

Nagumo's Dilemma in the Modern Era:

Carrier Air Wing Arming and Loadout Considerations

in *Command: Modern Operations*

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Introduction:

Aircraft Carriers are arguably the most powerful warships to ever be constructed, but their power rests entirely with the aircraft they carry and operate. They allow navies that possess them to be able to both project striking power far beyond the horizon (including far inland from oceans), as well as proactively defend their fleets from long range attacks. Experiences with general aviation and aircraft carrier operations during World War II is what brought the reign of the gun-armed battleship firmly to an end.

Aircraft Carriers are often the most critical platform available to a *Command* player in scenarios that have them, so knowing how to prepare and manage the aircraft onboard the carriers that are assigned to you is most important to effectively use these extremely potent vessels. A well prepared and organized Carrier Air Wing (CAW) can carry out a mission in a timely and effective manner, whereas a poorly prepared CAW can not only fail in its mission, but may also doom it's mother carrier to destruction.

This essay is intended to explain to newer players of *Command: Modern Operations* the nuances involved in choosing how to arm and organize the aircraft loaded onboard an aircraft carrier that is under their command. There is no single effective way to handle these matters for every type or size of carrier or aircraft, but I hope that this essay will set you on the right path in terms of knowing what to think about to make the best decisions you can with the information available to you in a given *Command* scenario.

This Essay is divided into three parts: Part 1 details the story of Nagumo's Dilemma(s) for those not familiar with the Battle of Midway. Part 2 goes into some of the basics and principles of Carrier Air Wing armaments to think about. Part 3 details the setup of a Command scenario as a larger example of everything this essay talks about.

PART 1: Nagumo's Dilemma(s), June 4, 1942

Almost six months after the attack on Pearl Harbor in December 1941, Japan had conquered most of the territory it had sought to seize by attacking the United States and the colonial possessions of Britain, France and the Netherlands. Following the tactically inconclusive Battle of the Coral Sea in May, Japanese naval leadership decided that the remaining US aircraft carriers had to be decisively defeated so as to force the Americans to negotiate, or at the very least buy Japan additional time to fortify their new conquests further. This was the genesis of Operation MI, the plan to attack and capture Midway Atoll, "only" 1300 miles from Pearl Harbor, so as to lure the remaining US carriers into battle for destruction.

The primary striking force of Operation MI was to be the legendary Kido Butai (Mobile Force) of the Imperial Japanese Navy, the very same force that had struck Pearl Harbor and rampaged across Southeast Asia, under the command of Vice Admiral Chuichi Nagumo. Of the six carriers that had been part of the strike on Pearl Harbor, two were unavailable due to combat losses and damage suffered at Coral Sea, so in Operation MI the Kido Butai would have 4 fleet carriers, with some of Japan's best naval aviators and support crews.

As part of the admittedly overcomplicated grand plan, the Kido Butai opened what would become the Battle of Midway with a large airstrike against Midway's sizable airbase on the morning of June 4th, 1942. The plan called for approximately half of Kido Butai's strike aircraft and escorting fighters to participate in this raid, with the remainder kept back for routine combat air patrols, and to strike the expected arrival of US carrier forces within a few days of this first strike.

However, US forces had advance warning of Japan's movements against Midway. Part of this was from successful codebreaking, which allowed the US fleet to depart Pearl Harbor far earlier than Japan had anticipated, on May 28th. Additionally, US patrol aircraft from Midway were able to detect Nagumo's first airstrike en route to the island, so the already alerted and reinforced commanders on Midway launched every strike plane they had, with fighters tasked with intercepting the raid, and all bomb and torpedo carrying aircraft sent after the carriers of Kido Butai.

The strike on Midway was only partially successful. The defending fighters were overwhelmed, and most of the bombers were able to strike their targets. However, the airbase itself was not effectively knocked out, and as said above, the US strike aircraft had already left and escaped destruction on the ground.

The combined US Army, Navy and Marine Corps aircraft from Midway attacked Kido Butai in separate groups, and failed to score a single hit on any Japanese ships, while taking losses themselves. However, the intensity of these attacks (including a near miss that almost killed Nagumo himself), and initial reports from his strike aircraft convinced Nagumo that Midway needed to be struck again. Therefore, Nagumo made the decision to re-arm his reserve aircraft that had been armed with anti-ship weapons (torpedoes and armor piercing bombs), to be re-armed with

general purpose bombs, suitable for land targets. With the US carrier fleet not expected to arrive in the area for at least a day or two, he felt it was worth going against the plan on this occasion.

Approximately 30 minutes after Nagumo had issued this order, with the re-arming underway, one of Kido Butai's scouting float planes reported visual contact with American warships to the east of their position, though the report did not specify what type of vessels were spotted.

Nagumo, greatly concerned since this was a very unexpected development, ordered the re-arming reversed back to anti-ship weapons. Within another half-hour, the sighting report was updated to state that this US force contained at least one aircraft carrier.

Nagumo now had a very hard choice to make. The confirmed presence of at least one US Carrier just made it the primary target and threat for his forces. Some of his subordinates were urging him to immediately launch a strike against this force with his planes, however they were armed (some were armed with anti-ship weapons, others with general purpose bombs).

However, if he made this decision, he ran the risk of not only having mixed weapon effectiveness, but also seriously endangering the returning Midway Strike, which was low on fuel. Launching immediately would prevent these aircraft from landing right away, making it very likely that most of these planes would need to be ditched in the ocean.

Hardly an envious position to be in. However, weighing up the pros and cons, Nagumo elected to use the time needed to recover the returning Midway Strike to complete the re-arming of his aircraft. With the benefit of hindsight, this was a most fatal error.

The Midway Strike was successfully recovered, and the reserve aircraft were mostly completed in re-arming, when a series of attacks by US Navy carrier aircraft disrupted Kido Butai. Due to the need for carriers to steam into the wind on a constant course to launch, the carriers could not launch and organize their attacks while under immediate air attack. The first attacks, conducted by US torpedo bombers, were massacred by Kido Butai's combat air patrol Zero fighters, and failed to score a single hit.

However, these attacks brought the Zeros down to lower altitudes, and by a stroke of massive luck for the Americans, two separate flights of dive bombers, one from the carrier *Enterprise*, the other from the *Yorktown*, arrived over Kido Butai simultaneously, despite the latter being launched much later than the former. The air opposition was minimal, and within a period of about five minutes this combined dive bomber force pulled off devastating hits on three of Nagumo's four carriers, which unknown to the American pilots, were especially vulnerable. The hangar decks of the carriers had spare bombs and fuel scattered unsecurely due to the back-and-forth orders on arming aircraft, making them extremely vulnerable to bomb hits causing explosive chain reactions. The carriers *Kaga*, *Soryu* and *Akagi* (Nagumo's flagship) were all turned into flaming infernos in these attacks.

The fourth Japanese carrier, *Hiryu*, survived this devastating attack unscathed, and was able to launch two successive counterattacks on this day, ultimately resulting in the *Yorktown* being sunk, but a final scratch US strike was able to cripple *Hiryu* by the end of the day.

Despite the impressive counterattacks by *Hiryu*, it was those five devastating minutes that decided the Battle of Midway. Not only were all 4 carriers lost to the Japanese, scores of skilled pilots, mechanics and aircraft handlers were lost, seriously weakening Japan's carrier force, which would be finally ground down decisively a few months later in the Guadalacanal campaign. Japan's carrier force would never truly recover, and ultimately be completely destroyed by the US Navy before World War II came to an end.

For our purposes in this essay, the key thing to focus on is the three key choices faced by Nagumo on June 4th, 1942:

- 1) Upon both receiving the reports from his Midway Strike, and the close calls from the American planes launched from Midway, Nagumo had to decide whether to go against plan and re-arm his reserve aircraft for a rapid follow up strike on Midway, which would take considerable time to set up, as well as leave his force unprepared if the US Fleet showed up earlier than expected.
- 2) The first sighting report of US ships in the area, especially since it did not contain a report of carriers, forced Nagumo to decide which target was the more pressing one to devote his resources to, especially since stopping and reversing a re-arming order would undoubtedly take more time to accomplish.
- 3) The follow up sighting report claiming the presence of at least one US aircraft carrier in the area made it vital that this target be struck as soon as feasible. However, launching a rush strike carried a strong risk of sacrificing a sizable portion of his aircraft, since the returning Midway Strike was low on fuel and needed to land soon. Additionally, launching a rapid strike with planes with a mixed armament did run the risk of some weapons not causing as much damage as needed.

These three decisions by Admiral Nagumo are easy to judge in hindsight, but trying to understand the situation from his perspective in the situation allows us to understand some of the important considerations one needs to make when deciding how to arm the aircraft onboard the carriers under your command, as well as when to re-arm and deploy them.

PART 2: Considerations of Aircraft Carriers post-WW2.

Now that we've reviewed the story of Nagumo's Dilemma, let us have a look at what Carrier Air Wings of the Modern Era are generally composed of in terms of aircraft types and amounts.

Size of the Carrier:

While many modern carriers are much larger than their WW2 counterparts, this does not necessarily mean they can carry more aircraft, which would theoretically allow more flexibility and diversity when deciding how and when to arm your aircraft.

For instance, USS *Midway* (CV-41) was initially commissioned into the US Navy in September 1945, right after WW2 came to an end, and at the time was the largest carrier in service in the world. This vessel had a capacity of over 120 aircraft at this time and through her early years of service.

However, the *Midway* went through two major modifications to her design before the 1970s, and carrier based aircraft had increased in size and complexity, as well as the mass adoption of helicopters. So by the time her final modernization was completed in 1970, her aircraft capacity was actually lowered down to around 70 aircraft, which remained consistent for the remainder of the carrier's service life which ended in 1994.

Size and types of Aircraft:

As aviation technology rapidly advanced during and after WW2, major changes to carrier based aircraft were inevitable and necessary.

Jet propulsion of course allowed aircraft to fly faster, but it also meant aircraft had to get larger to accommodate more powerful engines and carry more fuel, as jets are not as fuel-efficient as traditional propeller driven aircraft. All carrier based aircraft also have to be somewhat heavier than land based counterparts due to needing to be able to absorb the shock of carrier landings, which entail abrupt touchdowns and halts due to the arresting gear. This can therefore limit the amount of ordinance the plane can carry and how far away it can strike.

Larger, twin engined propellor driven aircraft also became important components of Carrier Air Wings, for roles such as Airborne Early Warning, Anti-Submarine Warfare, and supply deliveries.

By the middle of the 1950s, Helicopters also became an absolutely critical component of Carrier Air Wings, with them being absolutely vital for roles like Anti-Submarine Warfare and Search & Rescue. The latter role often being able to replace the use of "guard ships", usually a destroyer, that needed to steam very close to a carrier to rescue any downed pilots from failed landings or launches. This frees up an additional escort ship to focus more directly on protecting the carrier from threats.

Types of ordinance:

During WW2, and for several years after, there were three primary types of ordinance used by carrier based aircraft, not including the internally mounted machine guns & cannons:

- Free fall unguided bombs of different sizes and types
- Air-dropped straightrunning torpedoes
- Air-launched unguided rockets (more common from 1943 onward)

Other types of more specialized ordinance included depth charges and early forms of guided bombs.

How does this compare with what one can expect in Modern carriers?

Aerial torpedoes for surface attack were completely out of favor by the early 1950s, with the last such attack being the raid on Hwachon Dam during the Korean War in 1951. However, Air-dropped homing torpedoes for Anti-Submarine Warfare are still very important parts of a carrier's magazine and will probably continue to be for the foreseeable future.

Free-fall unguided, or 'iron' bombs, were still very common weapons through the end of the First Cold War, though dedicated armor piercing iron bombs have been largely replaced by specialized guided bombs, using methods such as lasers, GPS, and Television for guidance. Today one is more likely to find carrier aircraft suited to using guided bombs, though they are probably still capable of using Iron bombs.

Unguided rockets can still be found in certain loadouts suited for ground attack, but in many roles they have been superseded by guided air-to-ground or Anti-ship missiles. Many of these are capable of striking a target tens or hundreds of miles from the launching aircraft.

While some carrier based aircraft continued to have guns/cannon built into them, the primary air-to-air weapons since the late 1950s has been the guided missile, of both the Radar Guided and Heat-seeking varieties. What this primarily means for our purposes is that carrier aircraft assigned with an Air-to-Air loadout may not be able to neutralize as many air targets as they might have been able to in the past, as only a relatively small number of missiles can be carrier per aircraft, and modern countermeasures makes it a near certainty that some of those missiles will not strike a target.

Finally, though they were in use in WW2, the Jet age massively expanded the use of Aerial Fuel Drop Tanks that can be attached to an aircraft to extend its range. This, of course, takes up space that could otherwise be used with more ordinance, though.

Evolving Mission and Threat Types:

While aircraft carriers continue to perform some of the same roles they had in WW2, there have been considerable changes in both the type of missions carriers can perform and what threats they face.

With advances in aircraft technology, Carrier planes can now strike much farther than their WW2 counterparts, including far inland from an ocean. But this also means it will take longer for a plane to return to the carrier and rearm and refuel before embarking on another mission.

As said above, the mass adoption of helicopters opened a whole new range of missions for carriers, especially Anti-Submarine Warfare, Search & Rescue, and even Humanitarian relief.

The threats that carrier commanders need to concern themselves with have also evolved in response. While the basic threats are still largely unchanged in a fundamental sense, they now have the ability to attack the carrier from a MUCH longer range and from multiple directions than was possible in WW2.

Anti-Ship Cruise Missiles are arguably the most potent threat to carriers for most of the time that *Command* covers. These weapons can be fired from different platforms in the air, land, surface and undersea domains, making for attacks from many possible directions.

A missile does not even need to sink the carrier to win an engagement, because one or two hits can be enough to wreck the flight deck and/or destroy a large portion of the aircraft onboard, which can also spell disaster for any aircraft already airborne if there isn't an alternate carrier or land base within range for them to land at.

During WW2, the primary method of defending the carrier was the Combat Air Patrol (CAP) which is a rotating station of fighters to investigate and engage threats. The mass adoption of ship-based surface-to-air missiles has transferred some of this burden away from Carrier Air Wings, but they should not be depended on if one can help it. CAP is still a very important part of Modern Carrier Operations.

Submarine launched torpedoes are also still a potent threat that one must be aware of, making an ASW screen vital to protect the carrier. Aircraft attack with more basic ordinance like bombs is still a threat, but less of a danger as one gets closer to the present with more advanced radars making further out detection of manned aircraft more reliable.

Final Note: In the early 21st Century, two new and related types of missiles are starting to pose a major threat to carriers in a combat situation: Anti-Ship Ballistic Missiles and Hypersonic Missiles. As of this writing, the primary ways to protect the carrier from these do not directly involve the carrier air wing, and developments are on-going. As of now, the best way to not lose a carrier to these methods in *Command* is to not allow the enemy to get a good enough contact for a firing solution. If possible, destroy their scouting platforms that can detect the carrier.

How Should I Arm my Carrier Aircraft?

The Important Questions:

There is no single list of priorities that will fit any situation, so below will be a series of fundamental questions you should ask yourself about the given situation in the scenario you are playing. Then we will examine one specific scenario in Command as an example of all the principles covered in this essay.

What is your MISSION?

What task are you trying to accomplish with your carrier(s)? Is it offensive or defensive? Is there a specific location you need to attack or protect? How long do you expect it to take? How much time has the scenario allotted you?

What THREATS are out there?:

What types of enemy platforms you can expect to encounter will be vital to determining how and when to arm your aircraft. If you are fighting a land country with minimal or no navy but a considerable air force, then you can possibly concentrate most of your planes on Air-To-Air loadouts. Conversely, if you are sent to protect a location or convoy from an enemy surface ship and submarine threat, you may be able to arm most of your aircraft with strike loadouts.

What are YOUR assets?

Take inventory of the following:

-How many aircraft of each type do you have?

Some carriers may have an abundance of one aircraft type over another, while others have an abundance of aircraft that can perform a wide range of missions, such as the F-18 Hornet/Super Hornet series.

Multi-Role aircraft like this do offer flexibility, but rearming time can tie down assets at a critical moment if you are not smart about when to re-arm them.

Conversely, some older carrier air wings make things easier with dedicated types for different roles, such as early 1980s US carriers that may have, say, F-14s for Air-To-Air, and A-6s/A-7s for strike.

-How many of these aircraft are armed and whether or not they are presently ready to launch?

In many scenarios, to reflect real life restrictions, a certain number of aircraft may be unavailable for use despite being located on the carrier. This reflects the need for a certain number of airframes to need to go through maintenance periods that involve extensive work that cannot be canceled and made ready on short notice.

Modern aircraft, especially modern Jets, are far more complicated machines than the planes that flew off of WW2 carriers, which means that the time needed to arm and fuel them is more complicated and longer.

For aircraft that are already armed, some may be ready to go immediately, and if the situation presently suits them being armed this way, you should probably leave them with that loadout.

Some aircraft may have an assigned loadout, but are in-process of re-arming. If you determine that you need these aircraft with a certain loadout, and they are close to completion of the one already assigned to them, you have to decide if you can afford the time needed to change the loadout, or if the aircraft can do what you need them to do with the one they have been armed with.

-Do you have Airborne Early Warning aircraft?

This helps determine whether or not you may need to devote some of your aircraft to a defensive patrol or for long-range scouting. All things being equal, if you have AEW aircraft, set up a simple support mission for them to operate near the carrier as soon as you can.

-What other assets not onboard your carrier do you have? Do you have land based aircraft support? Surface ships with good AAW or ASW capabilities? A submarine screen?

Depending on what other assets you have, you may be able to leave certain tasks to them, therefore freeing up your Carrier Air Wing for other duties.

For example, if you have friendly land-based fighters or ASW aircraft available that can place themselves between your carrier and the expected threat direction, you might be able to have them perform some or most of the air and ASW defense duties to protect the carrier.

-Do your aircraft have an alternate landing site or carrier to divert too if something goes wrong?

Things may go wrong. An enemy sub could slip through your screen and torpedo your carrier. Or despite all the missiles launched in defense, an Anti-Ship missile could slip through and crash into the flight deck of your carrier.

In this situation, it's very handy for you to have available an alternate location for your aircraft to land, so that they do not have to be ditched, further compounding an already painful loss.

It may also be handy to move certain aircraft, like a cargo plane, to an alternate base before the action starts, simply to move them out of danger and to preserve the asset, especially if the scenario supports cargo operations that might allow you to bring in some more supplies.

Do you have enough time to re-arm your aircraft due to changing circumstances?

As alluded to in the story of Nagumo's Dilemma, arming and turnaround time can make a carrier very vulnerable. Answering this question depends on not only having a decent understanding of what you are likely to face, but weighing the risks vs rewards when faced with certain threats that may be more likely than others.

For instance, your carrier force has a mission to neutralize an enemy surface threat within striking range of enemy land based aircraft. A majority of your fixed wing aircraft are multirole, meaning they can perform both air-to-air and anti-surface missions. The capability of enemy surface ships' defenses could mean needing to concentrate more missiles/bombs to overwhelm the defenses, but arming most of your planes for this would degrade your ability to defend the carrier from a sudden bomber and/or missile threat, as modern fighters can not only intercept bombers, but can also aid in intercepting long range cruise missiles.

This is the crux of Nagumo's dilemma. Sometimes it may be more prudent to work with your aircraft as they are armed now, rather than wait several hours (in-game) for them to be re-armed. Afterall, if your aircraft are stuck being worked on when a sudden imminent threat shows up, you could be in for disaster, just like Kido Butai was in June 1942.

PART 3: *Fleet Action*, 1982: Putting everything together

With everything I've described above in mind, let us now look at a specific scenario available in one of *Command*'s DLCs to have a 'real' example of the principles discussed. This is NOT a walkthrough of the whole scenario, but rather an evaluation of the set up for both sides with a specific look at what the player has available in terms of Carrier aircraft. We will examine the options and threats available to the player, playing the role of the British Task Force commander, Admiral John 'Sandy' Woodward.

The DLC *Command: Falklands*, is a campaign battleset recreating engagements from the 1982 Falklands War, between the United Kingdom and Argentina. This war resulted from Argentina having seized the Falkland Islands (known to them as Islas Malvinas) via invasion, as a way of uniting their divided country that was then under a brutal military dictatorship, since the nation had long claimed the islands as belonging to them, a claim which persists to the present day despite the ultimate British victory in the 1982 war.

Most of the scenarios in this DLC are historical engagements, but there are a few that are 'hypothetical' set ups of certain situations that could have happened under other circumstances.

Fleet Action is one such scenario. It covers a direct major naval battle between the Argentinian Navy and the Royal Navy carrier force that was sent to retake the Falklands. Such a battle did not actually occur for two reasons:

- 1) The British submarine HMS *Conqueror* was able to locate, torpedo and sink the Argentine cruiser *General Belgrano* on May 1, 1982. This action caused Argentinian leadership to withdraw the fleet back to port for the remainder of the conflict, as the British submarine threat was deemed too great to risk the ships.
- 2) Argentina's sole aircraft carrier *Veinticinco de Mayo*, attempted to launch an airstrike against the British carriers on the morning the *General Belgrano* was sunk, but there was insufficient wind to launch the heavily armed strike aircraft, and before conditions were improved, the order to return to port was given.

The *Fleet Action* scenario allows the player to fight this battle that *almost* happened, with the Argentine fleet fully ready and willing to engage in battle with the Royal Navy.

General Situation and threats:

At the outset of the scenario, the British carrier force is about 125nm to the NE of the Falklands. The previous strikes on Port Stanley and Goose Green airports have largely diminished their threat to the Task Force, though Pebble Island airfield has not been struck yet. None of the captured airports on the islands support capable jet powered combat aircraft, so the most potent air threats come from Argentine land bases as well as the carrier *Veinticinco de Mayo* (discussed below).

The Argentine fleet has sortied from its bases in preparation for battle with your Task Force. Based on intelligence work, it has been determined that the overall Argentine fleet has been divided into two main forces, one to the north of the 200nm exclusion zone, the other to the south. They clearly intend to try to divide the limited British capabilities against threats from multiple directions.

The northern force contains, among other surface ships, the Argentine aircraft carrier *Veinticinco de Mayo* (25th of May), a WW2 period Colossus-class carrier that had previously served in the British and Dutch navies in the post-war period. It is known that its carrier air wing includes S-2 Tracker ASW and search aircraft, A-4Q Skyhawk strike aircraft, and Super Etendard strike aircraft. The latter are the most dangerous threats to British ships, as they carry the French-made Exocet anti-ship missile.

The southern force is led by the Argentine light cruiser *General Belgrano*, a former US Navy *Brooklyn* class light cruiser (USS *Phoenix*) that saw service in WW2. While it has had surface to air missiles installed, its offensive power is still limited to its 6 inch guns, of which it has several, and can devastate the British task force if it were to get within range.

All other Argentine surface combatants in this scenario, of various US and British types, do possess surface launched Exocet Anti-Ship missiles.

There is at least one Argentine submarine, a Type 209-class of West-German manufacture, lurking out there that no doubt has the British carriers as primary targets.

Finally, regarding land-based aircraft:

The airports captured on the Falklands have had some small piston engine aircraft stationed there that have light strike capabilities, but they pose a minimal threat to the task force at this time.

As for aircraft operating out of the Argentine mainland, the combat types known to be available are:

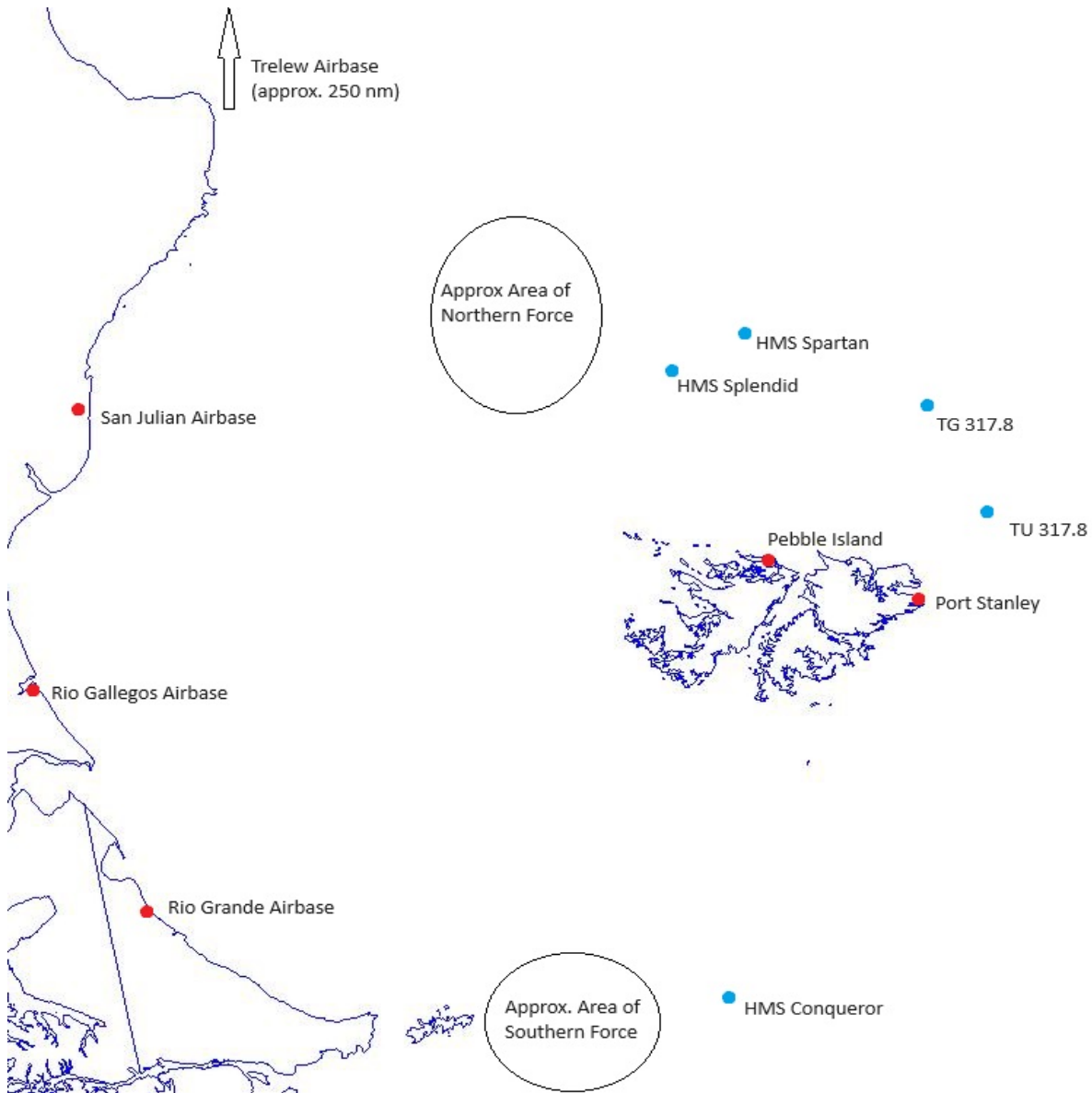
A-4 Skyhawks (various models): while capable of carrying Sidewinder missiles, their primary role in this scenario is one of strikes with Iron bombs; probably the most numerous strike aircraft available to the Argentines

Mirage III & Dagger Fighters: These delta wing aircraft are primarily air-to-air combat platforms, although they are capable of conducting bombing strikes.

Canberra B.62s: These are twin engine jet bombers that have a considerable strike range, though they are very vulnerable to fighter interception.

P-2H Neptunes: These are ex-US Navy Maritime Patrol Aircraft. They pose no direct threat in and of themselves, but they should be expected to be scouts sent out to find the British task force, so as to vector strikes.

Before we go into detail on what is available to the (British) Player, here's a map of the basic situation at the start of the scenario, for reference:



British (Player) forces:

Since this essay focuses on aircraft carriers, that will be the main focus of this section, but here's an overall rundown on the different naval forces available to the player:

TG 317.8

This is the main British Carrier task force, with both HMS *Hermes* and HMS *Invincible*, as well as their escorts. It is steaming at its designated station about 125nm from Port Stanley

TU 317.8

This is a small detachment of a destroyer and two frigates sent southward to bombard Port Stanley airport. It is currently about 65nm from Port Stanley

HMS *Conqueror*:

This submarine is on patrol about 150nm south of the Falklands, in position to try and intercept the southern Argentine force. It is armed with both older straight-running torpedoes and more modern wire-guided torpedoes

HMS *Spartan* and HMS *Splendid*:

These two submarines have independent patrol stations about 130-160nm to the Northwest of the Falklands, and are positioned to try and intercept the northern Argentine force. Like *Conqueror*, these submarines are also armed with both older straight-running torpedoes and more modern wire-guided torpedoes

The Royal Navy Carriers:

There are two carriers the British have available in this scenario:

HMS *Hermes*, flagship of the Task Force, is a converted Centaur-class carrier that has been modified to only operate helicopters and VSTOL aircraft like the Sea Harrier.

HMS *Invincible*, a more modern and smaller design that was purpose-built for only helicopter and VSTOL aircraft.

Below are tables laying out how each of these carrier's Air Wings are configured at the start of the *Fleet Action* scenario:

HMS Hermes (R 12)	Sea Harriers (VSTOL)	Sea Kings (helo)
Ready	2x A/A w/ Sidewinders 4x Strike w/3x bombs ea.	3x ASW Torpedoes 1x Maritime Surveillance
Readying	2x A/A w/ Sidewinders (1 hr 56 Min)	3x ASW Torpedoes (1 hr 56 min) 1x Maritime Surveillance (4 hr)
Unarmed (Available)	2x [Reserve] Loadout	None
Unarmed (Unavailable)	2x down for Maintenance	1x down for maintenance
Total Aircraft	20 Sea Harriers (18 available)	9 Sea Kings (8 available)

HMS Invincible (R 05)	Sea Harriers (VSTOL)	Sea Kings (helo)
Ready	2x A/A w/ Sidewinders 2x Strike w/ Cluster Bombs	3x ASW Torpedoes
Readying	2x A/A w/ Sidewinders (1 hr 56 Min) 1x Unarmed Recon Pod (4 hr)	3x ASW Torpedoes (2 hr 56 min) 1x Maritime Surveillance (4 hr)
Unarmed (Available)	1x [Reserve] Loadout	3x [Reserve] Loadout
Unarmed (Unavailable)	None	2x down for maintenance
Total Aircraft	8 Sea Harriers (all available)	11x Sea Kings (9 available)

As you can see, these carriers do not carry many aircraft, so it is critical to make smart use of the limited resources these carriers can provide.

Take note that neither carrier possesses Airborne Early Warning (AEW) aircraft. This is a significant disadvantage that greatly concerned the real Task Force Commander in the war. This likely means that you will have to use your ship-board radars for threat detection, though that does expose your ships to easier targeting for the enemy.

The Aircraft and their loadouts:

The Sea Harrier FRS.1 is the navalized variant of the Hawker Siddeley Harrier jump jet, the first operational military fixed wing aircraft capable of both level and vertical flight. It is a subsonic aircraft, meaning it is not capable of flying faster than the speed of sound. While it is capable of taking off vertically, on the carriers used in this scenario, the armament and fuel loadouts mean it must take off conventionally from each carrier's Ski Jump ramp. However, they must land vertically on the British carriers. Alongside its loadout options, it does carry a pair of 30mm cannons mounted internally. It has a short-range air radar that's mainly useful for lining up attacks on aircraft.

One significant advantage the Sea Harrier possesses over the Argentine aircraft it will face is actually the AIM-9L Sidewinder missile. This variant of the very-long serving series of US made heat-seeking air-to-air missiles has the then relatively new feature of All-Aspect attack capability. What this means is that the missile's seeker is sensitive enough that it can track an aircraft at any angle, whereas previous heat-seeking missiles were Rear-Aspect only missiles, where they needed to gain a lock from behind the target aircraft so as to detect its engine exhaust. All heat-seekers available to the Argentines are Rear-aspect only, so this will give the Sea Harrier pilots a significant advantage in combat encounters.

Here are the loadouts available to the Sea Harriers in the *Fleet Action* scenario:

Sea Harrier Loadouts	Armament	Strike/CAP Radius	Time-to-Ready
Air to Air- Sidewinders	2x AIM-9L Sidewinders 2x Drop tanks	115 min at 150nm CAP	3 hours or 30 min with Quick Turnaround
Strike- 1000lb Bombs; Standard	2x 1000lb bombs	205nm Strike Radius	6 Hours
Strike- 1000lb Bombs; Short Range	3x 1000lb bombs	190nm Strike Radius	6 Hours
Strike- 1000lb Bombs; "Falklands Terror CAP"	2x AIM-9L Sidewinders 1x 1000lb bomb 2x Drop Tanks	100 min CAS station at 350nm	6 Hours
Strike- Cluster Bombs	2x BL.755 Cluster Bombs 2x Drop Tanks	350nm Strike Radius	6 Hours
Strike- Rockets Standard	38x 68mm SNEB Rockets 2x Drop Tanks	350nm Strike Radius	6 hours
Strike- Rockets Short Range	76x 68mm SNEB Rockets	200nm Strike Radius	6 hours
Recon-Unarmed	1x Electro-Optical Recon Pod 2x Drop Tanks	410nm Recon Radius	3 hours or 30 min with Quick Turnaround
Recon- Armed	1x Electro-Optical Recon Pod 2x 1000lb bombs	205nm Strike Radius	6 Hours

The Sea King HAS.5 is the British license-built version of the American Sikorsky SH-3 Sea King, and it is an excellent ASW and maritime search helicopter. In addition to being able to deploy active sonobuoys, it also has a dipping sonar array. Its impressive surface search radar can make it an important scout for the task force, though it would be a sitting duck for Argentine fighters in this role. It has a surface-search radar with a maximum range of 160nm.

These are the loadouts available to the Sea King in this scenario:

Sea King loadouts	Armament	Search Radius	Time-To-Ready
Maritime Surveillance	None	380nm Search Radius	4 Hours
ASW- Depth Charges	2x Depth Charges 8x Active Sonobuoys	320min at 35nm ASW Search	4 hours or 30 min with Quick Turnaround
ASW- Torpedoes	2x Mk46 LWT Torpedoes 8x Active Sonobuoys	275min at 35nm ASW Search	4 hours or 30 min with Quick Turnaround

With all the above information, let us now look at this scenario through the lens of Carrier Air Wing loadout and arming consideration, and in particular the important questions from part 2:

Your Mission:

In *Fleet Action*, as with every scenario, the first mission is always to survive and preserve your assets from undue loss. That being said, in this situation, with the Argentine fleet definitely prepared and intending to do battle, your mission is to gain control of the seas around the Falkland Islands by neutralizing the threat of the Argentine Navy.

Scenario scoring considerations aside, this does not *necessarily* require sinking the Argentine ships, as damaged vessels can be forced to remain in port for long enough to conclude the war. In the case of the Argentine carrier *Veinticinco de Mayo* in particular, hits to its flight deck could effectively eliminate it from the war, either by wrecking the deck, catapults or elevators, or by destroying a majority of its relatively small air wing.

That being said, most Argentine vessels do pose a serious threat with their Exocet missiles, provided they can get within range to launch. However, sinking the *Veinticinco de Mayo* and the *General Belgrano* with minimal loss to your side would likely be enough to consider the battle a British victory.

A secondary mission is to try and keep up attacks on Argentine airfields on the Falkland Islands, in preparation for a future amphibious landing. The scenario has pre-setup two parts of your forces with this in mind. A pair of Sea Harriers onboard HMS Invincible are armed with Cluster Bombs, ideal for striking the Pebble Island airstrip (discussed further below). Additionally, TU 317.8 has been detached from the main Carrier force to carry out gun bombardment of the installations at Port Stanley airport, which despite prior strikes, is still somewhat operational.

Strikes against airbases on the Argentine mainland are completely out of the question due to the ranges involved and the concentrated air threat making such an approach of the British carriers almost assuredly a suicide mission. The further out from the mainland the carriers are, the more relatively safe they are from land-based air threats, as the Falkland islands are only just within strike range of certain airbases, and the Argentines only have a limited aerial refueling capability.

The Threats:

Despite the considerable Argentine surface fleet, the primary threat facing the British is aircraft, both land-based and from *Veinticinco de Mayo*. The Argentine strike aircraft are most likely to attack with unguided iron bombs, however the Super Etendards are assured to attack with Exocet missiles.

The main surface threat would probably be the southern force led by *General Belgrano*, as the Argentine Carrier force would be very unlikely to close within Exocet or even gun range.

The Argentine submarine threat is also very real and potent, though the only way it can attack is with relatively short range torpedoes, meaning the Argentine submarine would have to pass through the Carrier's escorts to engage. .

The British Assets:

The limited number of Sea Harriers means that, at any given time, they will either need to be concentrated mainly for one purpose, or split between different purposes, therefore diluting the number of aircraft available for either.

In terms of attacking Argentine warships, the only good option is to arm the Sea Harriers with 1000lb bombs. Cluster bombs will not be effective, and Rockets would only be marginally better against the larger vessels. The first strike launched must strive to be decisive, as there may not be an opportunity for a follow up attack on the same vessels.

The largest problem in this regard is range. At the start of the scenario, 4 of the Sea Harriers have a maximum bomb load, but this is completely inadequate to strike the Argentine Carrier at the opening ranges, and unlikely to be good enough unless the British carriers make a rapid advance to close with the *de Mayo*, which carries considerable risk.

The loadout "Falklands Terror CAP" offers serious potential in this role. Armed with only a single bomb, the range could be sufficient for a strike on *de Mayo* or *General Belgrano* depending on the exact position of the British Task Force. This means that the bombs MUST score hits, as even one or two hits on the *de Mayo* could wreck her to the point where she is out of the war. But accuracy and SAM threat considerations require that attacks be made from low level, especially since the 1000lb bombs available have a minimum release altitude of 1000ft above sea/ground level.

On the flip side, the considerable Air threat can make it tempting to concentrate on arming Sea Harriers with Sidewinders to intercept incoming raids. This may assure the safety of the carriers, but if you get a solid location on the *de Mayo* or *General Belgrano*, you may not be able to launch a strike before they are lost again or they are able to attack. Additionally, experience in the actual Falklands war showed that the ability of the British ships to defend against sea-skimming missiles like Exocet (and low level attacks in general) was rather limited, with two ships lost to those missiles. In both cases the Exocets were targeted against the carriers, but countermeasures caused them to lock onto another vessel. This makes it all the more advisable to detect and neutralize the Super Etendards before they can launch their missiles.

In the case of the *General Belgrano*, your detached surface force could provide an opportunity to defend against this threat, as they do have Exocet missiles of their own, as well as helicopters that can be fitted with air-to-surface missiles. However, if you choose to send them after the southern force, they will likely be within range of land-based aircraft, and if you can't spare Sea Harriers to provide air cover, they could end up being hammered by the Argentine Air Force.

Your three submarines (*Conqueror* in the south; *Spartan* and *Splendid* in the North), offer probably the most cost efficient way of dealing with both the Argentine forces. Afterall, in the real war, the *Conqueror's* sinking of *General Belgrano* is what effectively gave the British control of the seas. That being said, these are valuable assets that could be lost in short order if the Argentines detect them with ASW assets. They also have rather short detection and engagement ranges, so they may need to be vectored on an intercept course based on contact achieved with another asset.

The airports at Port Stanley and Pebble Island are valuable military targets, but in the end, their threat to the Carrier force is small compared to the other Argentine threats. Neither of these bases can operate jet aircraft, so the only threats from them are propeller driven aircraft with relatively light armament. That being said, if you practice EMCON and limit radar emissions, it is conceivable that they could pull off a surprise raid with little warning. Your ship's SAM systems can probably deal with these aircraft, but that could deplete the magazines that would be needed to defend against more potent threats. So starting out with a small strike by your two Cluster Bomb armed Sea Harriers might be a prudent first move. They can catch most of the planes on Pebble island on the ground, and it is far less well defended than Port Stanley. The remaining defenses at the Port Stanley airport probably make further attacks there by aircraft unwise due to possible losses to your small force of Sea Harriers. If you do wish to strike this airport, it would be better to use the detached surface force for bombardment.

A majority of your Sea Kings should probably concentrate on ASW searching to protect the carriers. But keeping one or two available for scouting can provide you with an early fix on the Argentine ships. Just keep in mind that if a Sea King is pounced on by Argentine fighters, it will likely be lost in rather short order.

Taking all of this together, despite the significant numerical disparity in aircraft available to the British Task Force, *Fleet Action* is absolutely winnable for the player. While the three nuclear submarines available are powerful tools that the player should make effective use of, the aircraft of the two RN aircraft carriers are critical to victory in this scenario.

For those in who play *Command*, as well as the real life carrier task group commanders out there, Nagumo's Dilemma over eighty years ago is a tale that should be understood and applied to the operations of their vessels and aircraft, not only to make most effective use of them, but to avoid making the wrong choices that can doom their assets and personnel to a sudden and devastating surprise attack. The lessons of that critical day in 1942 will likely be relevant for the foreseeable future, as long as there is a need for aircraft carrying vessels on the seas.