

# **COMBAT AIR PATROL FOR FLIGHT SIMULATOR 2004**



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## Introduction

Combat Air Patrols – or CAPs – in terms of naval aviation are missions that aim to protect the Carrier Battle Group from incoming enemy air and surface threats. A garden-variety CAP consists of two fighter aircraft that have the capability both to destroy the enemy at intermediate-long range distances or engage in a dogfight with that enemy.

During the past few decades, the US Navy used the Grumman F-14 Tomcat as its primary fleet defender. Throughout its service career, the Tomcat made many interceptions, shepherding aircraft away from the Carrier Battle Group. At least twice, Libyan fighter aircraft fell prey to patrolling F-14's. In 1981, two Libyan Sukhoi 22's were splashed into the Gulf of Sidra, followed by two Mig-23's in January 1989.

Combat Air Patrol for Flight Simulator 2004 uses a freeware carrier scenery, ArrestorCables and the F-14 of your choice to simulate CAP's in several different locations in the world.

You will first be given a rundown on the forms of CAP that exist, the flight profile (altitude, speed, etc.) and how to nicely intercept an AI airliner. After that, I will list the CAP missions from various aircraft carriers.

**I'm assuming prior flight simulator experience in high-performance jets.** The amount of actual flight instruction will be very limited, except where necessary. You're also expected to know how to fly the pattern around an aircraft carrier and land on it.

So: suit up and man aircraft and may the Tomcat be with you!

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June-July 2015

## Forms of Combat Air Patrol

CAPs come in different forms, many of which are no longer in use today. For the benefit of being as complete as possible, I have included them here anyway

- **BARCAP:** Barrier Combat Air Patrol. Flown between the carrier battle group and the compass heading from which it is most likely the enemy will engage.
- **CAP/STRIKE:** primary mission is CAP; secondary mission is a strike mission against ground targets. The aircraft on this type of patrol are not limited to defensive manoeuvres, but may also actively go in pursuit of enemy fighters
- **FastCAP:** CAP for the protection of strike fighters
- **FORCAP:** patrol of fighters for a strike force. In essence an escort
- **HAVCAP:** High Asset Value CAP. Protection of AWACS or tanker aircraft during their time on station
- **MigCAP:** Vietnam war terminology. CAP specifically aimed against enemy Migs
- **RESCAP:** Rescue CAP. CAP that protects aircraft and helicopters carrying out a rescue mission
- **SARCAP:** Search And Rescue CAP. Early version of RESCAP.
- **SlowCAP:** CAP to protect slower aircraft during the Vietnam war. Replaced by HAVCAP.
- **STRIKE/CAP:** primary mission is strike; secondary mission has aircraft assume an air defense role.
- **TARCAP:** Target CAP. CAP flown near/over the target area, protecting aircraft carrying out the actual attack mission.

This document will focus on **BARCAP**.

The missions will take you to a predetermined quadrant in relation to the carrier, where you will take up station, fly the holding and intercept at least one AI target.

## Flight profile of a CAP

For the flight profile of a CAP mission, I distinguish a couple of phases:

1. Launch from the carrier & departure
  2. Travel and climb to assigned station
  3. Arrive at assigned station, fly holding, observe radar
  4. INTERCEPT AI TARGET
  5. Return to carrier and land
- 

### Phase 1 – Launch from the carrier & departure

Right after you've launched from the carrier make a slight turn to the left (waist catapults) or to the right (bow catapults), level wings, climb to 500 feet and stay there until 7 miles from the ship. Keep your speed under control and do not exceed 400 knots!

At 7 miles from the ship, pull up to mission altitude while turning into the direction of your assigned patrol station. A typical CAP is at 20,000 feet, 300 knots.

In the Options menu, make sure the simulation only uses airliners for AI! (uncheck "General aviation")

If you do not set this option, you may find yourself intercepting a turboprop or small aviation aircraft...

### Phase 2 – Travel and climb to assigned station

This phrase has two types of movement with it. The "travel to" component refers to your horizontal movement in relation to the carrier: the distance you have to cover to get to the patrol station. The "climb to" component is the vertical movement in relation to the ground: the altitude at which your patrol station is (as said, typically about 20,000 feet, or flightlevel 200).

A Tomcat has the capability of quickly climbing to an assigned altitude. From there, the horizontal movement really gains momentum, depending on the speed of your aircraft. The following table roughly shows how much distance you can travel in 10 minutes, depending on your speed. Keep in mind that a typical BARCAP station is about 100-150 miles from the ship.

Speed	Amount of time	Distance covered (nm)
360 knots	10 minutes	60
400 knots	10 minutes	67
450 knots	10 minutes	75
500 knots	10 minutes	83
520 knots	10 minutes	87
600 knots	10 minutes	100
650 knots	10 minutes	108
700 knots	10 minutes	117

Flying these speeds for e.g. **15** minutes will increase the distance covered by 50%. So if you need to get 150 miles from the ship, you can maintain 600 knots for 15 minutes to cover that distance.

Keep in mind that I'm **not** counting the distance you traveled right after launching when you climbed to patrol altitude!

Once way of keeping track of your distance is the default FS2004 GPS. It will 'know' the aircraft carriers in the CARR2006 scenery as airfields starting with "AC" (followed by a number). If you set it to the carrier you launched from, the GPS can give you a good indication of the distance travelled.

### **Phase 3 - Arrive at assigned station, fly holding, observe radar**

Once you arrive at your assigned patrol station, adjust your speed to 250-300 knots (use the airbrakes if necessary) and fly a holding. FSNavigator has a nice "Fly holding" function: make sure you create a fix 100-150 miles away from the carrier, right-click it with the mouse and define a logical holding. Use the "FMS" button on the left of the map to gain access to the "Fly holding" button. The autopilot will then start flying the selected holding, constantly adjusting the heading bug to follow that path. Just make sure you keep the speed in the right values!

Activate a radar gauge (if you haven't already. Look for them on one of the leading flightsim sites.).

Study the radar scope. At all times, you should know your relative position to the ship. Where is it? Is an air target going in the direction of the carrier? If so, you must intercept it.

This is a game of using GPS and the radar gauge to determine where the ship is and if an air target is actually heading for it.

Once you notice an AI target heads for the carrier (or if you just feel like intercepting this one for the purpose of the mission), go for it! (see Phase 4)

### **Phase 4 - INTERCEPT AI TARGET**

If you have set the AI settings correctly (see the remark on the previous page), you should be faced with AI targets that – while cruising – have a speed of about 280 KIAS. While leaving your patrol station, you should be accelerating toward the target. However, your speed must be controlled in order to avoid overshooting the target. The aim is to end up flying at equal speed in relation to the target, positioned on its four/five or seven/eight o'clock.

I generally use the following procedure to more or less smoothly intercept an AI target:

1. First make sure you can get to the mentioned position (=somewhere **behind**) in relation to the target. If you are head-to-head with the target, you will need to fly around it at a distance > 10 miles in order to avoid being spotted. So turn 30-45 degrees to the left/right and keep an eye on the radar screen to keep track of the target's position relative to your aircraft. Same goes for a perpendicular course. **Make sure you do not get within 10 miles of the target prior to arriving in its stern quadrant!**

2. Once you are flying in the stern quadrant, depending on the distance between yourself and the target, accelerate to close the distance. Make sure you start decelerating in time! During the last 2 miles, your airspeed should at maximum exceed the target's speed by about 50-70 knots. During the last mile, extend the speedbrakes shortly, to bring the speed to about 310-320 knots and once within 0.5 miles, quickly adjust to the target's speed (as said, about 280-290 knots).

Once you are flying in formation with the airliner, you need to decide how to proceed.

- If the airliner is heading toward the carrier, escort it until it has passed the carrier by 10 or more miles, then head back to the ship and land
- If the airliner is not passing the carrier within 10-20 miles, just escort it until you pass a longitude/latitude of your choice, then head back to the ship and land

At all times, stay behind the airliner until it is time to break away and return to the carrier. Keep a sharp eye on your fuel state at all times!

## **Phase 5 - Return to carrier and land**

Breaking away from the carrier, is simply done by banking away from it, angle of bank 135 degrees and pulling down. The nose will come down and your heading will change rapidly.

Use your GPS to establish where the ship is and turn to that heading. To have a rough indication of altitude control: at 20 miles, make sure you're at 5000 feet, 10 miles at 2000 feet, change course to a point behind the carrier and at 5 miles at 800 feet, turning toward the carrier in a manner that would have you fly by it slightly to the right of the island (the superstructure). Speed: 300 knots, with hook down.

Once you've passed the carrier by about a mile, bank sharply to the left, speed brakes out, gear down below 220 knots, full flaps. Fly the downwind leg, pass the stern of the ship by 15-30 seconds, then turn toward the landing area. **Make sure you've set the ILS frequency on NAV1 and set VOR1 for the correct landing area heading!!**

Now it's up to you to bring the Tomcat aboard in one piece!

## CAP missions

From the instruction document within carr2006.zip:

Ship, Location (& Airport)			Rwy 01 Heading
CV 67	off Jacksonville	(AC01)	184
CV 67	in Persian Gulf	(AC02)	359
CVN 68	in Tasman Sea	(AC03)	133
CVN 68	in Sea of Japan	(AC04)	324
CVN 69	off Oceana NAS	(AC05)	213
CVN 69	off Libya	(AC06)	262
CVN 70	off Somalia	(AC07)	178
CVN 70	off Taiwan	(AC08)	251
CVN 71	in Bay of Bengal	(AC09)	278
CVN 71	West of Karachi	(AC10)	272
CVN 72	off Miramar	(AC11)	209
CVN 73	Lower Adriatic	(AC12)	173
CVN 73	East Med.	(AC13)	351
CVN 74	off Washington	(AC14)	267
CVN 74	off Nicaragua	(AC15)	111
CVN 75	in North Sea	(AC16)	208
CVN 75	off Brazil	(AC17)	213
CVN 75	off Ivory Coast	(AC18)	146

Rwy 01 signifies the landing area heading. So set your VOR1 bearing to that heading in order to line up with the landing area correctly.

The NDB setting for each ship is 3xx, where 'xx' equals the ship's numeral. For example: the USS Kennedy (CV67) has 367 as its NDB frequency.

Each ship has 108.40 as VOR frequency and 110.30 as ILS frequency.

See the below extract from the mentioned document:

Frequencies	
ATIS:	124.0
Tower:	124.8
NDB:	3XX
VOR:	108.4
ILS:	110.3

## Radar gauge

My advise is to download **airadr30.zip from Flightsim.com** as your radar screen. It is an easy-to-use radar gauge that is clear and has nice functionalities. Maximum range is 30 miles. Of course, you can use any radar gauge that fits your choice; this one is my personal favorite. This gauge will display a number next to a radar blip. If it's a positive number, the target is above you by <number \* 100 feet>. If it's a negative number, the target is below you by <number \* 100 feet>. Notice how fast the number changes when you climb or descend toward the target!



## Radio traffic management

Once you are near an air target, open the ATC window. Of course, you will be shown the option to switch to the radio frequency of the controlling air traffic agency in the area. Choose that option. You will probably hear – sooner or later – that the ATC transmits a warning to your target that some aircraft is close (that means YOU!).

**[the target will most probably reply they have you in sight. That is bluff: how can anyone aboard an airliner see you if you're in their rear quadrant?? But ok; it's recreational flight simulation, so don't worry about it]**

More important is that ATC will instruct your target to take a certain heading and/or altitude, so you will know beforehand what your target is going to do. Keep alert for announced frequency changes and try to switch to the new agency before your target does that; you will hear them check in soon after you have set that new frequency.

## Mission list

The list of missions contains one mission in waters bordering the United States of America. The rest of the missions take place from carriers located in waters off what are known as 'hot areas' (either past or present).

### 1 - CAP training

Location: USS Dwight D. Eisenhower (CVN-69), off Oceana NAS

Weather: set 20 miles visibility, scattered clouds, no winds, air traffic limited to airliners

Scenario: launch from the carrier and proceed to a point 150 miles northeast of it. Climb to FL200 and fly two complete 360 degree circles (left hand, 10-15 degrees angle of bank).

Next, practice flying a holding by creating one in FSNavigator (if you have that), using the 150-mile fix as the starting point. Make it a left-hand racetrack pattern with 3 minute legs. Let the autopilot fly the pattern while you monitor AI traffic.

Now it's time to pick a target. Intercept it, guide it for a while [keep track of your position relative to the ship!!], then break away and return to the aircraft carrier.

### 2 - Libya

Location: USS Dwight D. Eisenhower (CVN-69), off Libya

Weather: set 30 miles visibility, broken clouds, winds moderate from 262 (so you have a head-on wind while approaching the landing area), air traffic limited to airliners

Scenario: the general political instability calls for constant patrols that check airliner traffic in the area. At the same time, CAP's should keep a constant eye on the south, where Libyan fighters are most likely to show up from.

Launch from the carrier after determining which area you intend to patrol (yes, this is YOUR call!). Your primary focus will be the Libyan coastline and any air traffic that moves from there to the North, West or East. Watch the radarscope and select a target. Intercept it, establish its identity, escort it for 5 minutes, then return to your original patrol area.

Reassume your patrol station. You can decide to return to the carrier after a while or carry out another interception and return to base from there.

### 3 - Operation Southern Watch (Iraq)

Location: USS John F. Kennedy (CV-67), Persian Gulf

Weather: set 20 miles visibility, overcast, winds light from 359 (so you have a head-on wind while approaching the landing area), air traffic limited to airliners

Scenario: This operation had as its objective to monitor and control Iraqi airspace below the 32<sup>nd</sup> parallel. This was later extended to the 33<sup>rd</sup> parallel (1996). The operation ran from 1992 – directly after the Gulf War of 1991 – to 2003, when Iraq was invaded.

Launch from the USS Kennedy and proceed to a sector just South of the 32<sup>nd</sup> parallel. Take up a holding that puts you on a 270-090 inbound/outbound course to the fix, FL200, 300 knots, leg time: 5 minutes. Monitor air traffic and carry out the following actions at a time of your convenience:

- Intercept an aircraft in the Western sector of your patrol area
- Return to the holding and stay there for 2 cycles (flying two full holdings)
- Intercept an aircraft in the Eastern sector of your patrol area

Then return to the carrier.

#### **4 - Adriatic**

Location: USS George Washington (CVN-73), Lower Adriatic Sea

Weather: set 30 miles visibility, broken clouds, winds 16 knots from 173 (so you have a head-on wind while approaching the landing area), air traffic limited to airliners

Scenario: NATO aircraft are carrying out air strikes on Bosnian targets near Sarajevo (43°52'N, 18°25'E). Your job is to give fighter cover for those air strikes. Launch, then proceed to a fix near the city and start orbiting. Your TOT (time-over-target) should be 30-45 minutes), not counting any interceptions you might carry out. Make sure you intercept at least one AI aircraft, escort it for 5-10 minutes, then return to station, or (depending on the time you spent on station prior to the interception) the carrier.

#### **5 - Eastern Mediterranean, off Lebanon**

Location: USS George Washington (CVN-73), off Lebanon

Weather: set 30 miles visibility, scattered clouds, winds 16 knots from 351 (so you have a head-on wind while approaching the landing area), air traffic limited to airliners

Scenario: Continuing tensions have made it necessary to guard the airspace near Israel and its neighboring countries Syria, Jordan, Lebanon and Egypt. Patrol areas are to the North, South and West of the carrier. This part of the world has a very confined airspace: fighter jets can cross borders within minutes, sometimes even seconds, so potential violations of mutual airspaces are something to reckon with. Take up station at FL200 in the desired quadrant and intercept at least 2 aircraft, establishing their identities. Return to your original patrol station after each interception. Return to the carrier after two interceptions.

#### **6 - Korea**

Location: USS Nimitz (CVN-68), off the coast of the borderline between North and South Korea

Weather: set 20 miles visibility, overcast clouds, winds 24-30 knots from 324 (so you have a head-on wind while approaching the landing area), air traffic limited to airliners

Scenario: Tensions are running high between the UN and the North Korean government due to the threat of their nuclear program. Air traffic into and from North Korea has been made subject to close scrutiny and the USS Nimitz has been positioned in plain sight for two reasons. One is the 'show-of-muscle' element, two is to provision air patrols controlling the air traffic in the region.

Your assigned patrol area is North and Northeast of the carrier. First take off and take station due North. Don't go too far North, or you will end up in Russian airspace! Intercept 1 airliner, escort it for 5 minutes, then return to your patrol station.

Focus your radar attention on the Northeast/East and intercept any airliner coming from there, again escorting it for 5 minutes. Then return to the carrier.

## Aircraft

Of course, the focus of this document is the Grumman F-14 Tomcat. For FS2004, it comes in payware and freeware versions from multiple resources.

My Tomcat of choice is the IRIS F-14A, a very detailed Tomcat package that includes great sounds and wings that sweep backward automatically, based on your airspeed. They can even be 'overswept' after landing in order to minimize parking space taken up. The model is detailed and many repaints are available from the internet.

Visit IRIS at <http://www.irissimulations.com.au/hangar/free-flight-simulator-aircraft/f-14-tomcat>.

Another famous Tomcat is the one created by Dino Cattaneo. That, too, is a very sturdy product that passes the critical eye with ease. Search on Flightsim.com on Dino's name or on 'Tomcat'; you can't miss!

An important note on flying the Tomcat

The Tomcat is primarily a fighter aircraft. It's at its best flying at higher altitudes and speeds. In landing configuration, the Tomcat reacts quite sluggish and keeping the speed at the right level is an absolute must. Before attempting to land the Tomcat on the steel deck, make sure you have made sufficient approaches to and landings on shore-based runways.

The reason I mention this, is that when you launch from the carrier the correct way, arrive on station nicely, carry out an interception correctly and the only thing left in the mission is the return to the carrier, it is an absolute pity to find yourself crashing your aircraft. It is downright frustrating. So avoid ending up in such a situation and know how the simulated F-14 handles in landing configuration.

Drop fuel to make your aircraft sufficiently light (let's say with 8000 pounds of fuel left) for landing, concentrate on making small, but precise corrections when needed. Look at the landing area: meatball – line up – angle of attack, that's your scan!

Use power for vertical speed control and pitch for speed control. As said: you will need prior flight simulator experience and of course on-type experience. If that's all good, you should have no trouble flying these missions, concluding them with a nice #3 wire!

## Interested in simulated naval aviation?

I am! And this has lead to the creation of a number of sites containing naval aviation related flights for FS2004.

If you want to step into a training program based on 1960s flight training, visit

<http://vnavcad.simwings.nl/>.

Successor to this path, if you're an A-6 Intruder fan, is <http://www.simwings.nl/va128/>, where you start out as a nugget to the A-6 community and start getting your on-type training for this legendary attack plane.

For those who would like to check out some FS2004-based flight test experience, I created <http://www.simwings.nl/vntps/> which I based on a real-life blog. You'll get to fly missions in not only jet aircraft, but also in for example a light single-engined plane, a Navy-owned business-type jet and a four-engined turboprop patrol aircraft, to mention a few.

## Conclusion

I hope you like the missions in this document, as well as the missions described in the other links on this page. For me, naval aviation-related missions are the most demanding AND satisfying in the flight simulation realm. From what I heard, saw and read in books and on the internet, real-life naval aviation are the same in real-life aviation.

I recommend reading Stephen Coonts's "Flight of the Intruder" and "The Intruders", Stephen Gray's "Rampant Raider" and Paul Gilcrist's "Feet Wet". Another one – but less easily obtainable – is the published diary of Frank Elkins: "The Heart of a Man".