landing, and consequently crashed into the sea, costing the life of its pilot.[158]

This is just a typical example of the extraordinary danger experienced by a wartime aircraft carrier in Korea. Yet the *Sicily*'s captain makes no special mention of this string of mishaps and cheerfully concludes his report with 'personnel performance was excellent and in many cases outstanding'.[159] This seemingly cavalier attitude towards safety was of course dictated by the necessities of war, but it also spoke to the 'can do-mentality' aboard US Navy ships, and perhaps the captain's desire not to rock the proverbial boat. After all, during the above period the *Sicily* was still comfortably reaching its operational goals. There are only two instances in all the escort carrier Action Reports where a litany of crashes and related problems lead a captain to specifically comment on them. And in both cases the argument for doing so seems to have been more closely related to frustration over lost bombing hours, and less to health and safety concerns.[160]

It appears the bane of a carrier captain's existence was the arrival on board of a 'green' squadron, meaning a group of pilots that was unaccustomed to flying combat missions in Korea, or worse had no combat experience at all or, even more problematic, did not even any have experience landing on an aircraft carrier. In the last case an escort carrier, with its significantly smaller deck, was a very harsh proving ground, and sometimes pilots were forced to 'qualify', that is, prove themselves capable of independently landing on the ship, or 're-qualify' (after sustained absence) in the middle of combat operations. Such on-the-job training in already dangerous circumstances inevitably led to multiple accidents on board. It could even trigger a cascade of problems causing further problems, the sort of domino effect that the carrier's complexity made it especially vulnerable to; green pilots leading to crashes, leading to damaged planes, leading to stowage and supply problems and overall lowered achievement. Both the *Badoeng Strait* and the *Bairoko* suffered such an episode of prolonged crashes and accidents while accommodating a new squadron of Marine pilots, and both captains vent their frustration in the usually quite optimistic Action Reports. Captain Ray of the *Badoeng Strait* concludes his remarks on the matter with the wry understatement that: “The procedure of shipping pilots to the forward area to qualify and obtain experience in carrier operations seem unduly expensive in terms of damaged aircraft. In this instance it also seriously hampered the conduct of combat operations.” [161]

Another element that posed a significant challenge to smooth naval air operation on the

158 NHHC, *USS Sicily* (CVE 118), 13 June-16 September 1951, 4-5, 7-8, 10, 12, 19.
159 Ibidem, 18.
160 NHHC, *USS Badoeng Strait* (CVE 116), 29 October-12 November 1952, 4, 22-23; NHHC, *USS Bairoko* (CVE 115), 17-26 June 1953, 3, 15-17.
161 NHHC, *USS Badoeng Strait* (CVE 116), 29 October-12 November 1952, 4, 22-23; NHHC, *USS Bairoko* (CVE 115), 17-26 June 1953, 3, 15-17; NHHC, *USS Bataan* (CVL 29), 18-30 May, 13.

western coast, was the international character of the United Nations blockading fleet. It consisted of ships from nine navies, all of which used to their own distinct codes, procedures, doctrine and equipment.[162] Of course the problems arising from this fact, in the fields of communications, logistics and general operational cooperation, would have been felt on an American fleet carrier as well, but the CVE-class limitations made operating as part of such diverse group of ships particularly difficult. On the level of the combat patrol rotation with the mostly British carriers, such as *Ocean*, *Triumph*, *Glory* and *Theseus*, things went as well as could be expected.[163] These ships were light carriers, like the *USS Bataan*, and in almost every way comparable to the American CVE's. As these ships shared the exact same role within the blockading force they soon developed a mutually beneficial system for sharing experiences and intelligence, in the form of officer exchanges and target portfolios.[164]

More problems were experienced when dealing with the allied destroyers, which often made up the majority and sometimes even the total of the escort carrier's defensive screen.[165] As Captain Johnson of the *Badoeng Strait* noted, the allied destroyers' air search radar systems were so primitive, that if the carrier´s radar was to fail, the entire task element would be open to a devastating air attack. The very intimate coordination needed between carriers and screen was hindered further by other material deficiencies. Johnson also described how at night, when visual signals were ineffective, he had to communicate with his United Nation destroyer escorts in lengthy coded radio messages, since they were unequipped with the infrared signalling device that was standard on American ships. In the same Action Report he also complained of the way allied ships conducted shore bombardments, calling their gun control systems 'woefully lacking' and scoffing at their non-use of phosphorous as tracer rounds. He asserts he only got to the bottom of these doctrinal weaknesses 'after questioning', which suggests he seriously risked hurting the pride of allied commanders with critical inquiry. Interestingly, Johnson interspersed this litany of complaints with the remark that: “Finally it is felt that no Action Report would be complete, especially when it involves allied units, unless some mention were made of the benefits, lessons learned, difficulties, if any, derived from operating with allied units.”[166]

This contrast, between the genuine wish for cooperation in this new United Nations navy, and the less politically correct opinions of carrier captains, frustrated with the operational problems this entailed, is a real theme of the Action Reports. Still, while the captains are honest about their

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162 NHHC, *USS Point Cruz* (CVE 119), 29 October 1953, 2.
163 Hobbs, *Royal and Commonwealth Navies*, 98-102, 140-146, 179-181, 183-186.
164 NHHC, *USS Sicily* (CVE 118), 4-13 September 1952, 11; NHHC, *USS Bairoko* (CVE 115), 5-14 July 1953, 3.
165 NHHC, *USS Bairoko* (CVE 115), 9-18 April 1952, 2; NHHC, *USS Bataan* (CVL 29), 6-16 March 1953, 1.
166 NHHC, *USS Badoeng Strait* (CVE 116), 7-16 January & 25 January-6 February 1952, 14-16.

irritations with allies, they also seem to put praise where praise is due. The captain of the *Sicily,* for instance, does not limit himself to the standard praise of international maritime teamwork, but also specifically praises the VHF range finding equipment aboard a British carrier as more modern and far superior to his own. This shows a true willingness to learn from allied navies, set aside pride and adapt to common better standard.[167]

In fact the Korean War proved to be a pioneering moment in the quest for standardisation of communications and designations among navies. Aircraft carriers, due to their leading roles in fleets and complex command and control functions *vis-à-vis* their air wing, usually led other ship types in the fields of radar, radio and IFF. They were therefore at the forefront of processing the increasing amounts of information available during operations, and were most invested in clear and unambiguous military language. The *Bataan's* commander remarks on the difficulties of the unintuitive British system for designating surface and air contacts, while at the same time admitting that their grid coordinate system was more adaptable than the US equivalent. His call for standardisation of such systems is clear, and, although never fully implemented during the Korean War, was a harbinger of modern military classification systems within alliances such as NATO. [168]

Until such improvements were made, the inter-navy aspect of west coast operations had serious downsides for the escort carriers. For instance, acting as the only source of air cover for a fleet of ships with limited early warning capabilities of their own could consume up to forty-five percent of the carrier's available capacity, thus hamstringing the bombing ambitions of a CVE captain dreaming of an admiralcy, or at least a more modern boat.[169] Time was also frequently lost because friendly vessels were misidentified as enemy contacts. A possible new enemy radar installation was only determined to be a friendly British cruiser passing through, after large expenditure of time and effort.[170] This type of ubiquitous misinformation and constant ´fog of war' environment seems unimaginable in today's world of satellites, computers and GPS, but it was part of the reality of the Korean War, even among allies.

Still, for either the bombing campaign above relatively unknown territory inland, or the blockade of a coast dotted with besieged islands, to have any success, the carriers would have to find some way of obtaining accurate intelligence.[171] Once again the CVE-class carriers were at a heavy disadvantage, since only fleet carriers maintained dedicated photo planes for reconnoitring

167 NHHC, *USS Sicily* (CVE 118), 13 June-16 September 1951, 20.
168 NHHC, *USS Bataan* (CVL 29), 8 April-11 May 1951, 25-26.
169 NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 20.
170 NHHC, *USS Bairoko* (CVE 115),17-26 June 1953, 16.
171 Cagle & Manson, *The sea war*, 295; NHHC, *USS Badoeng Strait* (CVE 116), 11-21 January 1953, 2.

and identifying potential targets.[172] Ingenious attempts were made to attach photographical equipment to the normal F4Us, and this produced some results, but in general outside sources of intel were required.[173] In practice this translated to less accurate, less timely and sometimes even biased information. The guerrilla partisan regiments, comprised of men loyal to the South, were active throughout the islands and coastline of the west, and they tried to pass on targets and their visual assessment of bombing runs to the carrier.[174] Not all regiments were reliable however, since they had not been trained to evaluate damage or select targets for naval air power. They were also constantly in battle themselves, and sometimes lost territory to the communists, thereby removing the carrier's eyes from the battlefield.[175] Since they were fighting for their own island homes, there is some indication that they may have inflated or deflated certain enemy numbers to nudge the carrier's actions in their own favour.[176] Valuable though their intel was, invaluable even, their involvement in damage assessment means that the lists of targets destroyed in the Action Reports must be regarded with a critical eye.

Other ways of trying to form an objective overview of the battlefield were also less than ideal. In theory the JOC, or Joint Operations Center, located in the South, would coordinate and share intelligence between all branches of the US Armed Services and their allies.[177] In practice however, communication between this war room and the carriers was problematic at best, even after the carriers resorted to detaching their own officers as liaisons.[178] Moreover, the intelligence provided was heavily skewed towards the needs and preferences of the US Air Force.[179] The JOC was prone to ordering the carriers to conduct Close Air Support missions for the regular infantry along the inland front, away from their natural coastal habitat. Often these missions were then left without clear follow-up directions, wasting naval air time and capacity, to the immense frustration of carrier captains.[180]

As a consequence of these factors the CVE's had to supplement their intelligence themselves, with the tools at hand. This meant nightly patrols of the nearby archipelago by one of the escorting destroyers, thus weakening the carrier's protection, which they tried to offset by sailing

172 NHHC, *USS Sicily* (CVE 118), 4-13 September 1952, 12.
173 NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 29; NHHC, *USS Bataan* (CVL 29), 16-25 February 1953, 16.
174 NHHC, *USS Bairoko* (CVE 115), 5-14 July 1953, 2.
175 NHHC, *USS Bairoko* (CVE 115), 17-26 June 1953, 3.
176 NHHC, *USS Bairoko* (CVE 115), 9-18 April 1952, 12.
177 Hallion, *The naval air war*, 43-47; Field Jr., *Naval operations*, 116-119.
178 NHHC, *USS Badoeng Strait* (CVE 116), 11-21 January 1953, 13; NHHC, *USS Bataan* (CVL 29), 6-16 March 1953, 15; NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 30.
179 NHHC, *USS Badoeng Strait* (CVE 116), 26 January-6 February 1953, 3; NHHC, *USS Bataan* (CVL 29), 15 January-7 April 1951, 23-24; NHHC, *USS Bataan* (CVL 29), 15-26 February 1953, 16; NHHC, *USS Sicily* (CVE 118), 4-13 September 1952, 12.
180 NHHC, *USS Bairoko* (CVE 115), 30 May-8 June 1953, 4; NHHC, *USS Bairoko* (CVE 115), 17-26 June 1953, 4, 15.

a significant distance to the south between dusk and dawn, and returning in the morning to meet up with the patrolling destroyer and start the day's operations.[181] However, these patrols followed a limited and prescribed path along the islands, and especially the allied destroyers, with their inferior radar and electronics, could not be expected to produce the clearest intel possible. A better option was armed reconnaissance by the carrier's planes, fulfilling a hybrid role of developing an image of the battlefield and attacking where possible. This was especially successful along rivers and railroads, where enemy presence could be anticipated and pre-empted. Still, the pilots who conducted these missions had only their own memory of an unknown terrain and rudimentary charts to help guide their colleagues back on the ship towards future targets.[182]

Thus, in the field of intelligence we again see the hallmark patterns of naval air combat on the west coast emerging. Complexity of the carrier ship class, limitations of the escort variant, a propensity for bottlenecks and problems leading to further problems and a forced measure of self-reliance and bottom-up creation of doctrine. Despite these obstacles, and because of them, the intelligence officers aboard the CVE's were more important than ever, and did their job remarkably well. They managed to perform one of the most important tasks for a carrier's success. They took the information from all these imperfect sources and moulded, collated and processed it in a way which provided the pilots with morning briefings that allowed them to strike a bewildering array of targets across the coast and the islands during the day.[183] The carrier's success was determined by its planes' accuracy, which was largely dependent on flawed intelligence. The situation in Korea was a hitherto unknown, but nowadays common form of carrier warfare, in which the ships served as floating airfield off an enemy coast. In such a stable position large numbers of missions could be flown, and many targets attacked. But it also meant atrophy of the target portfolio, as the most valuable targets were taken out early on. Moreover, as the enemy learned to anticipate the timetable of carrier strikes (the *Bairoko's* captain specifically warned against this 'milk run schedule'), they perfected the arts of dispersal and camouflage.[184] In this situation accurate intelligence became increasingly important, and the way it was obtained and transmitted from sources on land, sea and air became an essential building block of the new carrier doctrine being forged in Korea.

Yet even if the intelligence collected had been of irreproachable quality, the sheer amount that needed to be analysed and processed not only threatened to overload the escort carrier's

181 NHHC, *USS Bataan* (CVL 29), 5-16 June 1952, 1.
182 NHHC, *USS Bairoko* (CVE 115), 5-14 July 1953, 2; NHHC, *USS Badoeng Strait* (CVE 116), 17-28 December 1951, 8.
183 NHHC, *USS Sicily* (CVE 118), 6-16 October 1952, 3.
184 NHHC, *USS Bairoko* (CVE 115), 17-26 June 1953, 5; NHHC, *USS Bairoko* (CVE 115), 30 May-8 June 1953, 3, 7; NHHC, *USS Sicily* (CVE 118), 4-13 September 1952, 3; NHHC, *USS Bairoko* (CVE 115), 22 March-1 April 1952, 15.

budding technological infrastructure, but also clashed with one of the more banal constraints of the CVE-class: the simple lack of space on board. This problem is best illustrated by a short period during which the *USS Bataan* was used as an admiral's flagship, and consequently had to deal with the information streams of not only its own task element, but of an entire fleet. Despite pre-emptive mitigating measures taken, the ship's communications were immediately overloaded, and the captain states that without enlargement of radio, communication and cryptography rooms "...the communication facilities of the CVL 22 class carriers are woefully inadequate to accommodate a flag officer´s requirements." It stands to reason that the even more cramped CVE-class suffered these same problems.[185]

But even when enough space was available the constraints of emerging technology weighed heavy on the carriers. Proto-computers, an optimistic description of the limited information processing equipment available, were primitive, cumbersome and labour-intensive.[186] The more established electronic equipment aboard a CVE-class carrier was also prone to errors and breakdowns. As stated before, IFF systems were primitive or non-existent, leading to constant jumpiness and false alarms over every ship and plane entering the carrier's range of action. ASW capability was even more tenuous for a CVE, with only one helicopter, which was usually preoccupied with other matters, and unequipped for submarine detection anyway, and no dedicated planes specialised in this task.[187] All this contributed not only to a sense of operational paranoia, and fear of enemy attack (which thankfully for the carriers never materialised), but also had real consequences for the operational efficiency of the task element. The nightly cruise to the south, and all the time and effort this absorbed, were in part a consequence of the carrier's lacklustre detection systems.

Even the more established parts of the electronic array, the radar and radio installations, which by the time of the Korean War had become the bread and butter of modern warships, caused problems for all the escort carriers throughout their campaign. With radio the problem was most often one of capacity or procedure, or a combination thereof. The limited amount of frequencies and radio nets governing the enormous tangle of various military branches (of various nations) on the west coast were often overloaded with traffic of lesser or no value to the carrier.[188] The disentanglement of this web of communication made the job of a skilled radio man one of the most important positions aboard the carrier, and the captains often request as many of them as possible in

185 NHHC, *USS Bataan* (CVL 29), 12 May-13 June 1951, 17.
186 Terzybaschitsch, *Aircraft carriers US Navy*, 16-17.
187 Polmar, *Aircraft carriers. Vol. II*, 211.
188 NHHC, *USS Bataan* (CVL 29), 29 April-11 May 1952, 12; NHHC, *USS Bataan* (CVL 29), 12 May-13 June 1951, 18; NHHC, *USS Bataan* (CVL 29), 15 January-7 April 1951, 23.

the personnel sections of the Action Reports.[189] Captains also tried, often in vain, to alleviate pressure on the radio networks by harping on established procedures, which in theory prevented idle chatter, or non-relevant information transmitted over certain frequencies. The carrier's own pilots often were the worst polluters of the airwaves and strict orders were given to have only wing leaders talk, and preferably keep it short.[190] Long-distance radio communications could also be problematic. The central naval broadcasts from Radio Guam and later Radio Hong Kong had an excellent reputation, even though decoding their messages required tremendous speed and skill. Radio Tokyo however was often unintelligible to most and sometimes all ships on the west coast of Korea.[191]

At least the radio equipment, in spite of all problems and limitations, was almost always functional, which cannot be said for the carrier´s various radar systems, which according to the reports proved to be by far the most vulnerable and sensitive equipment on the carrier. Countless mentions are made of radar malfunctions, and even the ship's maintenance crew, which was capable of wonders of improvisation, never seemed to be able to tackle this highly specialised type of repair, which often required quayside facilities, rare expertise and even rarer parts.[192]

As problematic and cumbersome as some of the electronic systems may have been, at least they were not as inherently dangerous as the tons of highly explosive ordnance the carriers routinely held to arm their warplanes. Bombs in weight classes up to a thousand pounds, rockets, bullets, napalm tanks and mixers, fuses and mines, all these had to be carefully handled and stored inside the ship's limited spaces. And during a patrol these spaces could fill up fast. Captains, always aiming to optimise their attack flight's explosive payloads, hated losing a cubed centimetre of storage room to anything that was not going to be shot in the enemy´s direction at short notice. The *Badoeng Strait*, like all carriers at the start of the war, held a standard quantity of sea mines aimed primarily at enemy submarines. The commander was more than eager to clear the space taken up by these defensive weapons in favour of airborne ordnance.[193] The CVE *Rendova* was asked to test a new type of firebomb, and space considerations proved to be an important part of the evaluation of the weapon. Not only were the bombs larger and harder to store than their predecessors, but to the extreme irritation of the captain the ship was also required to store and return the empty cases in which they came.[194] Clearly the mentality was to dispose of containers, and in fact everything used-

189 NHHC, *USS Bairoko* (CVE 115), 5-14 July 1953, 18; NHHC, *USS Sicily* (CVE 118), 4-13 September 1952, 10.
190 NHHC, *USS Bairoko* (CVE 115), 9-18 April 1952, 11-12.
191 NHHC, *USS Bataan* (CVL 29), 8 April-11 May 1951, 26; NHHC, *USS Bairoko* (CVE 115), 5-14 July 1953, 18.
192 NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 29; NHHC, *USS Sicily* (CVE 118), 13 June-16 September 1951, 19-20; NHHC, *USS Sicily* (CVE 118), 6-16 October 1952, 17.
193 NHHC, *USS Badoeng Strait* (CVE 116), 17-28 December 1951, 8.
194 NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 23-24.

up, from wrappers to aircraft wrecks, over the side of the ship as soon as possible, such was the need for room on board. Carriers developed their own strategies for dealing with the ordnance optimisation problem. The *Badoeng Strait* tried tailoring the supply and composition of explosives to the expected demands of future missions, and also somewhat petulantly requested their ammo to be delivered pre-belted, since it was deemed unfair to keep a portion of the crew performing this menial task, while their shipmates had fun in port.[195] The *Bataan* chose a different approach, less specialised, and centred around two key loadouts for the planes, that enabled every possible mission type between them, and also ensured a steady dissemination of ordnance from the ship´s magazines.[196]

The amount of ammunition necessary to supply the single fighter squadron for one ten-day patrol was staggering. It would take a party of one hundred seventy-two men over six hours of work to bring it all aboard ship.[197] This did not include extra quality control, or even perfunctory checks, because complaints about faulty ordnance turned out to be a regular feature of the Action Reports. For instance, during a patrol in November of 1952, the *Badoeng Strait* discovered that half of the napalm tanks they had taken on board in Sasebo were damaged beyond use and had to be discarded, while two large crates of 20 mm ammo were rusted through and dangerous to handle.[198] But at least these faults were discovered prior to operational use. The actual use of ordnance by aircraft came with a whole litany of problems, some only irritating and time consuming, others outright hazardous.

The F4U Corsair was a relatively dependable and versatile carrier based fighter-bomber, but also somewhat dated, as it had seen its peak during World War II, when most of the units still active in Korea were built. The realities of the Korean War, with its emphasis on a prolonged bombing campaign and lack of dog fighting, pushed the Corsair´s capacity to the limits. Besides their standard armament of four 20 mm cannons, they could also deploy numerous variations of armour-piercing anti-tank rockets, napalm tanks and all sorts of more traditional gravity bombs. The varied nature of targets on the ground and in the water meant that the aircraft often carried many different types of weapons at the same time.[199] Unfortunately, the Corsair´s weapon delivery systems did not mesh well with each other, and the planes fell victim to annoying interference. The steep dive-bombing required for effective use of HVAR rockets and some types of bombs caused G-Forces

195 NHHC, *USS Badoeng Strait* (CVE 116), 29 October-12 November 1952, 25-26.
196 NHHC, *USS Bataan* (CVL 29), 15 January-7April 1951, 22.
197 NHHC, *USS Bataan* (CVL 29), 6-16 March 1953, 14.
198 NHHC, *USS Badoeng Strait* (CVE 116), 19-29 November 1952, 25.
199 Campbell, *U.S. Navy*, 315-317.

which bent the fuses of the other bombs inside the plane, rendering them useless.[200] Complicating matters even further, when discharging the on board cannon, emptied clips would slam into the rockets´ release mechanism, causing these to ´hang´as well.[201] This meant that certain configurations of the weapon loadout could only be used successfully by the pilot solving a bizarre firing sequence puzzle.

All weapon systems were prone to failure above the battlefield, and the reports contain long lists enumerating the possible origins of the problem. These ´duds´ as they were called, were such a common part of naval air warfare that captains only commented on them when extremely high percentages of ordnance malfunctioned. But matters really got serious when planes had to return to the carrier with hung rockets and bombs, which even emergency manual release systems could not jettison above the sea. Planes returning with bombs above a certain weight, were not even allowed near the carrier and instead directed to one of the K-fields on land. This reduced the carrier´s strike capacity for that day, often the main concern of captains, so this policy is testament to the perceived dangers involved. The Corsairs did however routinely land with hung rockets, which upon landing had the habit of breaking loose from the planes´ wingtips and bouncing across the deck at great speed.[202] On 22 May 1952 such an incident occurred on the deck of the *Bataan*, resulting in a serious explosion. Not only was it common for planes to land with multiple 'hung' rockets, three HVAR's in this case, but deck crews had to live with the scary fact that a majority of these rockets would break loose from the impact of the plane hitting the arresting wire. “Upon landing all three rockets continued up the deck. One came to rest in the cargo net rocket barrier, the second hit a cross deck pendant and was deflected aft to a position near the LSO platform. The third continued up the deck bouncing end over end and striking on the nose directly above 5 landing gear engine and exploded. Damage included plane towing tractors set afire, a three-foot hole in the flight deck and major damage to the #5 arresting gear engine. Three men were injured by rocket fragments and one man received injuries taking cover.” Captains were often quite fastidious in their analysis of possible causes of incidents such as these, giving long technical descriptions of what happened when to which small part of some malfunctioning system. In this case the fault probably, but not definitely, lay with inexperienced crew handling the attachment of the rockets.[203] The most serious accidents were treated as simply 'part of the deal', and the captains never seemed convinced that any real change of procedure or doctrine would originate from their superiors. Once again this incident illustrates the precarious balance of the carrier at war, where all moving and non-moving

200 NHHC, *USS Bataan* (CVL 29), 15 January -7 April 1951, 22.
201 NHHC, *USS Bataan* (CVL 29), 29 April-11 May 1952, 10, 12.
202 NHHC, *USS Bairoko* (CVE 115), 17-26 June 1953, 17.
203 NHHC, *USS Bataan* (CVL 29), 18-30 May 1952, 3, 6, 10-12, 14.

parts of the ship influenced each other, and the balance of operation could be undone by a single small mistake.

While the handling of ordnance caused many headaches on board, the same could be said for its delivery system, the single squadron of (in theory) twenty-four fighter-bombers plus one helicopter aboard the CVE's. The sources reveal increasing wear and tear during multiple tours in Korea, and combined with the World War II provenance of a large portion of the F4Us, this put maximum strain on the maintenance crews. On one escort carrier alone thirteen planes, more than half the theoretical complement, could no longer successfully drop the heaviest type of bombs, due to outdated ordnance racks. Radio transmitters degraded beyond repair and missiles could only be launched after complicated rewiring within the planes' wings. On that same carrier the one helicopter, one of the ship's most valuable and unique resources, caught a bird in its rotor blades, on its first day of operations after a lengthy repair. This accident necessitated the complete replacement of all main rotor blades.[204] The loss of the single helicopter severely curtailed the CVE's capability to search for and rescue its own downed pilots. The helicopter was a prime example of a 'bottleneck' asset, and in a familiar pattern its absence threatened to create another bottleneck, as downed pilots could not be returned to carrier as promptly as needed.

Aboard the escort carriers, the squadron's ground crew and the ship's own deck crew worked long hours together in what sometimes resembled a junkyard floating in the Yellow Sea. To keep the squadron of aging planes, often riddled with North Korean and Chinese bullet holes, airborne, much less operational, they had to perform miracles, by cannibalising wrecks and improvising solutions. Yet all throughout the Action Reports we can see signs of the carriers' constant wrestling on the edge of operational collapse. The red line for the bare minimum of planes necessary to conduct a day of basic, routine carrier operation was aptly substantiated by one captain to be precisely sixteen planes. A dip below this number would cause immediate paralysis and downgrading of the carrier's ability to conduct multiple role missions. In the Action Reports though, we constantly see availability numbers hover around sixteen, often below it, and seldom above twenty. The captain mentions that squadron size should be augmented to at least twenty-eight planes, but at the same time realises that the CVE is simply a very limited ship.[205] From these numbers we can also infer a further disadvantage the escort carriers had towards the fleet carriers: relative numbers. The loss of one plane aboard a large Essex-class carrier, though serious, constituted a far smaller percentage (usually by about a factor of four) of its hundred plane air wing, than the same loss for an escort carrier. In short, more of the escort carriers´ striking potential was

204 NHHC, *USS Bairoko* (CVE 115), 30 May-8 June 1953, 17-18.
205 NHHC, *USS Bairoko* (CVE 115), 22 March-1 April 1952, 13-15.

concentrated in each single plane, which made their availability such a volatile problem. Luckily, this limitation also brought out the best in the commanders, as they learned to combine mission roles into innovative hybrids, a good example of new doctrine invented under pressure of circumstances, far from the safety of a Naval War College.

Even if all of these many challenges were overcome, carrier operations in Korea faced one last formidable problem, beyond the scope of human ingenuity to solve. The elements of water and air formed a particularly volatile mix in the seas on either side of the Korean peninsula.[206] Of course bad weather has always been an enemy of ships throughout the ages, an existential problem, but for aircraft carriers its impact was doubled. Not only could the ship's movement and situational awareness be impeded, but also the operations of the airplanes and helicopters on board. Difficult weather conditions could also generate disproportionately large issues for aircraft carriers, because they were so dependent on communications and radar systems. All these weather-related difficulties became familiar to the carriers operating in Korean waters, where atmospheric systems from all points of the compass collided and formed fierce tropical storms, typhoons, extreme cold, fog and even haze, caused by dust storms as far away as the Gobi desert.[207]

The escort carriers, as per usual, suffered even greater problems in the weather department. Their lower mass compared to fleet carriers made their flight decks less stable on rough seas. Their outdated catapult systems made take-offs more difficult during days with very low winds. Even more fundamental, their lower speed made it harder to avoid typhoons and storm systems, and it took longer to exit them once caught in the middle. Of course the lack of a dedicated weather reconnaissance plane did not help matters either, although F4Us were sometimes used in this role.[208] And finally, the sub-par electronics on board, especially the vulnerable radar equipment, was not suited to accurate meteorological prognostication. Captains often lament the lack of a machine capable of producing facsimile weather charts. Their knowledge of the existence of such a device indicates that other, more deserving ships, such as the fleet carriers, were in possession of these. There is no evidence of such an apparatus ever being introduced on a CVE during the Korean War.[209] The captains also hated the fact that most of their meteorological data was provided exclusively by the Air Force, which as noted before, was usually not invested in providing information tailor-made made to the Navy's specific needs. The west coast was especially problematic, because the Air Force neglected weather reconnaissance on that side of the peninsula,

206 NHHC, *USS Bataan* (CVL 29), 8 April-11 May 1951, 27.
207 NHHC, *USS Bataan* (CVL 29), 12 May-13June 1951, 16.
208 NHHC, *USS Bairoko* (CVE 115), 30 May-8 June 1953, 6.
209 NHHC, *USS Badoeng Strait* (CVE 116), 17-28 December 1951, 10.

while CVE captains felt they needed daily weather patrols, even reaching into Chinese territory.[210] But a large portion of disruptive weather systems actually formed on the east coast, near the Russian border, and perhaps out of fear of escalating the war, weather reports from this sector were not forthcoming.[211]

It is no wonder that the recommendations of the carrier captains are often so preoccupied with the weather. Bad flying conditions without a doubt formed the single greatest loss of offensive and defensive naval air capacity on the west coast. The only thing that came close was the attrition of planes through enemy fire and mechanical failure. But this factor at least was partially in the hands of the crew to anticipate and mitigate, while the weather could shut down a carrier's operations without any possible remedy. Even in spring, when deck conditions were at least somewhat tolerable, prolonged spells of bad weather occurred. During its patrol from 30 May till 8 June 1953 the *USS Bairoko* had only two day of good flying conditions, two days of complete shut down, and the rest allowed only very limited operations.[212] This was an extreme example, but almost every carrier combat patrol lost at the minimum one day's worth of flights to bad weather, which constituted an *a priori* loss of at least eleven percent capacity. The CVE captains were ambitious, and so obsessed with maximisation of their ships' offensive capabilities that they would even launch a final strike at the end of a patrol, as the ship itself was already sailing back to Japan. To them anything that counteracted their ideal combat patrol found its way into the Action Reports' recommendations section. From the tone and frequency with which problems and challenges are mentioned in the reports we can infer a hierarchy of the incidental and the existential, and weather-related issues are often prominent.

One interesting aspect concerning the captains' various recommendations is the question of their own investment in all the ameliorations they proposed. In the category of existential carrier problems we also find their unusually long development cycle. A consequence of their inherent complexity, this also meant that any structural design flaws could only be corrected in the design of the next ship class, which could take many years. For CVE's, ships that sometimes did not even begin life as a carrier, these flaws could be quite significant. Add to this the pressure of war, but also the competition between ships for manpower and material, and one has to wonder if the captains actually believed even a small percentage of their complaints would be addressed. Indeed, some of the complaining seems to have a ritualised character, as we often see phrases such as 'woefully lacking', but also literal repetitions of recommendations from patrol to patrol. Almost never is there

210 NHHC, *USS Bataan* (CVL 29), 12 May-13 June 1951, 17; Norman, 'MacArthur's blockade proposals', 161.
211 NHHC, *USS Badoeng Strait* (CVE 116), 7-17 December 1952, 30; Norman, 'MacArthur's blockade proposals', 161.
212 NHHC, *USS Bairoko* (CVE 115), 30 May-8 June 1953, 2.

any sign of feedback or redress from higher up, yet the captains keep dutifully recording the problems they encountered and their ideal recipes to better the situation. It is as if they know that during this Korean War, and with these limited vessels, they stand no chance of being heard, yet they write everything down for posterity in the hopes that their struggles will provide lessons for those who would continue to develop carrier doctrine in the future. But even during the war the Action Reports could serve as an object lesson. Not for the admirals far away in Tokyo and Washington, but for fellow escort carrier captains, who were always included as recipients of each other reports, who read each other's solutions to difficult problems, and made the most of the imperfect warship they commanded, forging a new doctrine on the waves of the Yellow Sea.

Chapter 4

The wave of the future

In the decades after the Korean War we have seen the aircraft carrier, especially when deployed by the United States, emerge as the single most powerful conventional weapon system conceived by mankind. In a world of mutual assured destruction, they are arguably the only viable superweapons on the planet. We have seen the somewhat ironic trajectory by which this status was cemented. After an experimental opening phase, aircraft carriers were subjected to a strenuous test in World War II, and passed with flying colours. Its success was overshadowed by the atom bomb, and for some years the future of naval airpower was in limbo. Then the conflict in Korea came, a weaker test with a much less decisive outcome. But by this time nuclear weaponry had proliferated to the communist enemies of the United States, and its practical deployment was well on the way to becoming an unthinkable taboo.[213] In such a world the aircraft carrier became the tip of the only spear that could be wielded.

Now what made the crucible of Korea a weaker test than World War II? We have already hit on many factors. In Korea naval air power had overwhelming numbers, air superiority, advanced logistical bases, supporting airfields on land, all factors that were lacking, or at the very least not reliably available, during the Pacific war against Japan. In this light the achievements of the large, well-supplied carrier force in the Korean waters seem meagre, especially on the strategic scale. But we should not disparage their efforts too lightly. For one thing the US Navy, and especially the carrier arm, had been defunded after World War II, many of its vessels arriving in Korea still shaking off the proverbial mothballs. Also the carrier experience in Korea turned out to be less about mobility and survival, and centred more on management of complex information and optimisation of assets, as the enemy coasts were besieged with impunity. For better or for worse this was the first war fought in this style, serving as a model for future carrier deployment. And though the carriers could not break the stalemate on land, or decide the eventual outcome, their presence was incredibly important to keeping the allied forces alive. It seems a reasonable speculation that without naval air power both the defence of the Pusan Pocket and the Inchon landing could have become unfeasible, which would have opened the door to a total communist victory. Although the test of Korea, the second crucible of carrier warfare, was in some ways lacking, in other ways the challenges were plentiful. After all, this was the place were carrier dominance and modern naval air

213 Tannenwald, 'The nuclear taboo', 442.

doctrine were born and emulated for decades to come, which could not have happened if the challenges of Korea had not been energetically met. Through the lens of the escort carriers on the west coast, it is now time to examine some of the areas in which these ships and their crews proved most successful. How did the specific circumstances of the Korean War bring the advantages of the aircraft carriers to the forefront? And what exactly were these advantages?

Without a doubt one of the greatest assets of carrier crews was their capacity for independent thinking, improvisation and the willingness to learn from their colleagues aboard other ships. All of these qualities were utilised to mitigate a dangerous problem, the heretofore described tendency of unfired, or 'hung' rockets to fall off landing airplanes upon contact with the deck. When these rockets did not cause a direct explosion, they still had to be stopped from rolling into parked planes, crew members or the island structure and detonating anyway. In December 1951 the escort carrier *Badoeng Strait*, devised a somewhat primitive but effective method of dealing with this danger, by tying together two large sets of nets, normally used for cargo hoisting. Ten men (later reduced to eight as handling skills increased) were needed to manipulate this unwieldy barricade, which could effectively catch wayward ordnance. Once in the nets the unstable rockets would be thrown overboard as quickly as possible via a special ramp. Even then, deep in the water, they could still explode with tremendous force. The men operating this so called 'Fredricks barrier' as the first version of this device was called, did an unenviable but necessary job.[214] The reports indicate that ninety-five percent of 'hung' rockets rolled onto the decks of the carriers, while a typical patrol saw around one hundred of such rockets returned to the ship. Their work became even more hazardous when pilots failed to alert the carriers in advance of the presence of misfired ordnance aboard their planes prior to landing. This seems an oversight which could only be explained by the pressures of war and the attitude towards safety of a bygone era.[215]

What is so interesting about the example of rocket catching methods on the decks of the escort carriers is the way in which the carriers adopted each other's ideas, a form of military *imitatio et aemulatio*. The captains are magnanimous in acknowledging and implementing the inventions of other ships, but are also critical and quick to propose slight adjustments. For instance, both the *Bataan* and the *Bairoko* copied the general idea of the 'Fredericks barrier', but tried to improve upon in with their own unique twists. Before this development the *Bataan* was in the creative, but less reliable and potentially dangerous habit, of creating an artificial rocket-catching pit on its deck by

214 NHHC, *USS Badoeng Strait* (CVE 116), 17-28 December 1951, 7-8; NHHC, *USS Badoeng Strait* (CVE 116), 11-21 January 1953, 24-25.
215 NHHC, *USS Bairoko* (CVE 115), 15-26 February 1952, 6.

shallowly lowering one of its plane lifts.[216] After the *Badoeng Strait's* recommendations came through, the *Bataan* realised this was a superior method, but also set out to improve on it, by commissioning a dedicated rocket net made from steel and finding a way to fix this to existing deck structures, thereby eliminating the need for vulnerable human mediation.[217] The *Bairoko* did not radically change the original idea but discovered a simple way to improve upon it. By leaving its cross deck pendants and wires in the upright positioning after a 'loaded' plane landed, a high percentage of rolling rockets were arrested before reaching the 'Fredericks barrier', making it more of a last resort, and alleviating the danger for its operators.[218]

And while its sister ships made variations on these ideas, the *Badoeng Strait* kept on innovating, releasing a vastly improved 'Irish barrier' in the winter of 1953.[219] This never ending cycle of grassroots innovation and improvisation stretches out across the entire spectrum of challenges faced by the carrier community in Korea. Of course, we also see the captains trying to enlist the help of the fleet and their superiors in dealing with the problems. In case of the rocket conundrum they give several suggestions concerning possible ways of making sure planes fire every piece of ordnance correctly. But the wording seems half-hearted
, as if they know in their heart of hearts that during this war at least it will be raining unfired missiles on their decks, and that the only people able to help them are their fellow captains.

The motive of the carrier having to rely on its own judgement and ingenuity was also present when acting as both laboratory and testbed for new weaponry and equipment. Just as carrier doctrine could not be designed from the comfort of a naval college, the means of *executing* the doctrine often had to be developed on the seas as well. As noted previously the *USS Rendova* was ordered to conduct tests of a new type of napalm bomb, which they dutifully fulfilled, despite the cumbersome storage and handling of the weapon. The wording of the captain's evaluation of the weapon in his report seems to contain a subtle message hidden between the lines. Of course, he remains very professional in his assessment, but he seems to feel this 'fancy' experimental bomb is in every way inferior to his trusty napalm tanks, a tried and true delivery method, created by pilots for pilots.[220]

To fill these napalms tanks before an attack the substance had to be mixed *in situ* on the carriers deck, right next to the planes. Facilitating this wicked alchemy, the ships carried their own mini chemical weapons factories in the form of napalm heaters, which were necessary to quickly

216 NHHC, *USS Bataan* (CVL 29), 12 May-13 June 1951, 15.
217 NHHC, *USS Bataan* (CVL 29), 29 April-11 May 1952, 12.
218 NHHC, *USS Bairoko* (CVE 115), 15-26 February 1952, 6.
219 NHHC, *USS Badoeng Strait* (CVE 116), 11-21 January 1953, 24-25.
220 NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 23.

produce a significant quantity. This heating process used to work with liquids, but the *Badoeng Strait*, always on the cutting edge of innovation even among its peers, had developed a version using steam to heat the mixture. In contrast with the aforementioned bomb test, which was mandated from outside the ship, the napalm heater, tailor-made to the specifications and requirements by the same people who would be using it in practice, turned out to be a resounding success. The captain noted four distinct improvements over its predecessor, and since the direction of this innovation was steered by the direct needs of the crew and vessel it is interesting to note in which fields the advances were made, since these could reflect what the crew itself regarded as paramount. The new napalm heater was judged to promote in order greater safety, greater accessibility, greater convenience and greater speed.[221] These four criteria encompass the most fundamental dimensions of the carrier's existence. Convenience and accessibility relate to space, speed to time, and safety to continued survival. Through the lens of localised on board innovation the fundamental needs of the ship class become evident.

We see this pattern of self-reliance and amelioration playing out in many facets of carrier life. For instance, when a carrier discovered a simple defect with one of its basic systems, it could not go into port in the middle of a patrol or ask for engineering help from afar. The *Rendova* found that its bridle catcher, a device on the front bow of all carriers of the period, which caught and recycled the cables connecting planes to the catapult, tended to break off and fall into the sea when a new heavier type of cable started being used. They successfully manufactured a custom supporting frame, and no more bridle catchers were lost.[222] In a later report we find the *Badoeng Strait* commenting on this invention, praising the *Rendova´s* design for a new bridle catcher as superior to that of the *Bataan*. But there is also criticism, as the new catcher still cannot prevent cables from dangerously sweeping towards launching planes.[223] Two escort carriers independently improvised different solutions to the same problem. A third ship evaluates both, chooses the best and then seeks to improve on the idea itself.

Sometimes ideas from other carriers were so polished that their recommendation could be integrally endorsed by other ships. Of course the actual implementation of said recommendation during the Korean War itself was another thing. The *USS Kearsarge*, one of the larger fleet carriers, had encountered a mundane but pressing problem, with serious repercussions for morale on board. Navy regulations prescribed that United States currency aboard the carrier could only be exchanged for Japanese yen or special military credits when the ship arrived in Japan. For a small ship this

221 NHHC, *USS Badoeng Strait* (CVE 116), 17-28 December 1951, 7, 14-15.
222 NHHC, *USS Rendova* (CVE 114), 23 September- 9 December 1951, 29.
223 NHHC, *USS Badoeng Strait* (CVE 116), 29 October-12 November 1952, 25.

would not form an insurmountable problem, but for a carrier with its large crew, this led to a huge money changing operation, which would require the efforts of four officers for two full days. We can only imagine the mood of impatient sailors waiting in line, wasting time on exchanging hard-earned cash, instead of spending it in the streets of Yokosuka. The *Kearsarge* therefore strongly recommended the opening of a special currency exchange facility at Pearl Harbor, a standard port of call for all Korea bound vessels.[224] This problem was so universally felt to be a nagging outgrowth of bureaucracy, that the other carrier captains merely added their voice to the chorus.[225]

Banking was just one small aspect of the carrier crew's busy and regimented lifestyle. In stark contrast to the chaotic experience of World War II, the more predictable and timetable based deployment of carriers in Korea meant that life on board had a chance to asymptotically approach the goings-on in a large village. Korea was so close to the Japanese naval bases that carrier crews could be driven by a 'work hard, play hard' mentality. Relatively short, but extremely intense bursts of labour during the nine-day patrols would be offset by extended periods of liberty in Sasebo or Yokosuka. The ruthless efficiency and drive of the carriers' crews in Korea and their almost constant high morale is partly explained by the relative proximity of a safe haven. The carriers' commemorative cruise books, provided as a souvenir to most of the crew members, provide an extensive photographic record of the crew relaxing in a country still recovering from the last war.[226] Apart from the uniforms, the sailors are indistinguishable from tourists in their behaviour. They eat *sukiyaki* served by *geisha's*, hand out cigarettes to the locals, take pictures, visit a pottery factory, and commemorate the fifth anniversary of the Nagasaki explosion on location. The ships also formed their own sports teams and competed in relatively serious competitions and tournaments, especially basketball, baseball and volleyball.[227] Of course these extended shore visits did have some negative effects. Venereal diseases, though not structurally damaging to the functioning of the carrier crew, were a fact of life in the entire Pacific fleet, and required regular monitoring by the medical staff. Sometimes more deadly habits were acquired on shore. A crew member of a destroyer was brought aboard the *Bairoko*, which medical facilities also serviced the smaller ships. He appeared to be suffering from jaundice, but further investigation led the doctors to believe he had been intravenously injected with drugs, potentially making him a very early western heroin

224 https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/kearsarge-cv33.html 6 December 1952-8 January 1953, 13; *USS Sicily (CVE 118) Cruise Book 1946 – 1951*, 051.

225 NHHC, *USS Bataan* (CVL 29), 15-26 February 1953, 17.

226 NHHC, *USS Badoeng Strait* (CVE 116), 19-29 November 1952, 21.

227 *USS Sicily (CVE 118) Cruise Book 1946 – 1951*, 022, 030, 044, 046, 047, 058; NHHC, *USS Bataan* (CVL 29), 6-16 March 1953, 10.

junkie.[228]

Back on the ships the sailors' free time became sparse, but what they had was used with gusto. Many of them tried to better themselves by taking correspondence courses and studying for ratings exams, in the hope of learning more naval skills and eventually improving their pay and rank. This meant that the carriers also doubled as both a college and a training centre. Naturally there was already a special group (called a division aboard a carrier) that concerned itself with training and specialisation of new sailors, but the portion of the crew willing to go above and beyond basic training is impressive. On the *Badoeng Strait* at a given moment, one hundred and sixty-one enlisted men were taking correspondence courses to attain higher ranks, nineteen of which were aiming to become officers. A further thirty-one were taking non-military courses to supplement their general education. These were very young men after all, and some still had some holes in their basic education.[229]

Religion, often ascendant in times of war, also took up a lot of time. A typical escort carrier would carry both a Catholic and a Protestant chaplain. These provided services tailored to the composition of the ship's crew.[230] For instance, the *Bataan* seemed to have been a more Catholic ship, as daily services were provided for this denomination, with Protestants only officially worshipping on Sundays.[231] On the *Bairoko* this situation was reversed.[232] In addition, Jewish and Mormon believers congregated at least weekly.[233] When the carriers' flock had been sufficiently tended to, the chaplains often took to sky in helicopters and paid visits to all the smaller ships in the fleet. Indeed, with the exception of rear-admirals, these holy men seemed to be the most mobile and omnipresent members of the naval forces.[234] They also had a secular role, since in Korea it was tradition, as later popularised by the television series MASH, for the chaplain to be both spokesperson and newscaster for a ship or army unit. On the carriers this meant that every day they would read out news, both international and local, and sports results over the ship's speaker system.[235] According to the reports, the carriers' sailors were very interested in the exploits of the squadron they hosted. In a way the pilots were the only physical link to the war they were fighting, as most of them would only ever see Korea's coastlines from a distance.[236] There was also some

228 NHHC, *USS Bairoko* (CVE 115), 5-14 June 1953, 21.
229 NHHC, *USS Badoeng Strait* (CVE 116), 11-21 January 1953, 23; NHHC, *USS Bataan* (CVL 29), 5-16 June 1952, 10.
230 *USS Badoeng Strait* (CVE 116) *WestPac Cruise Book 1950*, 014.
231 NHHC, *USS Bataan* (CVL 29), 6-16 March 1953, 10.
232 NHHC, *USS Bairoko* (CVE 115) 14-21 May 1953, 14.
233 NHHC, *USS Bataan* (CVL 29), 5-16 June 1952, 10; NHHC, *USS Bataan* (CVL 29), 6-16 March 1953, 10.
234 NHHC, *USS Bairoko* (CVE 115), 14-21 May 1953, 14.
235 NHHC, *USS Badoeng Strait* (CVE 116), 7-17 December 1952, 25.
236 NHHC, *USS Bairoko* (CVE 115), 14-21 May 1953, 14.

consideration given to operational secrecy, as the bigger picture of what other elements of the fleet had been up to recently, and the overall situation in Korea was kept from the crew. Only at the end of a patrol would they be provided with a summary of this information, and it was presented by an Intelligence Officer who presumably knew exactly what was safe to share with the ordinary crew.[237] There were also further informal broadcasts, produced daily by a section of the crew, which on the *Bataan* was known as the BBC, standing for Bataan Broadcasting Corporation.[238] In addition, each carrier produced its own newspaper, which was also distributed among the destroyer screen.[239]

All things considered, and despite the war stalemating after the Chinese intervention, morale on the escort carriers was high, as if the crew sensed any setbacks were not due to a lack of effort on their part.[240] In fact, in this type of geographically stable, timetable based employment of naval airpower, even the smaller, slower carriers could reach a very high potential of destructive efficiency. Consequently, their crews were kept very busy, but at a predictable, manageable level of stress, and the constant list of airstrikes facilitated and targets struck, gave rise to both team spirit and sense of achievement. Morale was almost constantly estimated as excellent, and there was no reason to think that the carrier force deployed this way could not continue almost indefinitely. In fact, in all the Action Reports there are hardly any mentions of lowered morale, bellyaching or undisciplined behaviour amongst the crew. Only once is a summary court-martial mentioned.[241] There is of course the need for some scepticism about the captains' assessment of crew morale. The standard formula 'personnel performance and morale has been excellent during the period of this report' was used by different captains, with only minute variations, which implies a certain complacency.[242] And the fact that negative reviews of crew morale could reflect poorly on a captain's leadership must also be taken into consideration. But overall the picture that emerges is, strange as it may sound considering the brutalities of the war on land, that of a large group of young enlisted American men frankly enjoying the navy life.

Of course, they enjoyed the freedom of rest and recreation on shore the most, going where they pleased, sightseeing and even sleeping in special hotels.[243] But the ship had many possibilities for relaxation and lighter matters as well. On the more organised side of this spectrum were traditional holidays such as Christmas and Thanksgiving, which were extremely important for a community of young American sailors on foreign seas, far removed from home and family. In the

237 NHHC, *USS Badoeng Strait* (CVE 116), 7-17 December 1952, 25.
238 NHHC, *USS Bataan* (CVL 29), 5-16 June 1952, 10.
239 NHHC, *USS Bataan* (CVL 29), 15-26 February 1953, 11.
240 Hastings, *The Korean War*, 272-275.
241 NHHC, *USS Bataan* (CVL 29), 6-16 March 1953, 10.
242 Ibidem, 9.
243 NHHC, *USS Badoeng Strait* (CVE 116), 19-29 November 1952, 21; NHHC, *USS Bataan* (CVL 29), 6-16 March 1953, 9-10.

winter of 1951 the *USS Rendova* had the misfortune of eating Thanksgiving dinner during a severe storm, but even then it was noted as a shipwide positive experience.[244] Birthdays were usually celebrated in a monthly mass celebration, and were also important for morale building.[245]

Apart from such communal activities, the individual sailor had many options for spending free hours on board. Scaling advantages meant that even the smaller escort carriers had recreational possibilities beyond those of cramped cruisers and destroyers. Small spaces functioned as hobby workshops for the building of model planes and leather working.[246] Carriers had their own extensive and professionally run library, which was opened all day and during most of the evening.[247] By far the most popular and ubiquitous form of entertainment seems to have been the viewing of movies. During the Korean War this became so popular that even CVE carriers would have up to three projection locations on board, and they were used extensively. Here we do start to see small but perhaps significant differences in culture between ships emerging. Whereas the *Bairoko* formed a steady median with one movie showing per day, the *Badoeng Strait* seemed far more likely to curtail the practice when operations were busy or extra plane repairs were needed. Since in the latter case this could not have affected the entire crew, this austerity was possibly a measure of enforced solidarity. On the other hand the *Bataan* acted as a veritable floating cinema multiplex, with three movies showing every day in the main venue and many extra features in other locations throughout the ship.[248]

In fact there is some other evidence that the *Bataan* had a more informal culture than the other small carriers. It seemed that cakes were omnipresent for every chance at celebrating something. Also every informal function on the *Bataan* was inevitably accompanied by its very own `Hill Billy´ band.[249] All ships liked celebrating records and jubilees related to their naval aviation prowess. The *Badoeng Strait* was very proud when its guest squadron VMF-212 performed its two thousandth consecutive landing without hitting a barrier. This was an especially impressive record, as we have seen that even elite squadrons could not avoid the occasional barrier crash.[250] The *Bairoko*, was more concerned with offensive matters, and on 18 April 1952 made an attempt at the record for number of combat sorties flown from a CVE carrier in a single day. They managed to hit

244 NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 18.
245 NHHC, *USS Bataan* (CVL 29), 15-26 February 1953, 11.
246 Ibidem, 11.
247 NHHC, *USS Bairoko* (CVE 115), 30 May-8 June 1953, 15; NHHC, *USS Badoeng Strait* (CVE 116), 11-21 January 1953, 23.
248 NHHC, *USS Bairoko* (CVE 115), 17-26 June 1953, 13; NHHC, *USS Badoeng Strait* (CVE 116), 7-17 December 1952, 25; NHHC, USS *Badoeng Strait* (CVE 116), 11-21 January 1953, 23; NHHC, *USS Bataan* (CVL 29), 5-16 June 1952, 10.
249 NHHC, *USS Bataan* (CVL 29), 15-26 February 1953, 11.
250 NHHC, *USS Badoeng Strait* (CVE 116), 7-16 January & 25 January-6 February 1952, 13; NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 27.

eighty completed mission plus two failures, but since there is no further mention of this in the Action Reports, we must assume even this impressive number was not enough to break the record.[251] Meanwhile, the ever festive *Bataan,* eager to produce cake and music at every given opportunity, not only recorded impressive landing records in Korea, but even celebrated the somewhat arbitrary seven thousandth launch from just one of its individual catapults.[252] It is amusing to speculate that this slightly more sanguine culture aboard the *Bataan* had something to do with its Catholic majority and the stereotypical attitudes this might engender. But it is far more likely a consequence of the fact that the *Bataan* was a boat with a strong tradition, being the only one of the smaller US carriers in Korea that had seen actual combat against the Japanese in World War II.[253] Still, whatever the differences, the escort carriers formed a tight community as exemplified in a cartoon drawn for a *USS Sicily* cruise book, the same one as shown on the title page of this thesis. In it we see *Badoeng Strait* crew members looking on in amazement at the antics of the *Sicily*. Tellingly, in this cartoon made by a *Sicily* sailor, the sister ship is affectionately named by its own preferred nickname 'Bing Ding'.[254] The CVE's were a close family indeed.

One of the greatest achievements of naval aviation in Korea was the advance made in pilot survivability rate. Of course some of this was once again due to specific circumstances, such as the static nature of the war, overwhelming air superiority and proximity to mainland and islands with friendly facilities and troops. Still, the number of pilots that were rescued successfully from forced landings into the sea and from behind enemy lines on land is indicative of changing doctrine, in which more emphasis was put on individual human life. This 'no man left behind' attitude also had pragmatic origins. Pilots were highly trained, specialised men, the only people on the carrier who looked death in the face on a daily basis, and very much a finite resource for the ship. Their value was such that risking other men's lives to save theirs was considered worth it. Also, the traumatic experience of being shot down, crashing and then being pulled from the enemies' teeth was no guarantee for a vacation, or even a short respite from flying combat missions. Notwithstanding serious injuries, we often find rescued pilots back in the cockpit the day after returning to the carrier.

That naval pilots were special, almost fearless individuals is aptly illustrated by the story of Captain Armstrong (not Neil Armstrong, who was also a naval aviator in Korea and was also shot

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251 NHHC, *USS Bairoko* (CVE 115), 9-18 April 1952, 8.
252 NHHC, *USS Bataan* (CVL 29), 5-16 June 1952, 3; NHHC, *USS Bataan* (CVL 29), 15-26 February 1953, 4; NHHC, *USS Bataan* (CVL 29), 6-16 March 1953, 12.
253 Campbell, *U.S. Navy*, 13-14.
254 *USS Sicily (CVE 118) Cruise Book 1946-51*, 041.

down once, but who flew jets from the larger fleet carrier *Essex*[255]), which was written up by himself and attached to the *Rendova's* Action Report as an appendix. During a strafing attack his plane was hit by heavy anti-aircraft fire, but he managed to make a relatively safe landing in a river estuary. With water streaming into his cockpit he was almost drowned by the drag of his parachute. Fortunately he was able to inflate his life vest (called a 'Mae West' by the pilots) and blow up a raft. He then used a signal mirror to catch attention of a British frigate nearby. Whereas most human beings would have been rattled by such an experience and simply grateful for their life and limbs, Armstrong decided his skills would be of further use. The British had been unsuccessfully trying to airspot for some of his colleagues from the *Rendova,* and he took over communication with them. After improving the accuracy of several bombing runs, he then attached himself to an upcoming commando raid by South Korean guerrilla fighters. Under Armstrong's supervision they departed on two Japanese mine layers hoping to form a diversion for an attack by a larger force. Unfortunately the South Koreans were too late to disengage from the ensuing firefight, and the tide trapped their two ships in the mud, while a significant communist force engaged them. Once again Armstrong managed to coordinate several supporting airstrikes from the *Rendova*, saving his stranded force and their ships. After this episode he finally decided to call it a day, and happily returned to his carrier.[256]

Not all rescue efforts went down this smoothly. Despite the factors that made survival more plausible in Korea, the situation remained extremely dangerous. Mechanical failures, overwhelming anti-aircraft fire and even the occasional MIG could down a pilot, and the crash location would have great influence on his chances of making it.[257] Crashing on land, usually after being hit during a bombing or strafing run, meant higher odds of initial survival, but also set a clock ticking towards captivity, as communist forces were very eager to seize the pilots that were plaguing them. Such an event set into motion one of the more spectacular aspects of warfare in Korea, as the downed pilots wingmen started to circle his crash, shooting and bombing all encroaching enemy troops. Often these flying sentinels were already somewhat low on fuel, and so, as soon a plane crashed a relief force of planes was also requested from the carrier. Such a special group was called a RESCAP (for Rescue Combat Air Patrol) and its task was to buy time for a helicopter, usually also from the carrier to pick up the pilot.[258]

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255 Hallion, *The naval air war*, 110-111.
256 NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 31-33.
257 NHHC, *USS Bataan* (CVL 29), 15 January-7 April 1951, 9; NHHC, *USS Badoeng Strait* (CVE 116), 17-28 December 1951, 3; NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 14; NHHC, *USS Bairoko* (CVE 115), 22 March-1 April 1952, 12; NHHC, *USS Sicily* (CVE 118), 4-13 December 1952, 10.
258 NHHC, *USS Bataan* (CVL 29), 18-30 May 1952, 3; NHHC, *USS Bataan* (CVL 29), 15-26 February 1953, 6; NHHC, *USS Badoeng Strait* (CVE 116), 7-17 December 1952, 3.

One would be forgiven to think that such a rescue under enemy fire would constitute the pinnacle of danger for a naval airman. Unfortunately, there was a situation even more hazardous to their survival: the water landing, which often had the character of a slightly softened crash. Landing in the sea or even on a river was considered so dangerous that the captain of the *Bataan* made doctrinal recommendations mandating pilots to deliberately crash into enemy territory if a water landing was the alternative.[259] This came following the tragic death of Captain Alfred Agan, whose plane was hit by his own bomb blast and, failing to reach the carrier, landed in the Yellow Sea. He was unable to inflate a life raft, and tried to swim towards land. The freezing water began entering his immersion suit, which was supposed to protect him. Within ten minutes he was overcome by hypothermia and started drowning. When the helicopter finally reached him an hour later the man trying to rescue him wore the same type of immersion suit and almost drowned himself. Another hour after that the helicopter returned with someone in a special underwater demolition suit, who finally managed to secure Agan's body. The results of the autopsy and subsequent inspection of the suit pointed toward severe design flaws, and a lengthy addendum was attached to a report criticizing the almost useless piece of equipment, setting out a large number of possible improvements.[260] Even though the rescue of pilots became both a priority and an expertise of US naval aviation, some of the realities of the Korean circumstances could not yet be conquered. Water temperatures were often so unforgiving that even right next to the carrier, with a CAP overhead to quickly locate a pilot in the water, and also the services of a dedicated destroyer tasked to pick up such pilots, fatalities would often occur.[261] Still, the lessons learned in this regard form one of the most lasting doctrinal changes for naval aviation in the Korean War.

Better medical facilities, advances in communication, coordination between ships, pilots, units even between fleets of other nations, increased specialisation on board as a response to increasing complexity of technology and information streams and the power to wage a conventional war far from one's home shores. All these factors formed the tapestry of the Korean War, and all of them, including the successful rescue of pilots, were made possible by men who knew what they had to do and then did it. Perhaps this is the greatest takeaway from this war for the future of carrier combat. Not that the circumstances in Korea sometimes prevented optimal performance, or that they proved less of a challenge than World War II, but that even on such a handicapped ship as the escort carrier, the sailors and their captains themselves learned to write their own handbook, as necessity dictated. The carrier doctrine that originated on the waters around them would shape

259 NHHC, *USS Bataan* (CVL 29), 15 January-April 1951, 21.
260 Campbell, *U.S. Navy*, 17; NHHC, *USS Bataan* (CVL 29), 15 January-7 April 1951, 7-9.
261 NHHC, *USS Rendova* (CVE 114), 23 September-9 December 1951, 7, 14; NHHC, *USS Sicily* (CVE 118), 13 June-16 September 1951, 5, 8; NHHC, *USS Badoeng Strait* (CVE 116), 7-17 December 1952, 3.

worldwide naval aviation for decades to come.

Conclusion

The evolution of aircraft carriers from their beginnings at the start of the twentieth century might appear to the casual observer an unbroken line of development and military success. From tentative experimental projects during World War I, the attempt to combine the domains of air and sea in warfare a mere decade after the Wright brothers' first flight, these ships became recognised in the present day as the spearheads of naval, if not all conventional military power.

Of course, there are several simple facts that support this point of view. For instance, the carriers' main competitor for naval supremacy, the heavily armoured, big-gunned battleships, which had the power of tradition and centuries of success behind them, decidedly lost the race during the second World War, and were relegated to supporting roles. Despite all their flaws and shortcomings, carriers (and their planes, which as I have described can be thought of as a carrier's 'ammunition') were constantly upgraded as new technologies became available. They became steadily larger, to accommodate more advanced air wings, more reliable as ships, and above all deadlier. At the present time, slightly more than a hundred years after their inception, ever larger carriers dominate the navies of the world’s great powers, especially the United States, which plans to replace its current carrier fleet at a projected cost of over a hundred billion dollars.

The great military lesson of the carrier age was that man had never succeeded in building a better platform for the mobile projection of force, aside from the unthinkable and unusable. Consequently, we can also identify an evolution of roles of the aircraft carrier, from experimental to supporting and tactical, to strategic and ultimately to political. If Von Clausewitz describes war as politics continued with other means, it stands to reason that the means used will be the best of the set that *can* be used. Nuclear weaponry fails this criterion, and the carrier does not. In conventional warfare the control of enemy airspace has become paramount, and only the carrier affords a reliable platform to establish this control in most areas across the globe. Its existence keeps the nuclear option tucked away far in the back of leaders minds, while at the same time affording them the possibility for almost limitless conventional warfare. In this regard it is a blessing and a curse in one.

Yet the success of the carrier, and the political role it eventually took on, can lead into a teleological trap. The carrier was never predestined to become the military and political panacea it is today. All weapons have weaknesses, all are challenged from time to time, and all, like the venerable battleship are supplanted in the long run. The evolution of the carrier was *not* an unbroken line of success, despite how we see them in the world today. In fact, paradoxically, it was

at the moment when this weapon was first seriously challenged and tested during World War II, and passed this test with flying colours, that the carrier's future seemed broken forever.

As we have seen, a misguided belief in the superiority of airborne nuclear weapons, combined with post-war budget cuts and weak and ineffective naval lobbying in the face of interdisciplinary rivalry led to a large part of the US carrier fleet being mothballed at the eve of the Korean War, while the *USS United States* supercarrier project, symbol of the weapon's future, was scrapped mid-construction.

Both the overshadowing of the carriers' arguably decisive success in the Pacific by the two atomic blasts and the subsequent reversal of naval prestige in the minds of US policymakers meant that the Korean War would form a critical second test of the carriers' abilities to prove their merit, a second crucible that would make or break the reputation of this special class of ships. Of course this test was not to be a controlled experiment in a laboratory, nor fair and balanced, and already starkly different from the realities recently faced during World War II. New lessons would have to be learned and new doctrines painfully improvised from the bottom-up, because a carrier by its very nature and complexity is more than any other military unit forced to learn its own lessons and adapt to its environment.

My goal in writing this paper has been to describe the contours of the crucible the Korean War formed for the aircraft carriers of the United States, with a particular emphasis on their day to day functioning as platforms, as ships and as logistical hubs, opposed to the more historiographically prominent focus on the actions and impact of their air arms. I wanted to describe their operations, their obvious and more subtle advantages as fleet units, but also their severe shortcomings and weaknesses and the way in which their crews tried to overcome these.

All my research for the central portion of this thesis, chapters 2, 3 and 4, which describe the practical realities of US carriers during the Korean War, has been based on primary sources found on the site of the Naval History and Heritage Command, the US Navy's official historical department. These sources are now completely declassified and give a decently complete, if very austere look at the conditions of the Korean War. It was my challenge to compare, combine and sometimes decrypt these very dense and pragmatic war reports, submitted by carrier captains, into a narrative describing the particular challenges of this war. As I have explained in the introduction, for reasons of brevity, sharp comparison, the relatively higher challenges they faced, their relative obscurity in the work of military historians, the unique international cooperation they formed and the way in which their role most resembled present day employment, I chose to focus on the operations of the humble work-horses of the US carrier fleet, the escort carriers and their deployment along the west coast of the peninsula.

My choice to concentrate on the less studied, less glorious escort carriers has paid off in my opinion. Historians such as Richard Hallion do acknowledge the Korean War as an important moment in carrier history, but perhaps because of the escort carriers' termination soon after, they neglected a class of ships that played a serious and useful role. In general, I would say that the dead branches on the evolutionary tree of weapon systems merit more study, as they can have more to say about the future than their disappearance would suggest. Also, to focus more on 'platform' (the ships themselves), as opposed to 'ammunition' (the planes), and to highlight less polished 'work-horse' versions of weapon systems, such as the escort carrier, can shed new light on current developments. Furthermore, as an additional point of interest, I feel that a further study of the international character of naval operations in Korea could add to the debate on maritime cooperation in our globalising world.

I hope to have laid bare some of the ironies involved with the carrier's historical trajectory, one of them being its ascension during a conflict of dubious outcome, after its decline following a war in which it was very successful. Of course, the early days of nuclear weaponry formed a dark horse in this equation, but I believe the observation of this irony might have something to say about the general rationality, or lack thereof, in the field of future weaponry and doctrinal development. It appears that the nature of tests or 'crucibles' as I like to call them, for any given weapon system can never be predicted, let alone their specific circumstances and contours. This may be even more the case for systems as complex as carriers. Even in a future of increasingly scientific methods of war, perhaps even after the advent of artificial intelligence, Von Clausewitz' 'fog of war' will dictate much of the outcome.

Finally, on the test of Korea, was this second crucible a good indicator of future carrier success? While the war ended in a painful stalemate, we can definitely state that the carriers acquitted themselves very well, at times even brilliantly. They were spared the intense pressure and chaos suffered by allied ground forces and were able to design a new naval air doctrine in relative peace, focusing on rationalisation, optimisation and maximisation. These new doctrines, those of the floating force-projecting airfield, as opposed to the mobile and embattled capital ships of World War II, then formed the basis for all naval warfare in the rest of the twentieth century and into the present.

The strength of these doctrines, as I hope to have demonstrated in this work, were their grassroots nature. A carrier is such a unique and complicated vessel that a large portion of its optimal operation can only be discovered on the sea, and disseminated to future ships by men with actual experience on these vessels. I believe this bottom-up doctrine creation guarantees a measure of concern for both safety and offensive results that other more generic military units may lack.

However, there is a giant elephant in the room. For all the time pressure put on carriers and their crews in Korea, and the undoubted heroics of their pilots, the environment in which current carrier modes of operation were born lacked the strenuous challenges of a true test. In World War II US carriers came under various forms of attack, some were lost, and they changed their operations accordingly. In Korea no serious communist attack on any carrier ever put these ships through their defensive paces. It is a final irony that the carrier broke the ceiling as a superweapon in a environment that was, from a testing standpoint, too safe. The later duplication of these circumstances in other theatres may gradually have led to a sort of hidden complacency. Of course, carriers are well protected these days by missile cruisers, by accompanying submarines, by their own aircraft. But are these defences not like the impregnably thick armour plating of the old Dreadnought battleships? Nothing lasts forever, and somewhere in the future another test awaits the aircraft carrier.

As for the specific contribution to this process by the escort carriers, which formed the nexus of my investigation, a few caveats are in order. It is extremely important to remember that a large component of what made the Korean War a seminal moment in aircraft carrier history was the transition into the jet age. The physical limitations of escort carriers excluded them from this revolution in naval aviation, and consequently their efforts and innovations during the war were almost exclusively applicable to the dying paradigm of propeller-based aircraft. It is also important to remember that the escort carriers accounted for a relative minority within the total carrier force deployed, and for an even smaller section of total active squadrons. Within the total scope of allied naval and land based airpower their accomplishments were significant, but should not be exaggerated.

That being said, my research has convinced me that the smaller carriers have been unduly neglected. Of course, some if not most of their actions could have been performed by the larger fleet carriers, but the fact is in Korea these roles were filled by escort carriers, and by neglecting them we neglect these interesting facets of naval air power during the war.

Almost every historical work written on the Korean War emphasises its international character, the role of the United Nations and military cooperation. Yet in these works one of the most impressive examples of this phenomenon, the inner mechanics of composite fleets from multiple navies to form a permanent blockading force on the west coast is hardly explored. The escort carriers were the central hubs in this experimental process of systematic convergence, and considering their limitations this cooperation formed one of their greatest triumphs. I hope to have shown how allied destroyer screens were directed, how target portfolios were shared with the smaller Commonwealth carriers and how communication was achieved despite the technological

limitations of the CVE-class.

In their general histories of the Korean War authors like Blair, Hastings and Halberstam pay very little heed to the naval dimensions of the conflict. Given their premise that Korea was primarily a land war, which is especially the case for Blair and Halberstam, this is somewhat understandable, but for insight on naval aviation, let alone the role of escort, carriers these works offer very little. Of this group Hastings is the only one who identifies the importance of aircraft carriers and describes their new role of 'floating airfield'. He also mentions that carriers did not suffer any serious communist attack in Korea. I believe that the west coast experience of the CVE's was a 'prime example' of this new role as 'floating airfield' and I hope to have demonstrated how in this relatively stable role, free from serious threats, the escort carriers were able to rationalise and maximise their striking capabilities. Also I hope to have shown how this lack of opposition in Korea might become a problem for aircraft carriers in the future, since the doctrines dictating their current mode of employment largely originated in a 'safe' environment. In passing Blair does make an important point in his work when he points out the crippling effect of post-World War II budget cuts on all branches of the military, especially the Navy. He quotes president Eisenhower, who considered the mothballing of the carrier fleet a case of penny wise pound foolish. In a way the deployment of the dated, less than ideal escort carriers is a testament to this wisdom. The budget cuts meant that second tier ships had to be deployed, but thankfully their limitations also brought out the best in their crews and commanders. These general historians of the war do of course pay attention to the unique United Nations component of the war and the integrating aspect of international military cooperation in Korea. I believe the experience of the west coast blockading fleet was an extraordinary example of this cooperation, and hope to have demonstrated how some of the challenges involved were overcome. This aspect of cooperation is perhaps the most important reason why the study of CVE's in Korea is rewarding. Of course larger carriers could have operated on the west coast and probably have done more, but the fact is that this coast was almost the exclusive domain of escort carriers during the war, and by neglecting to study them, perhaps because of a prejudice against lesser or obsolete iterations of weapon systems, we neglect a large part of a unique naval experiment, the first United Nations fleet.

The study of CVE's in Korea is also interesting for more narrow military reasons. Thomas Hone had observed how carriers in the Pacific theatre played an important role in amphibious operations, and how, in conjunction with the Marine Corps, they developed the new concept of Close Air Support. In Korea these roles were continued and improved upon by CVE's, although of course not exclusively by CVE's. It is however fair to say that since CVE squadrons were piloted by Marine Corps pilots, they were the spiritual shepherds of CAS doctrine in Korea, and even had

some advantages against jets in the field of fuel consumption and practical airspeed. At least part of the development of future CAS doctrine took place from CVE's in Korea and this warrants their study. In 1948 Henry Dater saw the future utility of escort carriers along more traditional lines, as a continuation of the roles they were first designed to fill. He also mentions amphibious operations, in which they indeed played their part in Korea. Their most archetypical role, from which their name derived, the protection of slow convoys, was far less prevalent in Korea. When they did protect convoys and other ships, they did so with their planes, not by sailing alongside them, and as a command hub for escorting destroyers. The role of training vessels was not relevant in Korea, as budget cuts meant that even the lesser carriers were needed for full combat tours. It was however an accurate prediction for what happened after Korea, as most of the CVE's did indeed spent their last years as training carriers. Finally his last observation on future utility of escort carriers turned out to be the most poignant in the light of what happened in Korea, namely that the CVE's provided an excellent platform for improvisation. Based on my research I can confirm that this is one of the most striking features of these vessels. By describing some examples such as rocket catching barriers, napalm heaters and bridle catchers I hope to have illustrated this quality of the CVE-class. Of course it is fair to say that the larger fleet carriers also engaged in impressive feats in this regard. But it is my contention that it was the CVE's limitations that forced a more constant stream of improvisation. Their crews became more versed in this art as a result.

Autors like Polmar, Field, Cagle & Manson and Hallion all recognise the Korean War as an important moment in the development of future carrier doctrine. They all focus on specific actions in which carriers were present, and give most of their attention to the exploits of their air squadrons. I hold that a study of the routine, even mundane experience aboard the carriers themselves is needed for a more full explanation of doctrinal invention, and I hope that in this work I have provided a cross section of day to day operations. With regards to CVE's, these authors do not neglect them completely, but they are named on an incidental basis, far surpassed by the focus on the larger fleet carriers. Their rationale seems clear. Escort carriers were in almost every way inferior and could not even launch the jet aircraft of the future. They were on their way out. So why do I believe studying them was worth it? The first time carriers were deployed in a way that asymptotically approached their current form of deployment, that is as a floating airfield off an enemy coast, was during the Korean War, and because of circumstances I have described, this mode of operation was most prevalent on the western coast, which with few exceptions was the domain of the smaller carriers. It was also the place where international naval cooperation reached its peak. My research uncovered the immense complexities involved with the ad-hoc integration of ships from so many different navies. By neglecting to study the CVE's, we neglect this important part of

naval aviation history. The lessons learned during this pioneering moment and the difficulties overcome, made the experience of the limited CVE's relevant. If it is too bold a statement that the ghost of the escort carrier lives on in modern doctrine, we can at least assume that their versatility and above expectation performance gave naval theoreticians food for thought in years to come.

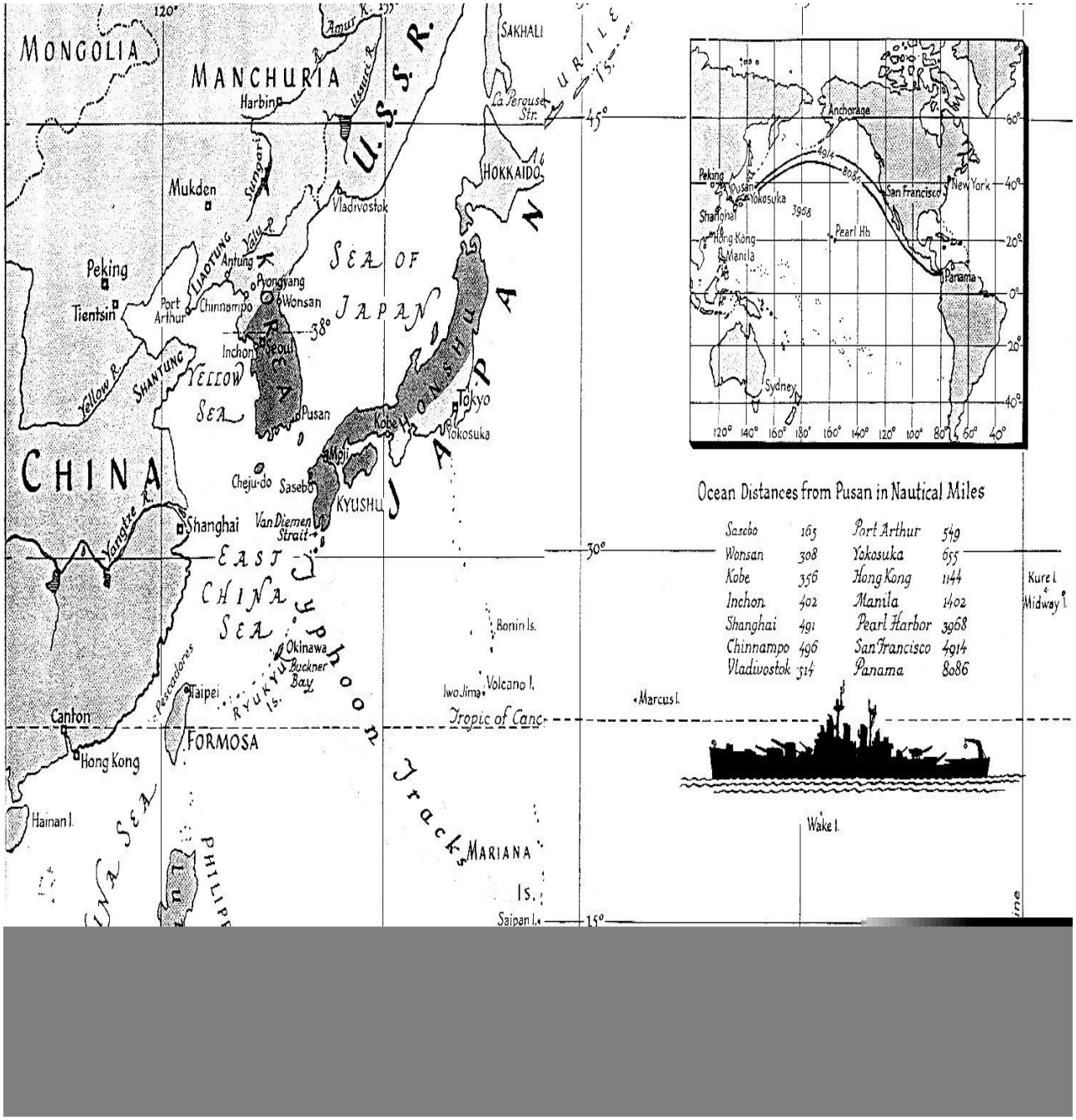
After World War II budget cuts and the rise of nuclear weaponry meant that the aircraft carrier would have to reprove itself as a viable weapon system. The mothballing of large parts of the carrier fleet and cancellation of future programs meant that when the Korean War broke out every available carrier, including the obsolete CVE's, had to be deployed. In Korea they found a war very different from the last one. It was characterised by closeness to friendly bases and total control over air and sea. In the absence of enemy resistance the carriers where free to operate with impunity as floating airfields, the way in which we see them operate today. Escort carriers blockaded the western coast in conjunction with vessels from various other navies and established close integration of efforts. To achieve the blockade and optimise their bombing campaign CVE's overcame a kaleidoscopic array of problems, including barrier crashes, communication breakdowns, information blackouts, faulty equipment, problems with logistics, lack of space on board and inclement weather. Using the ingenuity and talent for improvisation of the crew, the CVE captains managed to solve most of these problems and achieve a very high level of combat efficiency. Weaknesses in the ship's design were overcome by home grown solutions and inventions. Mission roles were diversified and adapted to both the needs of the warzone and to suit the limits of ship space and logistics. New procedures organically grew to account for the international component of the blockade group. The most valuable resource aboard a small carrier, the pilot, had greatly increased survivability, thanks to innovations in communications and helicopter based rescue missions.

The Korean War marked the rebirth of the aircraft carrier, just as the escort carrier entered its twilight. But even as they were disappearing, the escort carriers gave one last burst of energy and were unmistakably a part of this transition. In their dying hour they took on a role that they were never meant to play, and in doing so paid a final contribution to the future of naval aviation.

Appendix A
Abbreviations

AA	Anti-aircraft
ASW	Anti-Submarine warfare
ATAR	Anti-tank aircraft rocket
CAP	Combat air patrol
CAS	Close air support
COD	Carrier-on-board delivery
CV	Aircraft carrier
CVA	Attack aircraft carrier
CVE	Escort aircraft carrier
CVL	Light aircraft carrier
GDP	Gross domestic product
GPS	Global positioning system
GQ	General quarters
HMAS	His/ Her Majesty's Australian ship
HMS	His/ Her Majesty's ship
HVAR	High velocity aircraft rocket
IFF	Identification friend or foe
JOC	Joint operations centre
K-SITES	Military code for airfields in Korea designated by the letter 'K' (Korea) and a number
LSO	Landing signal officer
MASH	Mobile army surgical hospital
MATS	Military air transport service
MIG	Family of Soviet fighter planes designed by the Mikoyan-bureau
NATO	North Atlantic Treaty Organization
NHHC	Naval History and Heritage Command
RECCO	Reconnaissance
RESCAP	Rescue combat air patrol
TARCAP	Target combat air patrol
TE	Task element
TF	Task force
TFE	Task force element
UN	United Nations
USMC	United States Marine Corps
USS	United States ship
VHF	Very high frequency
VMF	Marine fighter squadron

Appendix B
Maps



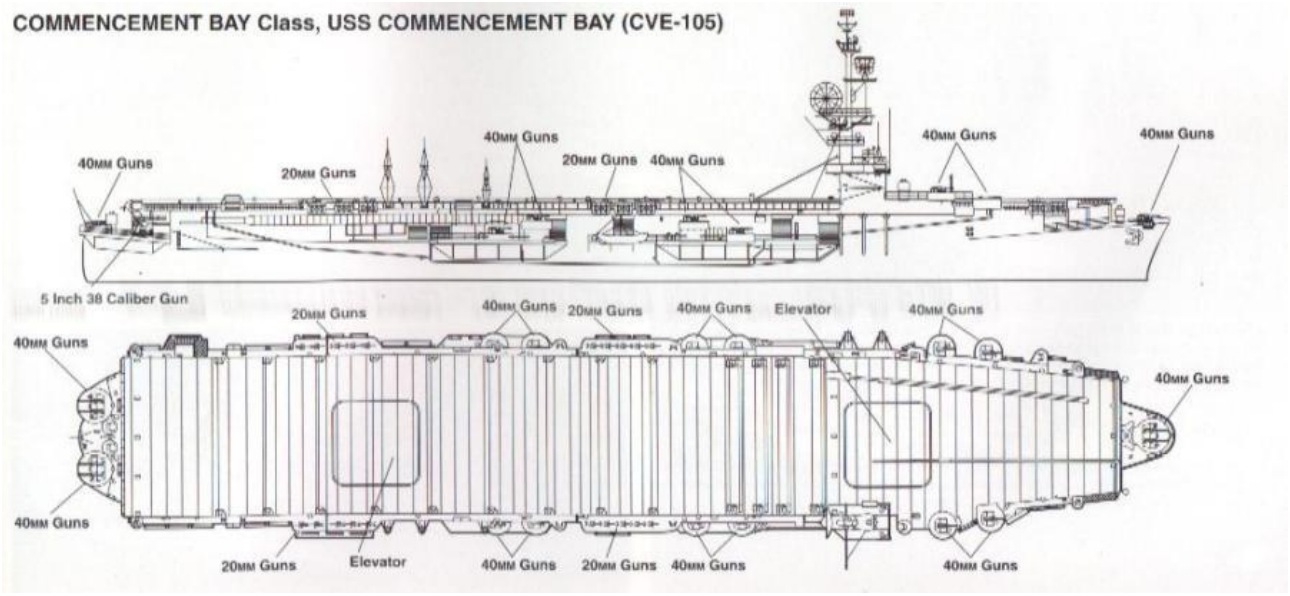
The Western Pacific theatre

(https://www.koreanwar.org/html/korean_war_maps_results_navy.html?id=1, consulted November 2018)

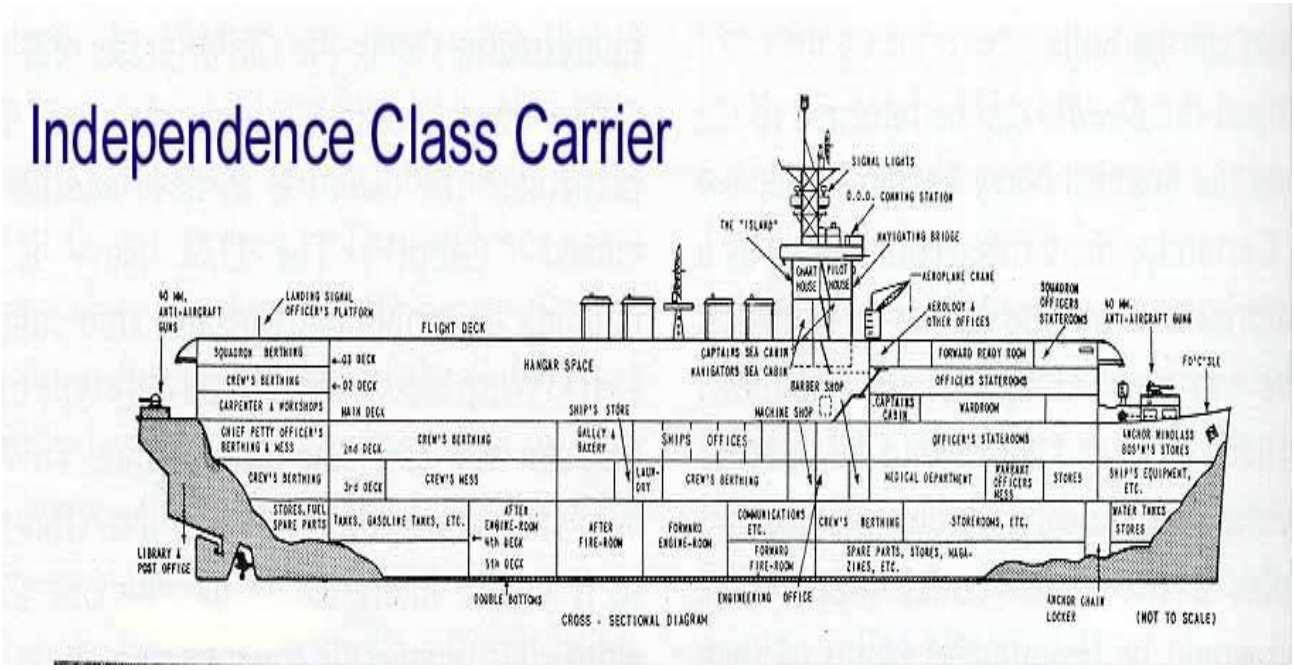
The Korean theatre

(https://www.koreanwar.org/html/korean_war_maps_results_navy.html?id=3, consulted November 2018)

Appendix C
Schematics



Schematic of the *USS Commencement Bay*, lead ship of the class that contained the *USS Badoeng Strait*, the *USS Bairoko*, the *USS Point Cruz*, the *USS Rendova* and the *USS Sicily* (https://laststandonzombieisland.com/2017/08/16/warship-wednesday-august-16-2017-possibly-the-most-devil-dog-carrier-ever/commencement-bay-class-escort-carrier/, consulted November 2018)



Cross-section of a carrier of the Independence class, which included the *USS Bataan* (http://www.oocities.org/ww2cvl/spec1.jpg, consulted November 2018)

Appendix D
Damage list

(B) Enemy

Destroyed		Disabled		Damaged	
Aircraft	3	Junks	12	Aircraft	1
Junks	2	Motor vehicles	195	Junks	2
Motor Vehicles	5	Railcars	5	Armored vehicles	71
Railcars	9	Oxcarts	5	Motor vehicle	1
Oxcarts	16	Sampans	117	Railcars	18
Pack animals	42	Locomotives	7	Oxcarts	2
Bridges	12	Tanks	5	Locomotives	3
Field pieces	22	Gun positions	6	Rail tunnels	5
Gun emplacements	2	Floating crane	1	Sampans	123
Fuel & supply dumps	49			Bridges	26
Warehouses	41				
Buildings	771				

Casualties inflicted on enemy troops, estimated - 1920

Example of a typical list of damage inflicted by a carrier's planes during combat patrols, by the *USS Bataan* from 8 April–11 May 1951 (https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/bataan-cvl29.html, consulted November 2018)

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Primary sources:

The bulk of primary sources used in this thesis is directly available from the website of the Naval History and Heritage Command (NHHC), the official subsidiary of the United States Navy, tasked with the preservation and analysis of all records relevant to US naval history. The site is stable and professionally maintained, but has a rather labyrinthine structure, so to avoid ambiguity, the link provided below circumvents the NHHC homepage and leads directly to the list of sources concerning US carriers active in the Korean War.

Link to primary sources:
https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat.html

Entries for individual carriers:

- *USS Badoeng Strait*: https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/badoeng-strait-cve116.html
- *USS Bairoko*: https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/bairoko-cve115.html
- *USS Bataan*: https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/bataan-cvl29.html
- *USS Boxer*: https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/boxer-cva21.html
- *USS Kearsarge*: https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/kearsarge-cv33.html
- *USS Leyte*: https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/leyte-cv32.html
- *USS Philippine Sea*: https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/philippine-sea-cv47.html
- *USS Point Cruz*: https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/point-cruz-cve119.html

- *USS Princeton*: https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/princeton-cv37.html
- *USS Rendova*: https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/rendova-cve114.html
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- *USS Valley Forge*: https://www.history.navy.mil/research/archives/digitized-collections/action-reports/korean-war-carrier-combat/valley-forge-cv45.html

The various cruise books of individual carriers, most notable for their photographical record, can all be found on the website https://www.navysite.de, under the heading 'Cruise Books'. The numbers in the notes refer to the .htm pages within the books themselves. The cover illustration taken from the 1946-1951 *USS Sicily* cruise book can be found at https://www.navysite.de/cruisebooks/cve118-51/041.htm.

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