



A-10 Attack!

Unofficial Demo Manual v1.2

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Introduction

Note: This manual is meant to be a supplement to the readme file that came with the program, not a replacement.

Soon after the release of Parsoft's A-10 "is so good it's almost scary" Attack Demo, Tim van der Leeuw made up a document containing tips and tricks that the sparse README didn't cover. Being bored one day I started with his document and expanded it a little, oh from 6 pages to the current 37, and I've spruced it up with pictures and a few sample missions to try.

I seem to have a lot of problems taking screen snaps from the game on my machine, so the majority of the pictures in this manual are taken from other sources, notably Tim's original work, ResEditing the demo, Tom Morrison's demo manual, and lately, some truly spectacular action shots by Titus Vegter.

Keys

An overview of all the keys can be found in the original readme file.

Preferences and Performance

Tips and explanation can be found in the readme, which I think is clear enough on this.

View Controls

In most flight simulators the ability to "look around" quickly and easily is a requirement, notably when engaged in air to air combat. Since we sim-fliers are limited by the small angle of view the monitor has, sims must have a convenient and easy method of "turning your head" without too much trouble.

Unfortunately, A-10, like it's cousin Hellcat's, is somewhat weak in this regard. For this reason, it's a good idea to practice the system.

Keys for the different views are the same as in F/A-18 Hornet:

- 1 - Forward view
- 2 - Lower instrument panel view
- 3 - Chase Plane view
- 6 - Tower view
- 7 - Chase missile/bomb view

9 and 0 are used to control the HUD (more on this later).

In all views except the Tower view, you can look around using the arrow keys. In all external views, you can zoom in and out using shift-up arrow to zoom in, and shift-down arrow to zoom out. Looking around with the arrow keys pans your view by 45°. Your view doesn't automatically snapsnap back to the front like in F/A-18 Hornet, one complaint of mine. Another complaint is that you can't look straight up out of the cockpit, 45 degrees is the highest you can get.

The most important view key in A-10 is the '1' key. This key will always return you to looking straight out the front of the plane. Since the other view keys won't snap back to the front when you release them (like in F/A-18 or Air Warrior), get used to using '1' to do this.

A-10 Attack has a "quick reverse" view, you get this by hitting 'rr', that's the 'r' key twice really quickly. The down arrow looks down, not to the rear as it would in F/A-18. Again, I'm surprised they didn't just use R, but who knows...

The '3' key will go to chase view. While in chase view you can turn the view 45 degrees at a time with the cursor keys. I can find no way to "snap" back to rear chase view in the demo. Another nice feature of the chase mode is that when you press the up or down key the first slew will put you level to the horizon. In other words, in addition to all the other angles, there's always an additional one that puts you level with the horizon. The chase view is actually very important in the demo, as there are types of damage you can only see from the outside. I understand this problem will be fixed in the future release version though.

If you choose quickstart Mission I, you can experiment with these different views at your leisure. Try looking into the sun, and watch the "blinding" effect it has...



Sun's blinding effect

With the 'n' and 'N' keys, you can set the clock forwards and backwards in steps of 15 minutes. Enjoy the beautiful sunset and sunrise, see how the sky colours as you change your direction of view? This type of attention to detail is a hallmark of Parsoft.



Sunset looking to the East and South
the sun sets in the east in this demo!

For night missions, you can turn the dashboard lights on and of with '1', and select the NITE mode on the HUD (more on this later) which turns down it's brightness to make it easier on the eyes. Those pilots who have flown at night will notice how realistic the night lighting effect is.



Dashboard at night, with the lights on and off

Basic Flying & Controls

We will now practice some basic flying. Along the way, you will learn the basic controls. Select Quick start mission I if you are not there already. Select the forward view ('1') if you are looking at another direction, or from an external view.

Let's look at using the switches and knobs on the instrument panel.

You can use key combinations from the Read Me to operate all of the controls, or you can use an ingenious 'virtual hand'. To use the virtual hand, press and hold the Option key and move the mouse. When you do this the mouse pointer will change into a hand icon, and when it goes over an "active" button on the control panel, it will turn into an indicator.

For example, if you hold down option and move over the "HUD" knob on the upper left of the control panel, you'll notice that the pointer turns into an arrow indicating that the knob will be turned to the left or right. If the mouse pointer is on the right of the knob, clicking the mouse will turn the control to the right, and you'll notice that the HUD (= Heads Up Display) turns on. If you then move to the left of the knob and click, the control will turn to the left, and turn the HUD off.

Other switches in the cockpit work in a similar fashion, if you click on the HUD control buttons below the knob, you can turn on and off certain items on the HUD. For example, with the HUD on, click the LDR button on the panel to see the effect. Finally, the last type of switch is the toggle, although these are all located in the lower portion of the cockpit. With a toggle you click on the top of the button to move it up, and the bottom to move it off.

In addition to the Option key, you can 'lock' the virtual hand on with Caps Lock. While Caps Lock is down, the virtual hand is on, so you'll have to put it back up to guide the airplane. I have not found this to be very useful.

A number of controls, including the engines and weapon controls, are in the lower cockpit. To use these buttons, press the 2-view to look down into the cockpit, at which point you can change them with the virtual hand.

Now let's take it for a spin.

Turn on your HUD by pressing '0' or use the virtual hand to turn the white knob on the left to NAV. The '9' and '0' keys switch the HUD between various modes. The HUD gives you information about your heading, altitude, airspeed, pitch and other information for weapons delivery. You can get all this information by looking at the instrument panel, but by looking at the HUD you don't need to take your eyes away from the scene of action.

Start your engine by pressing the '='-key, or by pressing the large red button you can see in the picture below, it's in the 2-view.



Engine start button

After a few seconds, you will hear the sound of the APU (= Auxiliary Power Unit) that is powering up. This takes a few seconds and leads many people to attempt a “restart”, just give it a bit of time.

Large engines like those in the A-10 take a lot of power to start up. Older aircraft used generators on the ground to fire up the engines, but the A-10 includes a small jet engine called an APU that acts as a generator. Since it's a small jet engine, it fires up off the batteries, and then the power from this engine runs a generator to start the other engines. The A-10 also uses the APU system because it allows for better survivability, even with both engines shot out, the plane will still have electrical power.

The APU is a small pure-jet, it's the one making the whoosing “classical jet engine” sound when you start everything up. After enough power is being generated from the APU, the main engines will be started. On the A-10 the main engines are turbofans, they make the “buzzing” sound that you'll hear. In a turbofan engine, only a limited amount of the thrust is generated by the jet exhaust, most is generated by a large fan (thus the name) at the front of the engine, it's the fan that makes the buzzing sound.

It's interesting to watch all of this happen in the 2-view. You'll see the APU start to spool up from idle, this is the electric motor spinning it up from the battery power and it's silent. Then when it gets to about 50% RPM, you'll hear the APU actually start, this is when the fuel is added to the APU. The RPM on the APU will now rise very rapidly, and then when it gets to about 60% RPM the main engines will start to turn over and start, at which point the APU goes back to idle again.

When the main engines are fully powered up and idling, you can control their power setting (throttle) with the '-' and '=' keys. In the HUD the display shows throttle position, not % RPM, so the range from 60% to 100% on the engine RPM seen in the 2-view is represented as 0% to 100% “throttle” in the HUD.

Press 'shift-=' for full engine power. You will start to move forward. Lower your flaps for takeoff with one press of the 'f'-key. The flap position is indicated beside the gear position. Notice that the flaps have multiple settings in the Hawg, 10 degrees is enough for takeoff.



Flaps at 10

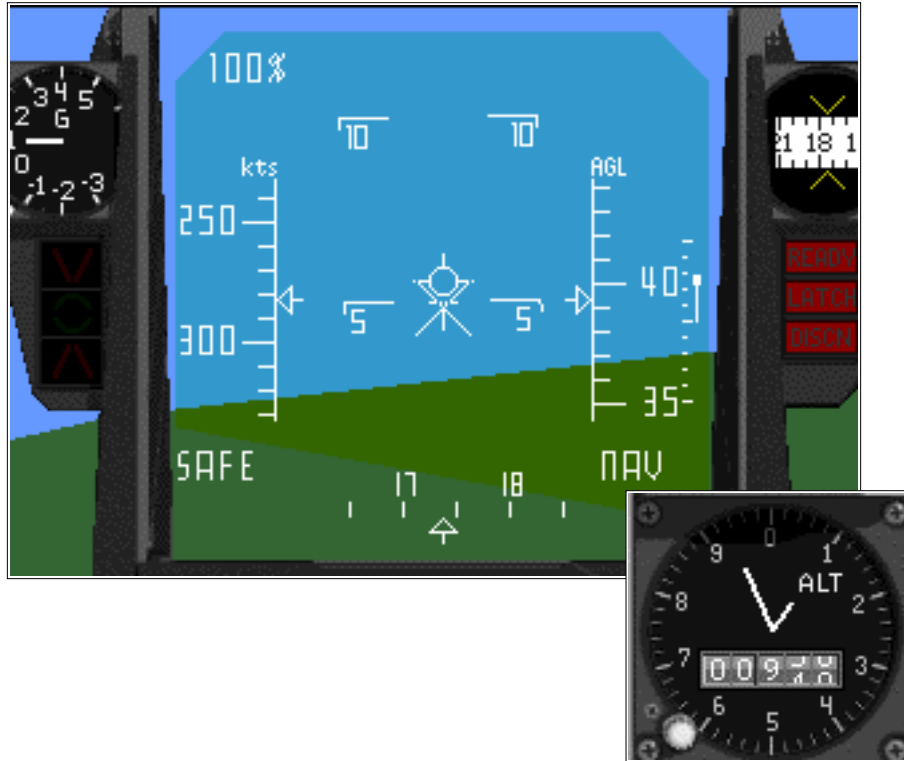
When your speed is around 150kts, pull back on your stick, mouse, or other control device you are using. You will now take off.

Retract your gear with 'g'. Once you are save up in the air and have a reasonable speed, you can give it less throttle and retract the flaps with 'd'. I don't know what a reasonable amount of thrust is, but your autopilot (you can turn it on and off with 'a') usually throttles back to about 50% engine power. If you forget to raise your flaps, once your speed is over 200kts, your flaps will automatically move up to their "clean" position. You can't lower them at or above this speed. Pulling up the flaps and gear is called "cleaning up the plane", and when you're clean the display should look like this...



Cleaned up

When flying, compare the altitude in the HUD with the altitude indicated on the instrument panel. If you fly over the land, you will notice that the altitude indicated in the HUD is a lot lower than what is indicated on your instrument panel.



The two altimeters, 400ft AGL, 940ft ALS
the difference is because we're going over a hill

That is because your instruments give you barometric altitude, or altitude over sea level, while your HUD gives you altitude above ground level, via a small radar on the bottom of the plane. Radar altimeters are very important for low flying planes like the A-10, although they are also used on many aircraft for landing on instruments.

In A-10 the rudders act in a realistic motion - they don't turn the plane they "yaw" it, pointing the nose to one side or the other. Very few flight sims model rudders properly, and without wind effects (which A-10 thankfully includes) rudders are best used in sims for quick aim correction.

They work with the ',' and '.' keys. To center the rudders, press '/'. The rudders have 4 different settings in each direction. Notice that the rudders are not turning the plane, they are yawing it. This means that the A-10 will continue to fly in the same direction (roughly) but it will be pointed to one side. This is how rudders are used to land, you point the nose into the wind with the rudders to keep your path right down the runway, this is discussed later in the section on Landing.

The plane also has some trimming controls. You don't often need this unless you're using a joystick. Using a mouse you can trim simply by moving the mouse a little and calling that "centered". This won't work on a joystick where there is a real, physical center. In these cases, the trim will keep the plane flying right.

Now you are free to practice your flight skills and fly around the island. Among the things to be seen on the island are another small airfield, a radio mast on top of a cliff, a village with several houses and churches, a bridge that connects the main island with a smaller in the bay, and roads between the different parts. Other items to note are the large pond on the north end of the island near the airbase where you started, and the large brown area of land that stretches across the island.

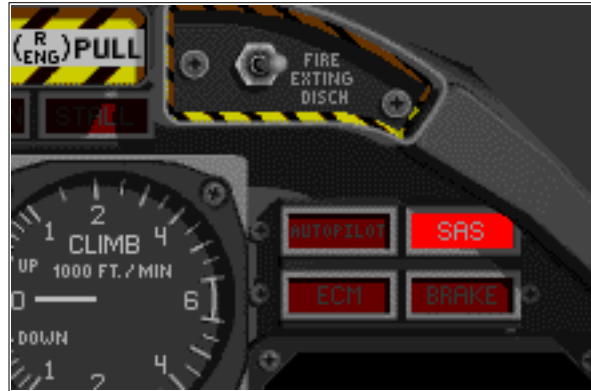
You'll find the Hawg is a pleasure to fly, it's smooth and responsive. You might find that if you really manhandle it it will respond in odd ways though. Be nice to it, and the plane will return the favour.

Advanced Flying Skills.

A-10 Attack has the most advanced flight dynamics of any PC based flight simulator currently available. Unlike most simulators which use "hard wired" behaviours to make the plane fly, A-10 actually calculates what's going on in the world; wind, air pressure, damage to the aircraft etc., are all calculated and have an effect on the way the plane flies. It accurately simulates a number of conditions that will make the A-10 fly "oddly" when pushed. Many planes have such behaviour in the real world, which is typically called "out of the envelop". It's not all that easy to push the Hawg into these conditions, but it can happen easily in combat so it's good to practice them.

Some more advanced flying practice can be had if you try to subtly damage the plane, by softly hitting the ground or a building with one wing. For example, if you knock off the tip of one wing, you'll see an interesting (and very realistic) effect - after leveling the plane out, pull back hard and fast on the stick and you'll notice that the nose comes up, but the plane will also roll quite quickly. This is because there is more lift on one side of the plane than the other (half a wing is missing after all), so the plane rolls towards the broken wing. Experiment with damage, it will be useful later when you receive damage in the combat mission.

The A-10 is somewhat unstable all by itself, so it includes a small gyroscopic system called the Stability Augmentation System. The SAS system makes the plane more stable by automatically adjusting the controls tiny amounts to keep the plane flying smoothly. If you turn it off ('s'), the plane will fly less stable. I still find it easily flyable, but you may find that the wind effects are more noticeable when it pushes your nose around.



“SAS working” lamp

It's possible to take so much damage that the SAS simply gives up. If you see this light go out on it's own, be VERY light on the controls. If the SAS can't keep the plane flying nicely, it means that a heavy hand will quickly make it go out of control.

Many people believe that planes stall by going to slow. This is not the case at all, all wings will stall as some “critical angle” pretty much regardless of airspeed. These stalls, “accelerated stalls” as they are known, typically happen when pulling very tight turns.

The best way to practice this is flying tight high-g maneuvers close to the ground. When you're pulling really hard you'll start to hear the stall warning go off, it's a loud solid tone. Since this happens just before the plane is stalling, and means you're flying the plane at it's best possible performance. If you pull harder at this point, the stall warning will start to beep, and you'll eventually stall.

In a turn like this, if you think about it, the “inside the turn” wing is going slower than the outside wing. This means that it's possible to stall one wing at a time. It's this condition that leads to what is known as a spin, which is bad news.

The A-10, when undamaged, is tough to spin, but you will notice some of the pre-spin effects. For example, if you get your stall warning beeping in the turn and then REALLY heave back on the controls, you'll notice that the nose will pitch down towards the ground. This is because the inside wing has stalled and there's no lift on that side of the plane. This is dangerous if you don't expect it, so try it a few times so you know what to expect. All you have to do to get out of this condition is to ease off one the stick a little.

Make sure to practice your low level flying. This is the key to surviving in the A-10.

Landing.

To land, fly towards one of the airstrips and try to align as much as possible with the runway from a distance of about 3 miles. Try to cut back your speed to under 200kts

using your airbrakes (spacebar). Throttle back to somewhere between 15%-30% (at least that's what I do; no official guidelines are available). Lower your flaps all the way and drop the gear. All the while, try to keep your nose down in a shallow dive. Keep an eye on your ground altitude. It should be under 100ft, preferably around 30ft-50ft, when you are close to the runway. Try to keep your plane in a steady dive, but minimize your sink rate to minimize the shock of touchdown and prevent damage. On touchdown, stop your engines and put on your breaks again. Touchdown is at an altitude of 7ft agl.

When you feel more confident in landing your plane, you can try to land on any surface. Don't worry about trees on the ground; they won't damage you.

Wind is most noticeable when you're flying slow (the relative speed is higher) and you always land when you're flying slow. The wind in the demo can be really annoying, but practice will help. The trick is to use the rudder, dip one wing slightly into the wind, and use the rudders to point your nose back at the runway. This will make the plane "turn" into the wind and correct the drift, but you'll still fly towards the runway. This is called a sideslip, and although it's hard to master in the game (it's easy in the real world) sideslips are the most universally effective way to land in a crosswind. This is tough to do in the demo because it's also gusty, simply pick a correction that seems to average the gusts out.



Turning "direct to the threshold" at night

Landing is the end of any mission, so it's a good idea to practice it. In the "real world" you do this by repeating "the circuit", a large square with the runway forming one side of the square. The A-10 is a little faster than the props I'm used to, so I did circuits until I have my landings DOWN.

If you'd like to try circuits, it's easy. Start the mission and note the direction you're facing with the compass, it will be 180, or due south. Now start up and take off like normal, but spool back the engines to about 50% as soon as you're airborne. After flying for about 30 seconds, make a 90 degree turn to the left, and fly for 30 seconds. Again, make another 90 degree turn, this time you should have the runway off to your left. However, don't wait 30 seconds this time, wait until the end of the runway (the one you're going to land on) is 45 degrees off to the rear. Now make another 90 back towards the runway, if you did this when it was 45 degrees off, you'll still have it on your left. At this point, start slowing down, get the throttle down to 15%-30%, use the breaks, and get the flaps and gear down. When you see that you're almost lined up out the left side, turn into the runway, you should be lined up about a mile back for a perfect landing.

What I've described here is what is known as the "standard left hand circuit", although I've lengthened all the sides to allow for the higher speeds of the plane. In the "real world" the goal is to start the first turn when you get about 500 feet up, and level off at 1000 feet (agl) on the long leg beside the runway, known as the downwind.

Flying Mission II.

Once you are familiar with the island, start playing with Mission II.

When you start Mission II, you'll notice several changes. For one, you're parked at the other airbase on the south side of the island. If you flew the first mission enough, you'll remember where the "first" airbase is, which is important because it's now in enemy hands. Another change that you won't notice until you get airborne is that the wind is stronger, and more gusty. You'll find that flying and aiming with the wind is a challenge all by itself. Get used to these effects, and the effect of the overcast sky, which is to make it very hard to spot other airplanes.

Another thing you'll notice is a number of new items in the world, including the Nimitz and Brest off to the south east, a pair of hydrofoils in the bay off the east end of the runway, and a number of enemy radars and MiGs on the north side of the island.



Other Controls

The HUD

Most sim jockies are familiar with a HUD (= Heads Up Display). HUDs are a fairly recent addition to aircraft, but they've proven so useful they even appear in some airliners now. The idea of a HUD is to allow the pilot to keep his head up out of the cockpit and look out into the real world as much as possible. To do this, the computers on board project useful information like airspeed and altitude onto the gunsight that already existed in most warplanes.

The HUD controls are all located in the panel in the upper left of the dash.

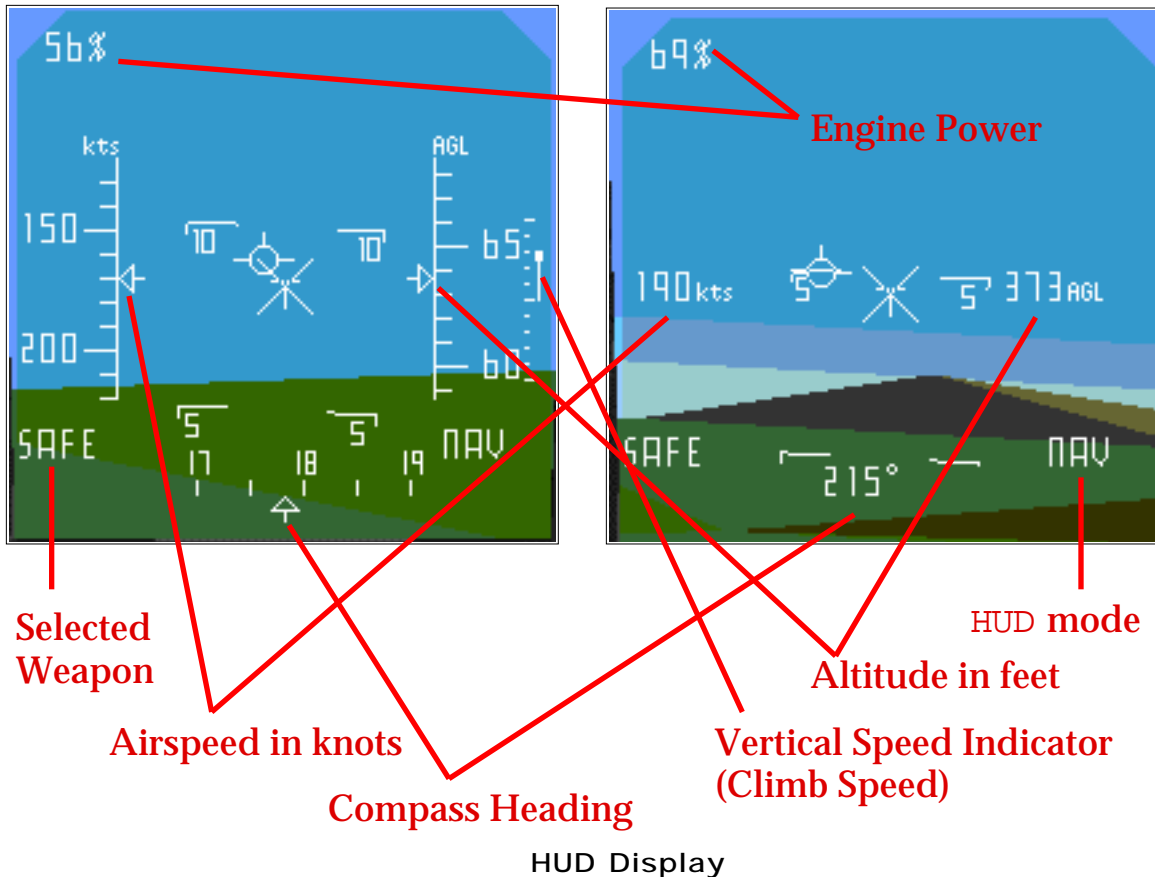


HUD Controls

We mentioned that the HUD reads altitude above the ground, but you can switch the HUD between barometric altitude and ground altitude with the 'b'-key, or clicking on the BARO button on the panel. Current setting in the HUD is indicated by the letters 'agl' or 'msl'. Above a certain altitude the radar altimeters cannot "see" the ground and simply stop working. I do not know if this is simulated in the demo.

HUD with 'TAPE' on

HUD with 'TAPE' off



There are a number of other display options for your HUD that you can select with the virtual hand. We have already seen the barometric altimeter, but you can also choose to remove the pitch-ladder with 'LADR' or the speed/altitude/heading tapes with 'TAPE'. These will be replaced by numbers. I prefer this display, because it is less cluttered.

The MFD

The MFD (= Multi Functional Display) is basically a TV screen in the cockpit. Unlike older airplanes where every display could have only one function, the goal in recent years has been to use a smaller number of displays with a larger number of functions - thus the name. This has been taken to its ultimate form in modern airliners in the form of the "glass cockpit", where there are no mechanical displays at all. Everything from radar to engine instruments to an artificial horizon are all selected and displayed on one or more computer monitors.

The A-10 is an older plane though, and its MFD does not have as much functionality. In the "real world" it's important for use with Mavericks and other such guided weapon systems, but in the demo you don't have these.

In A-10 Attack you'll find the MFD on the right side of the cockpit. The only thing it can do in the demo is a test or a damage readout. The damage readout might occasionally be useful. It doesn't display all damage; damage to your gear is shown in the gear indicator and damage to your wings isn't indicated at all (though you will see a control malfunction warning). When in the damage mode, the MFD's display will look like this...



MFD's Damage display

The Radar Warning Display

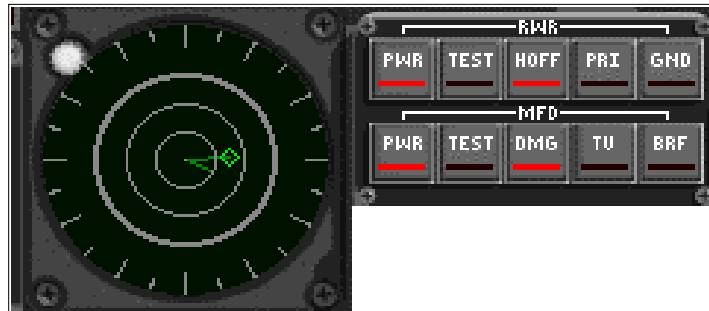
The A-10's purpose in life is to fly low, slow and kill tanks, and for this reason the A-10 has no radar. Although marginally useful in some circumstances, the added weight, cost and complexity of a radar system is just not worth it for the A-10's mission. Radar is typically used for air to air use, and if the A-10 is needing it for that purpose, you've lost the war already. Perhaps even more dangerous to a plane like the A-10 is that radar is based around a huge radio broadcaster, which everyone else can tune to and see where you are. Turning on a radar is a far better way to tell people where you are, or even that you're simply "out there", than a 50ft neon sign tied to the plane.

On the other hand, planes like the A-10 that are trying to stay away from planes can use the other plane's radar to their advantage, by listening to where this signal is coming from. For this reason the A-10 (and most other combat planes) includes a Radar Warning Receiver. This is a passive device that's basically a smart radio receiver, and since it's passive no one can use it to track you. It's tuned to several "stations", the frequencies that common radars use, and from the signals it gets it can figure out what that radar is most likely attached to. It then tells the pilot where that signal is and how strong it is.

The idea here is that you can use this to fly around hostile forces. By watching where the signal is and how strong it is, you can make sure that there's not enough of a signal for them to lock onto you. Remember, for you to see the radar signal, it only has to get to you... for them to see you on their radar, the signal has to get out to you, bounce off, and get all the way back again. This means that if their radar is turned on, you'll see them a long time before they see you. In the words of Monty Python "Run Away! Run

Away!”.

In A-10 Attack, the RWR is the round display just left of the centre of the instrument panel, and has some associated controls in the center portion.



RWR Display

note the two “strokes”, one selected with HOFF

It’s always on as soon as you start the engines, so there’s nothing you have to do to “get it working”. However, you can turn it on and off with the PWR button located in the middle of the panel.

When you’re on the ground, you won’t see anything on the RWR. This is because radar signals are line-of-sight, and while you’re in the runway all the radars in the game are either below the cliff to the south or over the hills to the north. This is another area where A-10 really shines, the radar is VERY realistic. Oddly enough, there is a radar on the control tower, but it doesn’t show up on the RWR for some reason.

To test it out, simply get airborne in Mission II. Soon after cleaning up you’ll see two long lines appear in the RWR pointing forward and to the right. If you look to the right at this point you’ll see the Nimitz and Brest, both ships with very powerful radar systems. The reason the signals suddenly appear “out of nowhere” is that you’ve got enough altitude to see over the cliff. If you take off looking out to the right side, you’ll notice that the RWR “strokes” appear soon after you clear the cliff and can see the ships.

The longer the line drawn on the RWR (known as a “stroke”), the stronger the signal. The signals from the ships are very strong, and thus the line in the RWR is right to the outside ring. Remember, **the line points to the radar, and the length is the strength.** This is important to remember, because a longer line typically means a closer and more dangerous source.

Another part of the RWR system is the small red R light just above the RWR display itself, and a speaker that you can’t see, but can hear. You’ll see this light flash every time a radar “pings” you, and will beep if it’s an enemy radar with enough strength to see you. If you see it light up and stay lit with a solid tone, someone not only sees you, but is locked onto you and is most likely firing at you too. When this happens you’ll also notice that one of the lines on the RWR will turn brighter, that’s pointing at the

radar that's tracking you. Run away!

Press 'h' to "handoff", or select different radar targets. The selected target will have a diamond at the end of it's line. I don't know what good this does, it's most likely only useful for weapons that attack radar sites, like HARMs.

With the switches to the right of the RWR, you can control what is being displayed. 'PWR' turns the RWR on and off; 'TEST' will initiate a test sequence, 'HOFF' selects the next target if any are available (the same as the 'h'), 'PRI' will show only the 5 most important targets and 'GND' will show only ground targets. You have to use the virtual hand to select these modes. There seem to be a few problems with the PRI and GND buttons in the demo.

You'll note that as you fly behind hills, the lines will disappear. This is the whole idea of flying low to the ground. Since radar is line of sight, if you fly behind a hill they can't see you. The trick is to use the RWR to figure out where they are, run behind a hill and fly towards them, and then pop up really quick and hose them down with the cannon. This effect, "nape of the earth flying" is very important. A-10 Attack is the first Mac game to correctly simulate this effect.

In the "real world" there are missiles like the HARM, Shrike and Tacit Rainbow that will track these radars and kill them for you. None of these are available in the demo, but I fully expect some of them to show up in the full version.

There are a number of enemy radar sites in Mission II, most of them attached to something deadly. On the brown area of land are three "Zoos" (more on these later) as well two more near the airbase. I'll let you find the later two on your own as a test, they are difficult to see. There's also a SAM launcher at the airbase itself, we'll be attacking it later in this document.

Another target that has radar are the MiGs. They have a powerful radar in fact, and this means you can typically find them by looking for spikes on the RWR that point to items that would have to be out in the water. If you see something like this on the north side of the island, you've most likely found yourself a MiG. Remember that your RWR will see their radar before their radar sees you. This gives you a chance to get lined up for a Sidewinder shot before they start to hunt you down. The MiG's have an RWR too, aren't you glad you don't have radar now?

If you watch carefully, you'll see how well the radar simulation in the game works. If the MiG is turned away from you, the line will be short, but as he turns into you, it will suddenly grow MUCH longer. This is very realistic, and represents the direction the radar dish on his nose is pointing. In fact, most of the time when I'm tracking one down, the line will start short, but as I close on them they see me and turn around.

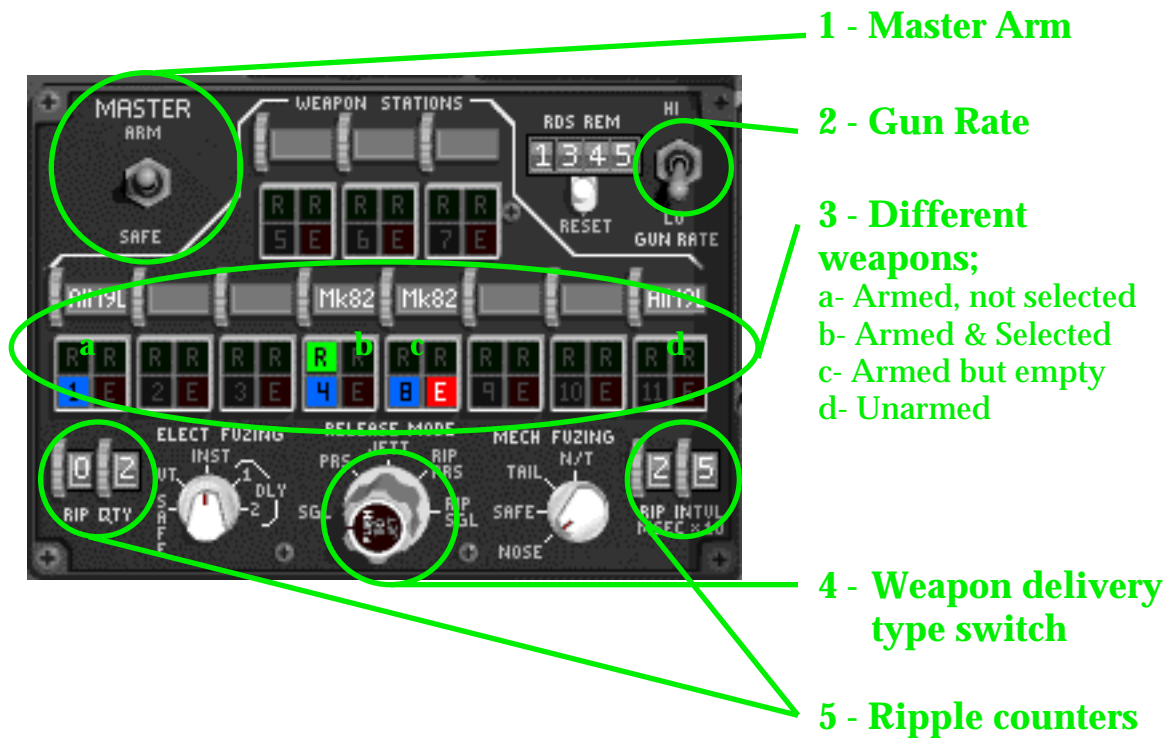
Later in this document we will look at three typical missions. In all three you'll need to use the RWR. Yes, it's that important.

Offensive Weapons Control & Use

We will now look at the reason you downloaded the demo, to see what A-10's combat is really like. Select Quick start Mission II for this section.

Weapons Systems.

Arm your weapons by first setting the master arm switch to on (or using the 'm'-key), then pressing the function keys to arm a specific station. Look at your lower instrument panel to find out what weapons are on what stations.



Weapon stores controls

You can select a station by clicking on it with the virtual hand, or by pressing that function key. For example, you can select the sidewinders by pressing F1, because there are Sidewinders on station 1. Also notice you can select multiple stations, more on this later.

When a station is selected, the blue light will turn on, and turn off when you “de-select” it (or press F12 which turns off everything). If there are no items on the station, the red E light will turn on, meaning “Empty”. Finally, if master arm is on and a station is selected, the next item to drop will have a green light turned on, so if you select multiple stations, the one with the green light is the next to drop. Notice that each station has two green lights, this is because each station can hold two of any item. It appears that if you select multiple stations, the LAST one selected is the next to drop.

If you look at the station controls you'll notice thumbwheels above the station lamps. In a real A-10 the pilot rotates these to tell the fire control system what's attached to that station, or that it's empty. The game apparently does this for you.

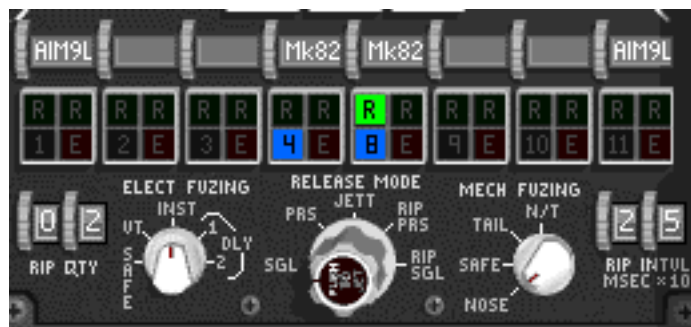
Several release modes for bombs are available, controlled by the knob on the lower panel, or with the complex 'r' key system described in the readme.



Ripple controls

Basically there are 4 modes, SGL, PRS, RIP PRS and RIP SGL. The first two mean...

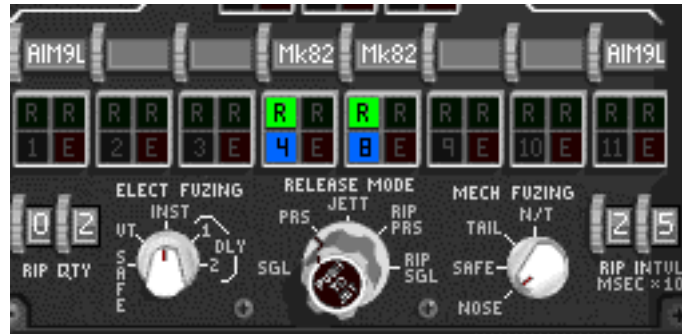
SGL: Release a single item from the selected station(s). For example, if you select station 4 (the Mk82's) each "release" will drop one bomb. If you hit Return/Enter twice, the station will now be empty. If you select station 4 and 8, a bomb will drop from 8 first (that's the LAST selected station if you clicked on, 4 then 8) then one on 4 will drop, then one on 8, then one on 4 at which point you're empty again.



Stations 4 and 8 selected

note the R light on station 8, it's the next to drop

PRS: Release a pair of items from the selected station(s). If you select station 4, both bombs on that station will release. If you select 4 and 8, one will drop from each. You typically use this to keep the plane balanced in flight, if you were to release both bombs from one station, the other side of the plane will now be heavier (yes, it does take this into account). If you use PRS with both stations selected, it will keep itself balanced. Admittedly, this is not all that important for Mk82's at 500lbs each, but with Mk84's or other heavy items it helps a lot.



4 and 8 selected, dropping pairs
note that the R lights on both stations

It's also possible to select odd combinations of stations, the A-10 is not smart and will allow you to select, say, station 1 and 4. If you're on PRS and fire, it will launch a Sidewinder from 1 and a bomb from 4!

Ripple controls.

Ripple is a method of dropping a bunch of items all at once. Although this is not all that useful in the demo, it's very useful when using rocket packs or cluster bombs. The idea of ripple is that each release will drop xxx number of items from the selected racks, dropping each set after yyy milliseconds. The controls for xxx and yyy are on either side of the rack controls, and consist of pairs of thumbwheels.

On the left side you'll find the control for "xxx". When you start up it says "0" and "2". This means if you select RIP SGL, it will release 0 ripples (one drop) of 2 items. In other words, two bombs will drop. To see this, simply turn on the master arm, select stations 4 and 8, and select RIP SGL. Notice that the green lights on both 4 and 8 turn on. This means it's going to drop one from each - a total of 2 bombs with no ripple. now flick the 0 to a 1, notice that all the lights are green now. This is because it's going to ripple once (2 drops in total) of two bombs, that's four bombs. Try the same experiments with only station 4 selected, you'll get the hang of it.

On the right side you'll find the control for "yyy", in milliseconds times 10, or "point seconds" really. When you start up it's set to 25, that's 250 milliseconds, point 25 seconds, or 1/4 of a second. This control is only useful if the ripple amount is more than 0. If you select a ripple count of 1 and release 1 item each time, with 25 in yyy what will happen is that a bomb will drop, then 1/4 of a second later another will drop. If you had 2 and 2 as the ripple settings, 2 bombs would drop, then 2 more a 1/4 of a second later, then 2 more 1/4 of a second after that. Using the ripple controls you can quickly drop a large number of items nicely spread out.

RIP PRS: Release ripple of items from each of the selected stations. Note that this means it will release TWICE the amount in the ripple settings! In this picture I have selected RIP PRS, and since the ripple count is 2, it's going to release 2 pairs of bombs, or all four bombs. The arm lights on all four thus light up.



4 and 8 selected, rippling pairs
all the R lights are on, a pair will drop, then another

RIP SGL: Release a single ripple from the selected stations. In the picture below I have selected the two stations, and selected RIP SGL. The result is going to be one bomb from each dropping.



4 and 8 selected, rippling singles
after this drop, the other two R lights will come on

In this picture I have the same selection, but I've changed the ripple settings to do one ripple (TWO releases...) at 500 milliseconds, or 1/2 a second. The result is that all four are armed, two will drop, then another 2 1/2 a second later.



4 and 8 selected, rippling singles
but this time each ripple drops 2

Complex, I know.

Using the cannon.

The easiest weapon to use is the cannon. It is always available once the master arm is on and you have lifted off. You can switch between fast and slow fire with the 'c' key or by toggling the switch in the 2 view. Fire the cannon with the mouse button or with keypad-0. Your cannon is very capable and will blow up most buildings as well as the planes and smaller boats. The cannon has a LOT of recoil, if you fly flat and hold down the trigger with the cannon on "fast", you can see the airspeed drop. This may be something to consider when flying slowly, you don't want to stall out.

Practice using the cannon, because it looks like (unlike the "real world") it's going to be the most effective weapon overall. A great way to practice is to simply get airborne and then nose over to the water and strafe the hydrofoils in the bay. You'll find that the wind can be rather annoying when lining up for a shot, this is one area where a rudder pedal setup seems to be almost a requirement. The hydrofoils will blow up, but it might take you a few passes to do it.

Notice that the cannon rounds always hit somewhere. You can use the splashes in the water or the ground flying up from the misses to help your aim. It also looks really cool.

Using the bombs.

You can "blind fire" bombs by selecting them, and pressing return with the HUD in NAV mode. However, with the speeds and altitudes that the Hawg operates at, this is not really an option, you won't be able to push over and get a lot of speed like you do in Hellcats.

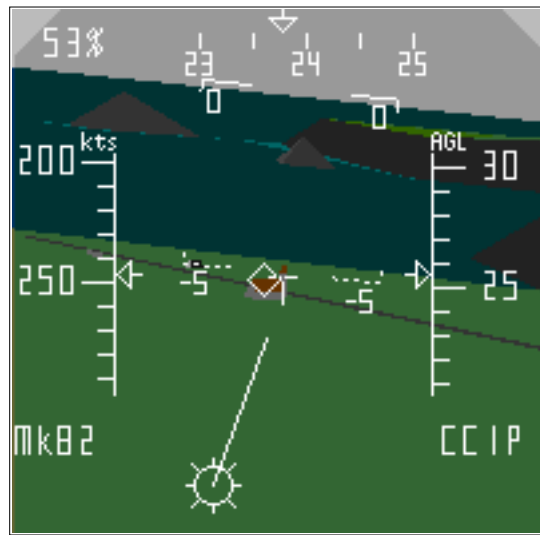
However, this is why most modern aircraft have some sort of bombsight to help you out in this operation. In the A-10 you have a HUD mode called CCIP (= Continuously Computed Impact Point), which calculates where the bombs will fall based on the speed of the plane and other factors. CCIP mode requires you to select a target for the system to calculate when to drop, here are the directions.

Select CCIP on the HUD mode knob. When you're flying along and see your target, point the nose of the plane at it so that the small T shape in the HUD is right on top of the target. Now press 'Return' once to select a this target, this won't fire, it will just select the target (this is called Pickling). If you targeted wrong, press 'DEL' to clear the target and try again.

A diamond will appear in the HUD over the target, at this point you can pull the nose up and fly level. This is the idea of pickling, once the computer knows where the target is, you can fly level and not have to dive at the target. At the same time as the diamond appears, you'll see a line pointing down from the marker. Although you can't see it because it's "below" the HUD, there's another marker down there that's showing you where the bombs will hit if you release them right then, this is called the "release

reticle". The idea is to keep this line pointing straight down from the marker in the HUD (not always easy with the wind blowing you around) as eventually the marker over the target and the release reticle will be on top of each other, at which point the bombs automatically release. You can also manually release them by pressing Return again.

To practice bombing, pick any obvious target, let's say the church. Take off and clean up the airplane. Select stations 4 and 8, and turn on CCIP in the HUD. Now you're ready. You'll find that when bombing everything seems to happen too fast, the easy way to solve this is to fly slowly on a low throttle setting, keep your speed around 200 to 250kias and you'll be fine. Now fly level until you're close to your target, when you get there, push forward on the controls to point the nose at the target. When the T is on the target, pick it with Return. Now pull the nose back to level (or slow dive so you can see what's happening) and keep the line straight up and down. Eventually the bombs will fall away from the plane automatically.



CCIP HUD

This picture shows the run on the church. The target reticle is right on the church, and the release reticle is starting to become visible. In this case it's most likely not going to be a good run, as the line isn't vertical, meaning the bombs are going to fall off to one side, in this case to the left.

I seem to have a lot of problems getting the CCIP system to work properly. One thing is that it seems that it always targets just on the far side of the target you pick. I've since simply practiced eyeballing the drops with the NAV HUD and dropping when it just looks right. Practice makes perfect!

Using the Sidewinders.

Sidewinders are fired by just pressing Return. There is no HUD for Sidewinders, so you

might want to select NAV, because if you're in CCIP your Return will simply paint some part of the ground with a marker instead of launching. You'll also want to make sure that no bomb stations are selected, because for some reason they get dropped "first". For example, if stations 1 and 4 are selected, even with 1 being the last to be selected, it will drop a bomb. You'll also typically want to be set to SGL or PRS release mode.

To use the Sidewinders, simply select one of their stations, and point at the enemy plane. You'll hear a soft, fast beeping sound. When it gets louder, the missile has locked on, fire with the Return. It's that simple to launch them, it's not so simple to get a kill. You might want to practice locking them up with the C-130 at your airbase in Mission II.

Defensive Weapons Control & Use

In case you think someone has launched a missile at you, you can try to spoof the missile using chaff and flares. The same keys are used as in F/A-18 Hornet: “;” and “’”. Unlike F/A-18 where the number of chaff/flares released is always one, in A-10 you can select the “ripple” amount with two controls that are right under the engine start button.



Chaff and flare controls

The demo does not actually have any IR guided missiles that I’ve run into. For this reason you won’t have a chance to test the flare release effects. However, there are several targets (described later in this document) that will attempt to track you with radar, so you may want to experiment with chaff as a way of blinding them.

In addition to the flares and chaff, the can carry an ECM (= Electronic Counter Measures) device. ECM is somewhat similar to the RWR, but instead of simply reading the signals, it will attempt to send out signals of similar frequencies in an effort to “blind” the tracking radar with noise. Against older tracking systems, this can be very effective, and can reduce the effective range of many radar tracking systems. However,

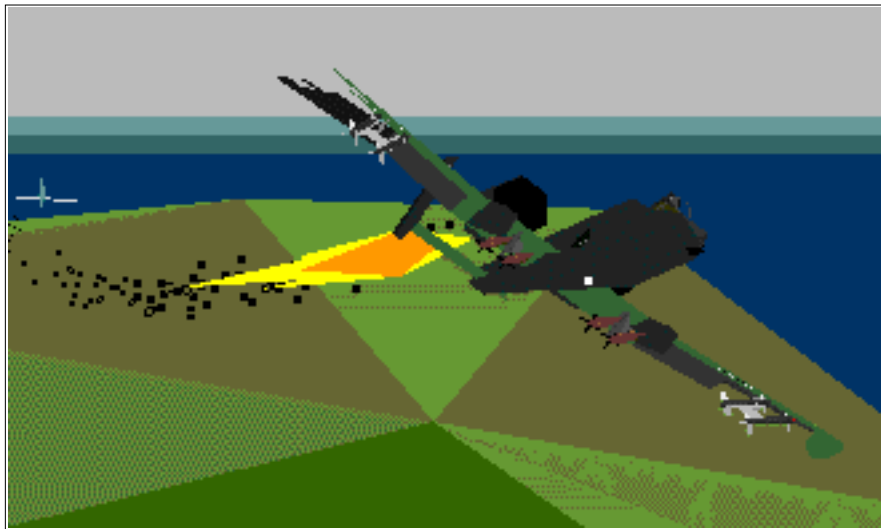
I am unable to operate the ECM in the demo. I assume is because the plane has no internal ECM and must carry one on a pod externally, which is not supplied in the demo.

Dealing with Damage

Earlier in this document we talked about getting used to damage on the aircraft. In both real life and the demo, the A-10 can take a LOT of damage and still fly home. In many cases dealing with damage is as easy as knowing what's happened, and then making sure you know how the plane is going to fly under those conditions.

If you hear the plane getting hit, you may not see any indication of damage inside the cockpit. However, I always turn the MFD to damage when I start up, just to be on the safe side. If your gear is damaged (stuck up or down), the indication will be in the gear indicator on the left. Some damage, like a broken wing or tail, can only be seen by taking a look from outside in Chase view, I understand this will be fixed in the release version.

One thing that you'll need for sure to get home is your engines. If your engines get damaged, there's a chance that they will catch on fire. Although it looks pretty from the chase view, an engine on fire is not a good thing, so you can try to extinguish the fire by pressing the 'z' and 'x' keys for your left and right engines, or by pulling the large black-'n-yellow striped button at the top of your instrument panel. You can tell what engine is on fire from these handles too, they will flash red.



Right engine and wingtip out

The first thing you should do when damaged is to turn around and go home. However, this is a demo and there's no "points" to be gained, so I typically fly until I die.

Combat

This section will outline a few sample combat missions you can try out to get the hang of the game.

Air to Ground Mission: Airbase closure.

In this mission we're going to fly to the enemy airbase, and close it by dropping four bombs on the runway.

Complicating matters are the fact that the hill to the east end of the island contains several Zoo anti-aircraft guns, so we won't fly over there. There's also a SAM launcher at the airbase itself that we're going to have to deal with, we can't fly around it and still bomb the runway. And don't forget the MiG's, although they most likely won't bother us on this mission, keep an eye on the RWR for them.

Ok, we know the Zoos are on the east end of the island, and I've developed three ways of dealing with them. The first the way to avoid them is to fly high over them, out of their reach. This requires a few minutes of climbing out. Another way is to fly around to the airbase from the west, avoiding them altogether. Finally, you can fly directly over them a low alt really hauling, but that's the tough way. I typically start this mission by cleaning up and making a quick 90 to the left and head right over the hill at low level. Once over the hill (mountain as the case may be), start turning slowly to the right to head to the airbase, the nearest zoo will be about a mile off to your right.

Ok, now it's time to arm up. Select stations 4 and 8, turn on master arm, and select high speed on the guns. Continue on your way, and select CCIP as the HUD mode (you might want to turn off the LADR's and TAPE to clean up the HUD a bit). We're going to have to deal with that SAM, and without a Mavric, we'll have to gun it into submission.

At this point you should be flying low over the water, heading almost due east. You'll see the SAM's radar when you start to close on the airbase, and he may fire at you. Don't worry about it too much, just find him (parked on the west side of the runway), fly straight at it and hose away at the gun. Correct your file by watching where the shells hit the ground and kill that SAM.



Lining up on the SAM
 oddly enough it looks like an American Chaparell

Once the SAM is dead, head back out over the water and pull up to about 1000 feet. Do a slow turn as if you were lining up for a landing. When still a good distance offshore, pick the middle of the runway. Now pull the nose back up into a shallow dive and drop the the Mk.82's so they hit the middle of the runway. This is easiest to do with the ripple commands set to 1 and 2, and both stations selected.

At this point you should be pointed south toward the Zoos, there's a zoo on either side of the airbase, and the MiGs are most likely off to the east. Your RWR will be lit up, and this is a good time to practice using it to get home without being seen.

Air to Ground Mission: Defence suppression.

Another important mission for the Hawg is killing ground defences, most typically in a tactical role because there are Wild Weasel planes for just this task on a more "formal" basis. In this mission we'll be using the A-10's survivability to win the fight, rather than any fancy electronics.

Defence suppression is an incredibly dangerous job, you have to fly right at the AAA or SAM which is going to do it's best to kill you. In this mission we're going to be dealing with the Zoos, which are far deadlier than the SAM at the airbase.

Start up the same way as the last mission, but as soon as you get airborne, drop the bombs. They could be useful on the Zoos, but I've found that they are VERY hard to hit so you may as well rid yourself of the extra weight. Fly towards the enemy airbase, but fly right at it this time. This will take you right over the Zoos.

As you get over the hill, you'll see a number of short lines, that seem to be pointing

towards items on the brown portion of the ground. These are the Zoo's, or to be exact, ZSU-23-4's. As you fly towards them, you'll notice that the lines will grow longer and longer, and then finally they will see you. At this point you'll start to hear the RWR beeping - this means you are being tracked. After getting a little closer, the RWR will start giving out a solid tone, the R light will go solid, and one of the lines on the RWR will get brighter. This means that that radar is now locked onto you, and if you look in that direction you should see yellow tracers flying up at you.

You're going to find it difficult to kill them, they're small and you're going fast. Slow down as much as possible to get a good run at them, and use the RWR to line up on them before they are even visible. Another annoyance is that one of them is on a "shelf" halfway up the hill. Although this makes it very easy to spot, it also means you have to climb up a good distance to get a shot at it - which means it's got a great shot at you too. Two of them are grouped together, the third is "around the corner" to the east by itself, which makes it somewhat safer to go after that one. There are another two of them stationed near the airbase, but that's for you to hunt down with the RWR.



The ZOO

The ZSU-23-4 is a BTR-80 tracked APC body with a turret on top that carries four 23mm guns (thus the name "23-4", there are also ZSU-57-2's and ZSU-30-2's) and a search/track radar. The ZSU-23-4 is the most popular mobile AA gun in the SovBloc forces, and is widely exported. Updated versions of the Zoo, along with the more modern S-300/ZSU-30-2 Tunguska system, form the basis of the SovBloc air defence system which is easily the best in the world.

The Zoo's radar is somewhat old by today's standards (although there are new versions with fully digital fire control) and can take a fairly long time to lock onto you and slave the guns, up to 20 or 30 seconds. This seems to be very well modeled in the game, you'll see their radars on your RWR for quite some time before they notice you and start tracking. In fact, this is what allows you to get good at killing them, you can "pop-up" over the hills and gun them before they lock you up - the pop-up technique is most used by combat helicopters which can hover behind cover and collect information from ground forces before firing. The A-10 is somewhat hampered in this regard because it has to keep moving forward at several hundred knots to stay in the air.

Once locked on, the guns are typically fired in 3, 5 or 7 round bursts (although there is a 30 round burst mode too apparently), but the demo always fires in threes. I've always found these numbers odd though, with four guns you'd expect 4, 8 and 12 round bursts.

The 23mm gun the Zoo uses is a old and popular one with SovBloc forces. It should be pointed out that the A-10 was designed specifically to survive exactly the 23mm shells the ZSU fires, and I've yet to be shot down by a single hit in the game. Then again, I have been shot down by multiple hits in the game, so don't take them lightly.

The Zoo can also be "blind fired" by optical means without turning on the radar. This can be quite annoying because you'll never have any warning that they're out there, you'll be flying along happily when your plane disintegrates around you. Luckily, they don't seem to try this trick in the demo, nor is firing on a fast moving aircraft without the help of a fire control system all that easy or accurate.

For those of you who are interested, there's a perfectly preserved Zoo sitting at Duxford outside Cambridge. If you ask them really nice, they'll let you inside... sadly they won't let you inside Black 6 (Duxford's flying Me-109G) no matter how nicely you ask.

Air to Air mission: Hawg vs. MiG.

Simply put, the A-10 is not an air to air fighter.

In the air to air mission the lack of radar is a real problem, as the RWR only gives you a direction to "active" radars, whereas a radar set would tell you which direction they were facing, their speed, their altitude, their range AND their direction, even if their radar is turned off. This extra information can be incredibly helpful in combat.

On the other hand the A-10's huge straight wing means that it has excellent low altitude turning ability. If it can survive long enough to get into a turning fight at low altitude, it will win with one quick blast of that massive cannon. In fact, it's so good in the defensive fight that the turn-and-blast is known as the "Warthog Stomp".

One oddity of the demo is that the MiG's are supposedly not really MiG's at all. They have radar, and seem to blow up easily like they should, but they have the flight model of the A-10. This means that the standard defence of getting low and slow is simply not going to work.

Instead, we'll have to take what we can get. We have two advantages in this game: missiles, and the fact that the MiG's leave their radar turned on. The later means we'll see them first on our RWR and be ready for the fight, the former means we can damage them before they get a chance to do the same to us with their cannon, the only weapon they carry in the demo.

Take off, clean up, drop your bombs and get stations 1 and 11 ready to fire. Now fly

due north and start watching the RWR like a hawk. Eventually you'll find the two MiGs, typically off to the north of the island, straight out from the "pond" with the cruiser in it. There are no radar sources to the west of the "enemy" airbase, so if you see vectors on the RWR pointing out over the water, you've found them.

The key now is to get lined up for a shot when they are still "out there". Just turn until one of them is directly forward on the RWR, and fly towards it. When it sees you you'll suddenly see the RWR vector get a LOT longer in a hurry when they turn to meet you (the radar signal is stronger when it's pointed at you). At this point you should start to hear the low, slow Sidewinder tone. You're not locked yet, just wait. If you hear it speed up or get louder, fire!



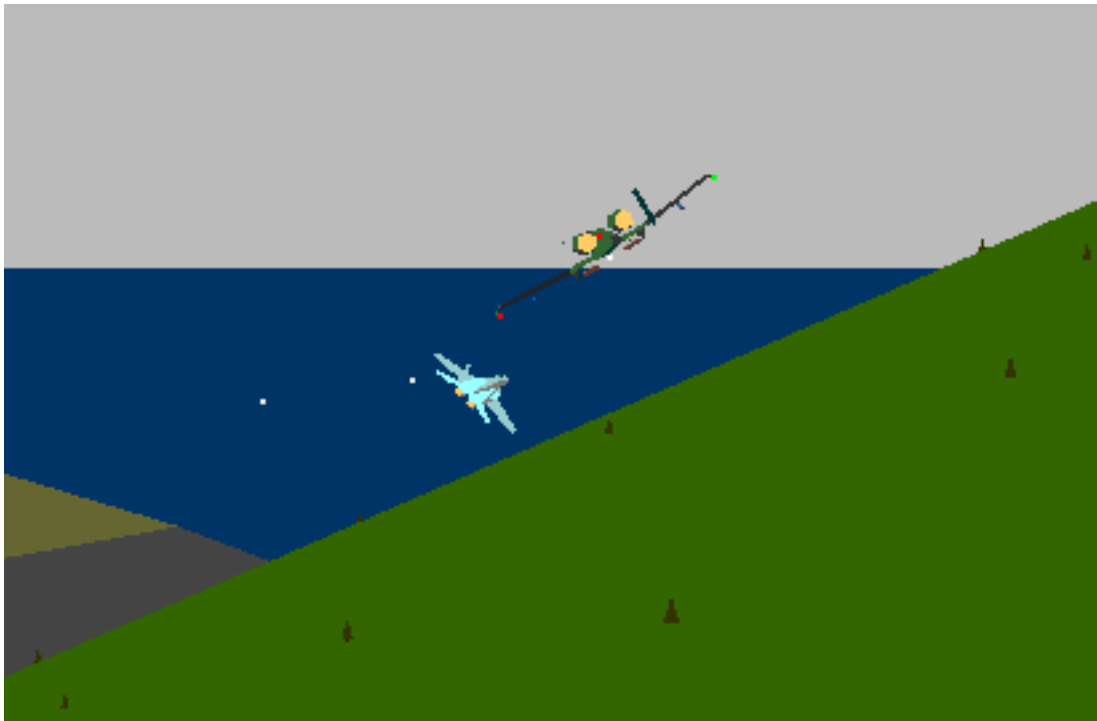
MiG's on the RWR
note the MiG just to the left of the HUD, and it's shadow

On a nose-on shot the Sidewinder is not all that great a missile, you'll find yourself first getting locks when the plane is already visible. To maximize the MiG's visibility, try to stay above them, they're painted sky blue and are only easily visible against the sea or

grass. After firing the Sidewinders, I typically start hosing away with the cannon.

The MiG's in this demo are not stupid, in fact, they're really very good. I have never managed to sneak up on one, which means I don't get to use the tail shot the Sidewinder is so good at. For example, the Sidewinder can lock onto the engines of a target at about 5 to 10 miles out. When aiming at the nose you're lucky to get a lock at anything over 2 miles, which is only a few seconds from passing.

In addition, you'll notice that the MiGs will start tossing flares and turn across the missile's path as soon as they see you've launched (I don't know the logic to how they realize they've been launched on). The flares are pretty effective as making the Sidewinders miss, and I find that they seem to be able to dodge over 50% of the missiles I shoot at them. In addition, a single hit never takes the MiGs down, I've seen them fly away even after 2 hits. For this reason I typically fire all four at the first lock I get, because I might not get another chance to use them.

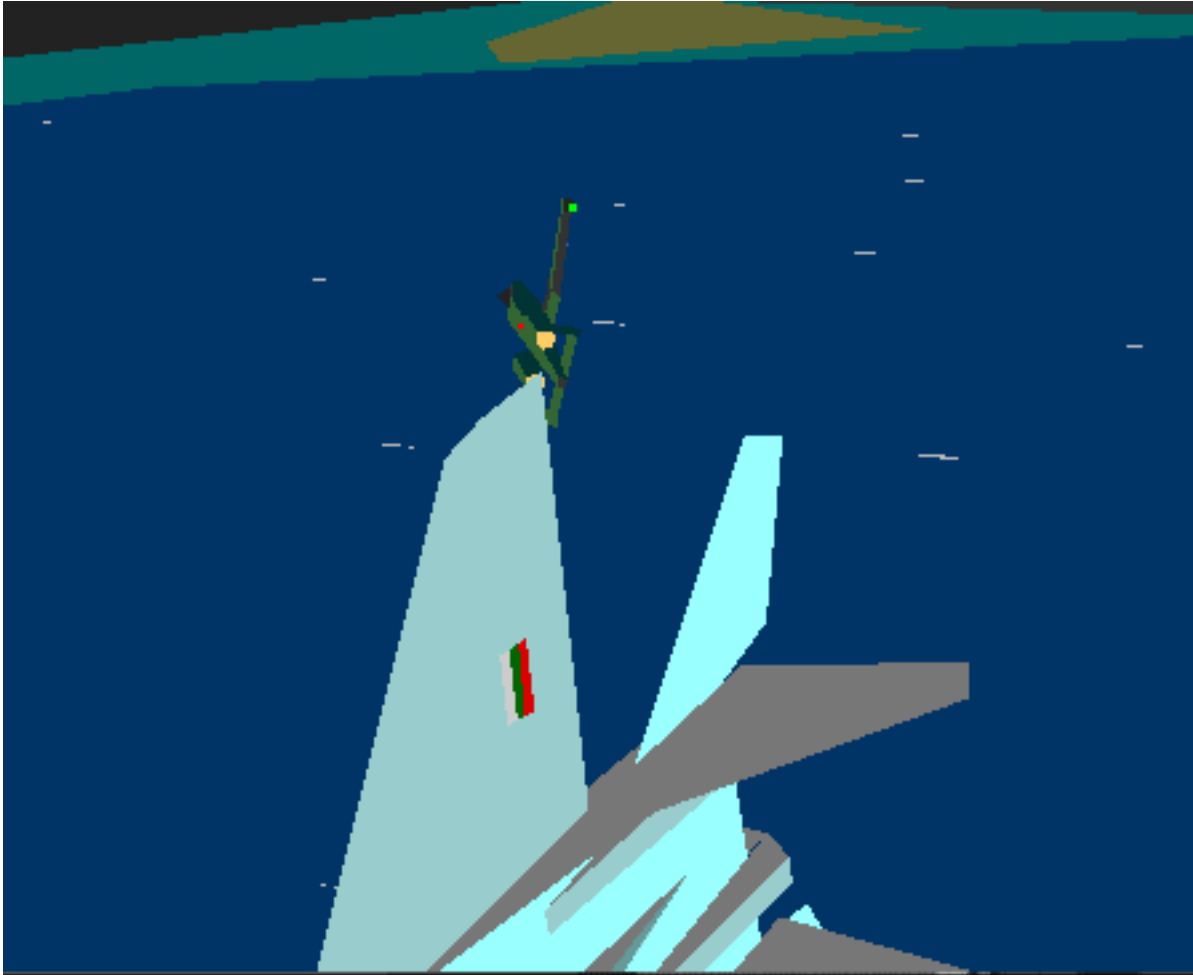


Titus Vegter lines up for a beauty of a shot on a MiG
notice the flares being dumped from the MiG to ruin a Sidewinder shot

Nevertheless, the Sidewinders can perform superbly in a secondary "spotting" role. As soon as you shoot, you'll start seeing flares popping up, and you can use that to spot the MiGs. This is particularly useful if they are over land when you see them on the RWR, you can simply follow the RWR into a lock without ever seeing the MiG visually. Once you get the lock tone and fire, you'll see the flares and know where the MiG is.

Once you get to the pass, turn hard. If you entered the fight going downhill, hit the

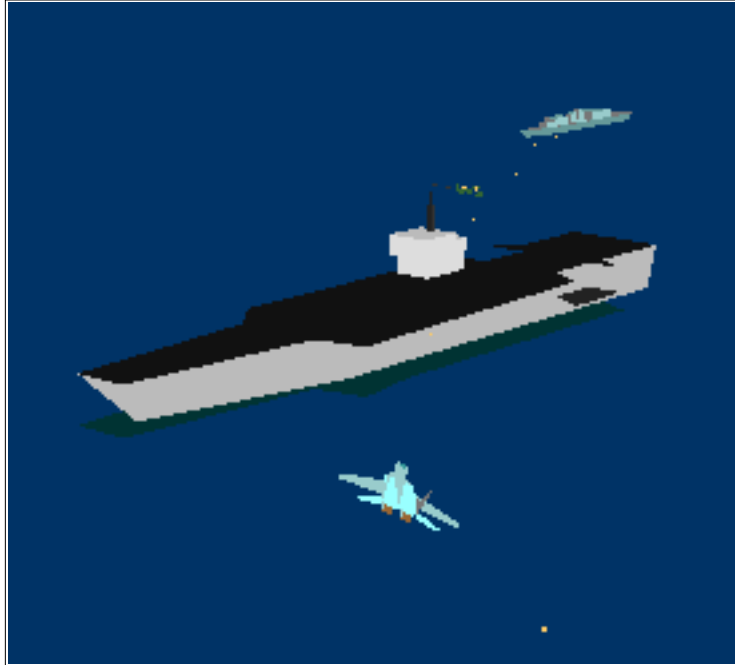
airbreaks and slow down, the A-10 performs at its best relative to the MiG at lower speeds. Stay low, the MiG's don't crash often, but what the heck, it's worth a try.



Going two-circle at the merge
is that a Bulgarian flag?!

If you want to get fancy you can try lead turning them, because they always fly HUD BFM attempting to get a shot at the pass. If you don't turn into them you might get angles on their plane, and the A-10 will always win the angles fight. The problem with this lead turn is that the MiG is going for a guns solution anyway, and a lead turn will maximize the time they are behind you. You also have to consider that there are two of them, and a perfect lead turn on one gives the other a perfect sandwich - if they happen to be close together at the merge.

If everything goes wrong, fly quickly to the Nimitz and stay low. Fly circles at low alt over the Nimitz and it's ack will quickly shoot the MiG down. Other players have suggested you can do the same by flying over the Zoos, as they tend to shoot behind you, and will often shoot down the MiG's for you.



The Brest shoots at the MiG

You'll find that air to air in the Hawg is not all that easy. It's not supposed to be. If you see a real fighter coming to get you, Run Away!

Conclusions

There's little doubt that A-10 Attack is the most sophisticated flight simulator available today. Although the demo is limited in scope, it's a superb introduction to the game and lots of fun to fly.

I hope this guide helps you flying the demo, and perhaps the release version when it ships too.



Off into the sunset

Happy Flying,
--Tim van der Leeuw.
--Maury Markowitz.