



Flying the Harrier

Harriers are tough airplanes to fly. Early in it's career many aviators found out the hard way just how hard it was to fly this unique aircraft. By the time the AV8B came along, advances in avionics made flying the Harrier less of a chore enabling the Harrier to reach it's potential in air services around the world.

The AV8B is a Hawker-Siddeley design that was licensed by McDonnell-Douglas for use by The United States Marine Corps. Finding themselves with a need for a close air support aircraft that could be quickly deployed and based, the Marines became interested in the Harrier in the early 70's. Receiving a few AV8A's, the Marines quickly learned that the Harrier was not easy to tame, having lost a few in spectacularly horrific crashes. It became apparent that while the Harrier was not quite ready for Prime Time, there was great potential. Considering that the Royal Navy and RAF were using similar versions with great success, the Marines looked for modifications that could increase survivability, range and payload.

The AV8B was the answer the Marines needed. Upgraded avionics all but removed controllability issues and provided the needed payload for CAS missions.

The Harrier modeled here is an early Airframe used by VMA-331 at MCAS Cherry Point, NC during the 80's. The "bumblebees" have since been retired but the model here is one with the typical European camo scheme used by all Harriers at the time.

Flight School Intro

Flying the Harrier is a unique experience and while I think I get pretty close here, there are some concessions I had to make because of the limitations imposed by the FS2000 engine. Also, Harriers rely on avionic systems to provide stability that is nearly impossible to control manually. Keep that in mind when flying the Harrier because it is very easy to get your aircraft way out of the flight envelope. You will find yourself flying on autopilot a lot. Consider this the stabilization systems.

Important Tip

Nozzles are controlled through the Flaps which DO NOT work as flaps.

Takeoff

Take off is easy. In reality, Harriers often do a “rolling takeoff” or short field takeoff to save fuel. Set the autopilot for departure speed and altitude (usually 300 knots and 3000 feet) and taxi to the active. At the numbers, run the throttle to 100%. Release the brakes if they are set and as you begin forward motion, hit the flaps key (F8) and the harrier should pop up rapidly. Use the stick to keep the nose pointed at a slightly positive AOA.



As the aircraft continues to gain forward momentum, progressively reduce the flaps. The aircraft will gain forward speed. As you pass the 20 knot level, retract the gear and pull the nose to keep the nose up.



By the time the gear is fully retracted and the flaps are raised, the aircraft should be moving at around 200 knots and climbing. Activate the Autopilot for departure and continue on your flight plan. Watch out for the transition, you will have a noticeable pop up as you transition from the hover to forward flight. TIP: Harrier pilots learn to fly with the hover first. Try hovering instead of making the transition a few times to get the hang of it. Use very gentle commands to the stick. Ham fisting the Harrier will put it out of control rapidly.

Forward Flight

Because of the limitations of the MS FS2K engine, I had to slightly overpower the aircraft to enable decent handling in the hover. What this means is that in level flight, this Harrier will begin Oscillations at 350 Knots. The Harrier is a sub-sonic aircraft but it should be able to move a little faster. Limit your speed to around 325kts to avoid losing control. You may also want to consider using the autopilot for level flight to keep the aircraft stable. This is why I put the AP on the panel directly.



The Harrier will VIFF like real Harriers do. VIFFing is known as Vectoring In Forward Flight. During ACM, the Harrier will bank 90 degrees and engage the nozzles causing the aircraft to slide inside of its own normal turning radius! It takes practice but it is fun. Get up a good head of steam, bank 90 degrees and while banked, tap the flaps key (F8) and watch the slide! Don't go too long or you'll go out of control. Tap the F5 key and resume flying normally. This is a real maneuver and it is impressive to see!

Landing

Landing is the toughest part of the flight. You can land normally like any other aircraft but just remember NOT to use the flaps. To make a short field landing or hover landing takes a lot of practice but it can be done.

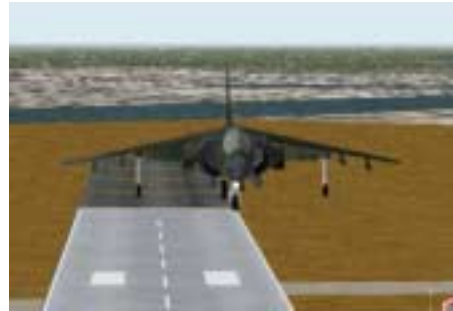
Within 30 Miles of the Landing Site, drop your speed to 150kts. You can easily do this by deploying the speed brake (/). Get lined up with the extended centerline of the runway as soon as possible.

When you're within site of the runway, drop your gear and lower the Flaps one notch. *Watch up for a drastic pitch up when you first lower the flaps! When you lower the flaps a notch, your forward airspeed drops to 40 knots. At this point throttle controls altitude. You need to have a feel for how much power will hold altitude and how much will raise or lower the aircraft. Again as in takeoff, gentle subtle control movements are required to keep the aircraft in control. You're basically balancing the aircraft on the head of a pin!



Pick a landing spot and maneuver towards it, using the throttle to control altitude, stick controlling attitude and rudder controlling direction. Flaps (nozzles) control speed of forward motion, so as you near the landing spot, increase flaps.

With a little practice you can land close to where you 'spot' the aircraft. It is important to note that the amount of flaps will control your forward speed. Full flaps allow hovering by limiting speed to 20 kts. 19knts is stall speed with full flaps but don't worry. Since there is very little air moving across the wings, there is very little effect from departure.



Summary

Things to remember when flying the Harrier:

Flaps are not flaps, they're nozzles!

Gentle Control movements keep the aircraft in flight.

Transitions cause the aircraft to drop or the nose to pitch up, be ready.

Practice. Real Harrier pilots practice just hovering constantly.