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# DCS World Air to Ground Tutorial For the A-10C Warthog

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# Contents

<b>1</b>	<b>Introduction</b>	<b>3</b>
1.1	Why this Document? . . . . .	3
1.2	What does this Document provide? . . . . .	3
1.3	The Structure of the Document . . . . .	4
1.4	Your Aircraft . . . . .	4
1.5	The Mission . . . . .	5
1.5.1	The Targets . . . . .	6
1.5.2	Mission Success . . . . .	8
<b>2</b>	<b>Start Up, Taxi and Take Off</b>	<b>9</b>
2.1	Situation . . . . .	9
2.2	Airplane Start Up . . . . .	9
2.2.1	Cockpit Preparation . . . . .	9
2.2.2	Engine Start Up . . . . .	14
2.2.3	System Start Up . . . . .	15
2.2.4	Weapons Start Up . . . . .	18
2.3	Taxi and Take Off . . . . .	19
2.4	Enroute Flight/Fence In . . . . .	21
<b>3</b>	<b>Weapons Delivery</b>	<b>22</b>
3.1	General Tactical Considerations . . . . .	22
3.2	Bomb Delivery with the Warthog . . . . .	22
3.2.1	General Aiming Remarks . . . . .	22
3.2.2	Delivering Bombs on Ammunition Bunker . . . . .	23
3.2.3	Delivering Cluster Bombs on Fuel Tanks . . . . .	25
<b>4</b>	<b>Return and Landing</b>	<b>28</b>
4.1	Fence Out . . . . .	28
4.2	Intercepting Glide Path . . . . .	28
4.3	Landing . . . . .	29



# 1 Introduction

## 1.1 Why this Document?

Tutorials for DCS World are numerous. If you search Youtube, the number of videos is stunning. Unfortunately, I find videos as tutorials for a complex thing like flying a fighter jet only of limited use. If you know already what you are doing, the videos can give a good best practice support. If you have to learn how to do things in the first place, the videos are too fast.

Reading the manual is always a good start. However it is not really helpful for training purposes either, as the descriptions are technical and not particularly user oriented. The “Chuck’s DCS Tutorial Library” is a very good and beautifully pictured series of tutorials for most aircraft available in DCS. But again, the documents have a general structure and to actually fly a mission it needs a more hands on approach.

Especially the DCS A-10C is an extraordinarily detailed representation of the numerous systems installed in this aircraft. That means the learning curve is very steep and I know of many flight sim enthusiasts that gave up on the module over time, as they could not figure out, how to handle it properly. For many years I was one of them. Now, after investing a lot of time and effort, I managed to at least fly well preplanned missions with this extraordinary module. I put all I have learned into this tutorial in a way that is intended to help newbies get started with this fine aircraft.

Please be aware that English is not my native language. I apologize for any misspellings, grammar mistakes and strange wordings this document may include. I hope the understanding will not be jeopardized by this.

## 1.2 What does this Document provide?

This document describes an air to ground training mission with the A-10C Warthog module in DCS on the Caucasus Map. It is assumed that you know how to fly in a flight sim and have a general understanding of how DCS works as well as what air plane you are flying. The tutorial describes how to get the aircraft started and into the air, how to deploy weapons and how to safely land the aircraft.

The provided mission is a training sortie. Targets are placed on a bombing range. This will give you the opportunity to learn how to fly and fight in this aircraft. The document is supplemented by a mission file (“A2G-A10C.miz”). After placing this file into your appropriate DCS directory you can fly the described mission to practice what you have read before.

Additionally I have provided a checklist for the mission. It is not based on official

checklists available on the internet, but tailor-made to the needs of DCS World A-10C missions. The flight preparation described in this document is actually based on this checklist. The idea is that after reading the tutorial off line, the full document should help to execute the mission for the first time using the “Pause”-function extensively. Later, the checklist should be enough to execute the flight successfully. After this mission has become second nature it will be easy to add new weapons and aircraft systems to be used.

## 1.3 The Structure of the Document

After this introduction, the document is divided in three chapters:

- **Start Up and Take Off**

This chapter describes the startup procedure of the aircraft from a cold and dark cockpit. This includes starting the engine(s), setting all systems as required, rolling of the aircraft to the runway and taking off.

- **Weapons Delivery**

This chapter describes how the different weapons are utilized from the in-cockpit and the flight manoeuvre perspective.

- **Return and Landing**

This chapter describes how to get back to the airfield and land successfully, which at least with the A-10C is relatively easy compared to i.e. the MIG-21bis.

## 1.4 Your Aircraft

The Fairchild Republic A-10 Thunderbolt II is a single-seat, twin turbofan engine, straight wing jet aircraft developed by Fairchild-Republic for the United States Air Force (USAF). The A-10 has received many upgrades since entering service. In 2005, the entire fleet of 356 A-10 and OA-10 aircraft began receiving the Precision Engagement Upgrades including an improved fire control system (FCS), electronic countermeasures (ECM), and smart bomb targeting. The aircraft receiving this upgrade were redesignated A-10C. There is some controversy about the future of the A-10C in US military service. The A-10C is quite expensive in terms of running costs (though substantially cheaper than the F35 program) and lacks any meaningful secondary capability for the air to air role. On a modern battlefield, the A-10C will always need support by fighter aircraft, which again increases costs.



Figure 1.1: A-10C in real life

In DCS World the A-10C can be considered the benchmark for system simulation and flight model. It is a payware add-on for DCS World and you need to own this add-on to play this tutorial. The creators of DCS World could use their expertise gained by implementing a system simulator for the USAF for transition of pilots from the A-10A to the A-10C. It is therefore no wonder this model is by far the best simulated fighter aircraft in the flight sim universe from a systems perspective. Regarding the required airmanship, the A-10C is not really demanding. It is slow and stable and the manoeuvrability is as required for its purpose. The flight experience is similar to an airliner, where the systems management is key to a successful flight. One can attack targets with the A-10C via dive bombing (using its mighty gun close to the target). But the added value of the aircraft is its capability to precisely attack targets from high altitudes and out of range of many defence systems. This is the reason why this training missions assumes a heavily defended target.

## 1.5 The Mission

The mission descriptions is as follows:

Your country only lately gained independence. It is located in very unstable surroundings. Building up an army is necessary. You are part of a team to build an airforce for your country from scratch. Financial resources are scarce, so it needs to be determined, which aircraft(s) to buy. Either the airforce acquires a multi role fighter bomber or a dedicated groundpounder plus a dedicated air superiority fighter. Several aircraft are on offer. You had the opportunity

to get some basic training on each of them. Now a practical shoot-out is planned. All aircraft on offer are stationed on the airport of Senakhi-Kolki. A bombing range has been build on a deserted airfield near Batumi, which is easily recognisable from the air due to its unique x-shaped runways. Some training targets are placed on the range. There are two ammunition bunkers on the south end and three fuel tanks on the northern part. The targets are protected by AAA-artillery and manpads. To safely attack the targets the A-10C needs to fly higher than 10.000 feet. Your aircraft is armed with guided munition to destroy the targets. Two US F-18C Hornets are assigned to provide fighter cover during the exercise to avoid interference by neighbouring countries. If all targets are destroyed and the plane returned safely to the base, 100 points will be granted to the pilot. It is 0700 hours in the morning and the weather is fair and stable. You have been tasked to fly the first test flight with the A-10C Warthog. Good luck.

Your aircraft is parked with a cold and dark cockpit on the apron. It is 0700 hours. The weather is pretty nice and stable. The A-10C Warthog is properly armed and fuelled and ready to fly. The target is approximately 30 miles from your airport, which means the mission following the given flight plan can be accomplished in roughly 45 minutes. External fuel is therefore neither required nor installed.



Figure 1.2: Bomb load of your A-10C

To attack the ammunition bunkers, the aircraft is armed with 2 GBU31 with GPS-guidance. For each target, there is only one bomb, therefore the targets must be hit precisely to destroy them. To attack the fuel tanks, the aircraft is armed with two CBU103 cluster bombs, which are INS guided for high precision.

### 1.5.1 The Targets

Due to its unique shape, the target area is easily recognisable from the air and looks as follows:



Figure 1.3: Target area viewed from the air

Two ammunition stores are located on the southern end of the airfield. The stores are bunkers and require a direct hit by a reasonable bomb in order to be destroyed. On the northern part of the airfield, three fuel tanks have been installed.



Figure 1.4: The two ammunition bunkers

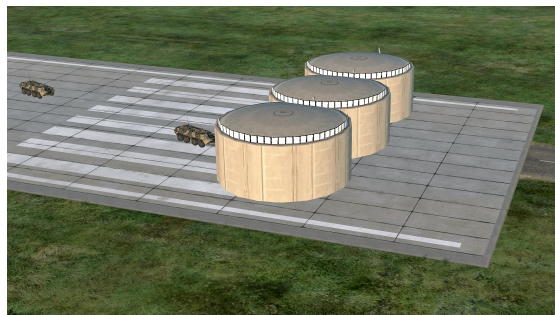


Figure 1.5: The three fuel tanks

### 1.5.2 Mission Success

The destruction of an ammunition store and a fuel tank carry a score of 25 points and 10 points respectively. The safe return of your plane to the airport is supposed to carry another 20 points. A complete mission success will therefore be awarded with 100 points. Unfortunately for the time being I could not figure out, how to measure a safe return and awarding points for it in the Mission Editor. Hence only 80 points can be achieved so far.



## 2 Start Up, Taxi and Take Off

### 2.1 Situation

Your aircraft is parked on the ramp of the airfield of Senaki-Kolkhi. For better orientation, this is your location on the airport:



Figure 2.1: Location of A-10C on mission start

### 2.2 Airplane Start Up

Starting-up the A-10C in DCS is quite a complex and time consuming exercise. A pre-flight check is normally performed prior to start up to ensure the aircraft is configured properly. In DCS World, the aircraft's initial configuration is always as required, so its tedious checking for all kind of switches to be in the correct position and can be skipped in this tutorial. The following procedure is my way of doing it and only vaguely resembles real life procedures. The following walk-through is for absolute beginners. After some training, the attached checklists can be used, which are structured according to this description.

#### 2.2.1 Cockpit Preparation

- **Electricity**

To begin, we have to provide electricity to the aircraft. This is done on the “ELEC PWR Panel” on the right side of the cockpit.



Figure 2.2: ELEC PWR Panel on the right side of the cockpit

We switch battery to “PWR” and Inverter to “STDBY”. Additionally we switch the left and right AC GEN switches to “PWR”. As soon as the engines are running, this ensures that the AC Generator will take over. Finally we turn on the oxygen supply and close the canopy to reduce the noise level in the cockpit.

- **System Tests**

Now we will perform some crucial tests of systems:

- Signal Light Test
- Fire Detection System Test
- Fuel Quantity Test
- Oxygen Supply Test

The first two tests will light up the warning lights. Check that all warning lights are on, while testing. Pressing the button for the Fuel Quantity Test the gauges for the tanks should move to roughly 3.000lbs and the digital readout should read nearly 6.000 lbs. Pressing the Oxygen Test Button will move the gauge to 0.5, where the warning horn should engage. Keep button pressed until you hear the warning sound.

- **APU Start**

- Now we can turn on the APU, the switch being under the throttle:





Figure 2.3: APU START under the throttle

We monitor the APU start up on the respective gauges on the front dash:

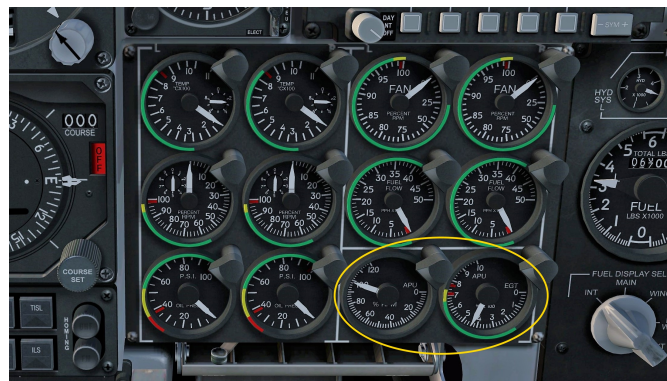


Figure 2.4: The APU gauges

- After the APU has run up, we now can provide the aircraft systems with power from the APU by turning on the APU GEN to “PWR” on the “ELEC PWR Panel”.

The aircraft can now rely on its own electricity and pressured air, required to start the engines.

#### • Navigation Systems

The navigation systems need several minutes to align themselves. During this time the plane must not move. To ensure early completion we start the navigation systems right now. To do this, we turn the CDU and EGI switches to “On” and let the systems run up. This will take approximately 4 minutes. During that time we can continue to wake up the aircraft.



Figure 2.5: CDU PANEL

- **Radios**

As we need approval from ATC to start the engines we need to turn on the radios. The A-10C has three different radios:

- AN/ARC-186(V) VHF AM Radio 1(Radio 1)
- AN/ARC-164 UHF Radio 2 (Radio 2)
- AN/ARC-186(V) VHF FM Radio 2 (Radio 3)

Radio 1 is used for communication with ATC. Therefore we turn on Radio 1 by turning the switch on the bottom right of the radio to “TR” and dial in the frequency for ATC on Senaki-Kholki, which is 132.00. The other radios will not be used in this mission. We just turn them on for completeness.



Figure 2.6: Radio Panel

### 2.2.2 Engine Start Up

Engine start up is simple in the A-10C:

- **Request Approval for Engine Start**  
\\, F5, F1, F3
- To ensure fuel supply to the engines we turn on the left and right boost pumps for the main and the wing tanks.

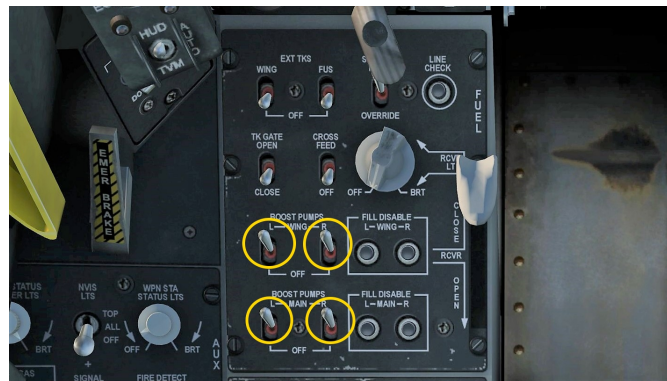


Figure 2.7: FUEL PANEL on the left side of the cockpit

- **Master Exterior Light Switch**  
Pinky Switch FWD or Left-Alt-P
- **Left Engine Start**  
To start an engine, we must push the throttle forward to the start position. However as most throttles for gamers do not support this function, we use “Right-CTRL-Home” and monitor the spooling up of the engine on the Engine Control Panel.
- **Check Hydraulics**  
Move rudder and stick and check that rudder, ailerons and elevator are moving correctly. Please note that the airbrakes cannot be applied yet, as they need hydraulics from the right engine.
- **Right Engine Start**  
Apply “Right-Shift-Home” and monitor the engine instruments for proper start up.
- **Check Speed Brakes**  
Now the speed brakes can be tested.
- **APU (Generator) Off**  
As all systems are now powered by the engine generators, the APU generator and the APU itself can be turned off.

### 2.2.3 System Start Up

Now things are getting slightly more complicated, as we handle systems that are not as closely related. I tried to follow the procedure in a logical order, which might not reflect the real checklists. However it helped me to not just follow a list of switches to press, but to understand what the systems are doing.

- **Yaw & Pitch SAS, Take Off Trim**

Turn all four switches to “On”. The SAS improves the handling qualities of the A-10 and allows better and finer control. This results in better target tracking and reduces the amount of trimming needed. Now press and hold the “Take Off Trim” Button for 3 seconds and verify the green light is on.



Figure 2.8: TRIM Panel on the left side of the cockpit

- **Armament HUD Control Panel**

- CICU to “On”. This switch applies power to the Central Interface Control Unit (CICU), which in turn provides data input to the MFCs and associated subsystems.
- JTRS to “On”. The Joint Tactical Radio System (JTRS) switch enables power to the Datalink system.
- IFFCC to “Test”. The Integrated Flight and Fire Control Computer (IFFCC) switch applies power to the IFFCC and HUD.





Figure 2.9: AHCP on the front dash

- Press “Enter” on the UFC under the HUD to start the self-test sequence of the IFFCC.
- **MFCD**  
Turn on both MFCD with the switch on the lower left side of each MFCD and turn it to “Day”. After a few seconds both MFCD show the Load Data screen. Press the “Load All” OSB on either of the two MFCD and wait, until the asterisks reappear. Choose the “CDU-Screen” on the right MFCD and the “TAD-Screen” on the left MFCD.
- **Auxiliary Instruments**
  - Uncage the Standby Attitude Indicator and make sure its level
  - Reset the G-Meter beside the HUD
- **Navigation preparation**
  - Turn on the ILS and tune it to the frequency 108,9.
  - Turn on the TACAN and tune it to 31X.
  - Dial 88° on the Attitude Director Indicator (ADI).
- **Countermeasures**  
Although we do not expect to be attacked on this mission, the countermeasures should be turned on. The “Mode Selector” is turned to “Automatic”. Then the following systems are turned on:
  - Missile Warning System (MWS)
  - Electronic Countermeasure Self-protection Jammer (JMR)
  - Radar Warning Receiver (RWR)
  - Chaff and Flare Dispenser (Disp)



Figure 2.10: Countermeasure Panel on the right side of the cockpit

### After EGI INS Alignment by T:4.0.0.8 and IFFCC Test completed:

- Press OSB10 on the Load Data screen to load the flight plan data. This roughly takes 15 seconds. After the asterisks on the screen reappear, change the right MFC to “CDU”.
- Either on the CDU or on the right MFC press the “NAV” button.
- IFFCC from “Test” to “On”.
- On the Nav Mode Select Panel (you need to look around the stick to find the panel) as the navigation source “EGI” is selected and the navigation mode is “Str PT”. To be able to use ILS for landing, make sure the “PTR” switch between the HARS and EGI options is set to “ABLE” to uncage the ILS needles.



Figure 2.11: NAV Mode Select Panel on front dash

- Turn the “Steer PT” switch under the FMC to “RT Plan”.
- The EAC is switched to “Arm” and the Radar Altimeter to “Norm”.

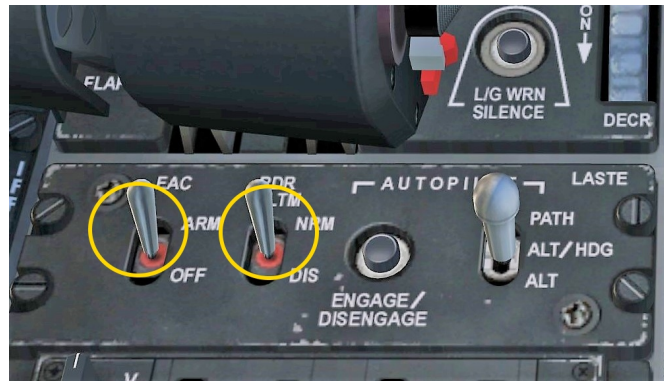


Figure 2.12: LASTE Panel below throttle

## 2.2.4 Weapons Start Up

Now the A-10C is ready to fly, but not ready to fight.

- Laser to “Arm”. Although we do not use laser guided weapons in this tutorial, the laser is very useful. It can be used to measure distances precisely, which helps pinpointing targets.
- TGP to “On”. TGP is the “Litening Targeting Pod” that we use to select targets from long distances.

For the management of the weapons load we use the “DSMS” page that we turn on on our left MFCD. Check that all stores data and profile data have been correctly transferred from the “Data Transfer System” (DTS). There should be no red indications. It should look like this:



Figure 2.13: DSMS on left MFCD

As we are on a pre-planned mission, it is advisable to set up the weapons according to our mission requirements before take-off to reduce workload while in the air and close



to the enemy. In this case the standard profiles of the GBU31 and CBU103 suits our requirements so we do not have to change anything here. For now, we remain on the DSMS “STATS-Page”.

## 2.3 Taxi and Take Off

We are now ready to fly and start our mission.

- **ATC clearance to taxi**  
\\, F1, F3
- **Aircraft Preparation**
  - Nosewheel Steering “On”
  - Taxi lights “On”
  - Ejection Seat “Armed”
  - Anti-skid system “On”

- **Taxi to runway**

After taxi clearance is received we slightly increase thrust to start rolling and steer the aircraft via rudder inputs. To get to the active runway we turn right and stop the aircraft, when approaching the runway threshold.

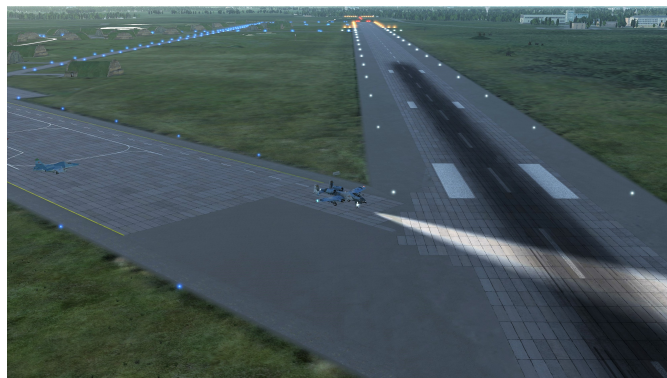


Figure 2.14: Hold position before runway entrance

- **ATC clearance for take off**  
\\, F1
- **Final Aircraft preparation**
  - Altimeter is set to the pressure provided by ATC at clearance
  - Flaps one notch down to “MVR”
  - Pitot heat “On”

- **Lineup on runway center line**

After clearance from ATC we slowly roll the aircraft onto the runway and line up in the middle.



Figure 2.15: Line up on runway

- **Take Off**

- Last chance check (i.e. engine instruments)
- Press brakes and throttle up to 90%
- When engines are spooled up properly release brakes and throttle up to 100%
- Start rotation at 127 knots (see performance charts with a weight of roughly 40000 lbs) at an angle of 10 degrees. The aircraft should lift off at 137 knots. Do not try to “pull off” the aircraft from the runway but wait until the aircraft lifts off on its own.



Figure 2.16: Rotation at 127 knots

- At positive rate of climb retract landing gear and flaps



Figure 2.17: Landing gear and flaps retraction

- Raise nose to maintain a climb speed of 180 knots and follow the course to the next waypoint, as indicated on the HUD.
- At 3000 feet lower nose to let the aircraft accelerate to 220 knots.

## 2.4 Enroute Flight/Fence In

Our mission calls for an altitude in excess of 10000 feet, so we continue to climb at 220 knot until we reach the desired altitude. At the same time we follow the pre-planned flightpath by heading to the waypoints. This means after reaching waypoint 1 we turn sharply to the right to fly to the second waypoint, which in our case is the target.

To prepare for fighting we now have to do the following:

- Turn off all lights.
- The Master Arm switch on the AHCP is switched to “ARM”.

## 3 Weapons Delivery

### 3.1 General Tactical Considerations

Our targets are two ammunition bunkers and three fuel tanks that are located very close to each other. To safely destroy an ammunition bunker you need to drop some heavy ordnance on it. For the fuel tanks cluster bombs are a good choice. To destroy the targets, your aircraft is loaded with:

- Two GBU31, which are essentially MK84 with GPS-guidance
- Two CBU103, which are essentially CBU87 cluster bombs with INS-guidance
- The Litening targeting pod and the ALQ131 Jamming pod



Figure 3.1: Load out of your A-10C

The plan is to attack any bunker with a GBU31 each and the fuel tanks with two CBU 103. The attack is planned from an altitude of more than 10000 feet to ensure that the Manpads and AAA cannot destroy the A-10C. That means, instead of CCIP bombing we have to use CCRP. The targeting pod is used for aiming. It is assumed that due to the high precision of the bombs a single MK84 is enough to destroy the bunker.

### 3.2 Bomb Delivery with the Warthog

#### 3.2.1 General Aiming Remarks

Regardless of the target and the specific weapon used, using the TGP to determine a target require the following steps:

What to Do	HOTAS	Keyboard
Toggle Right MFCD to TGP	Coolie Right Short	K Short
Making Right MFCD SOI	Coolie Right Long	K Long
Slave TGP to active waypoint	ChinaHat Aft Long	C Long
Selecting the target	HOTAS Slew	as mapped
Zoom in	DMS FWD	Home
Zoom Out	DMS AFT	End
Toggle wide and narrow view	ChinaHat FWD Short	V Short
Pinpoint target with laser	HOTAS NWS	Insert
Mark target	TMS Right Short	Left CTRL Right Short
Mark as SPI	TMS FWD Long	Left CTRL Up Long
Everything slaved to SPI	ChinaHat FWD	V Long

### 3.2.2 Delivering Bombs on Ammunition Bunker

We are now approaching the target area from the east at an altitude of more than 10000 feet. This is now a good time to engage the autopilot to concentrate on the required system management for a successful attack.

- On the right MFCD the targeting pod (TGP) is activated by pressing OSB13. Press OSB13 a second time to make it SOI (Sensor of Interest). This ensures that the commands we execute with our HOTAS are related to the TGP. Press OSB4 to switch the TGP to air to ground mode (A/G).
- We acquire the target using the TGP with the functions outlined in the section above and slave all weapons and sensors to the target.



Figure 3.2: TGP as SOI on the right MFCD

- To make the airplane combat ready, we put the Master Arm Switch to “ARM”. On the DSMS one of the GBU31 stations is selected.



Figure 3.3: DSMS on the left MFCD

- The HUD view should now look like this:



Figure 3.4: HUD view approaching the target

The plane needs to be steered in a way that the pipper on the HUD is as exactly as possible on the center line and the plane should not be turning or changing altitude.

- When the bomb can reach its target, a message is displayed (“MAN REL”). We now drop the bomb.





Figure 3.5: Time of release

Despite the high altitude the bomb should hit the target precisely, as shown on the screenshot:

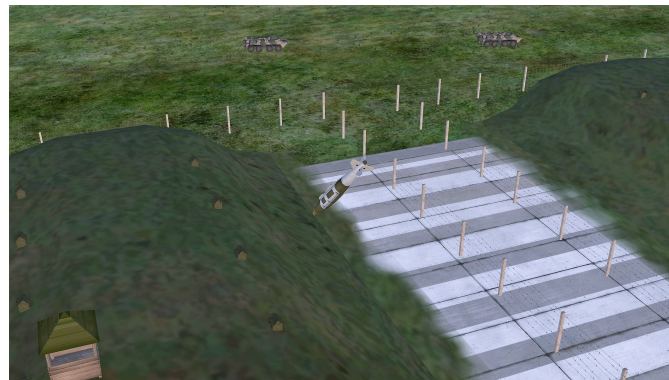


Figure 3.6: Bomb hitting a target

- Immediately after dropping the bomb we turn the aircraft back east and fly 10 miles to the east. This will give plenty of time to prepare for the second run. Make sure, waypoint 2 continuous to be the active waypoint. For the second run, we repeat the process, as described above.

### 3.2.3 Delivering Cluster Bombs on Fuel Tanks

Dropping the cluster bombs is not much different from dropping the GBU's. We again approach the target area from the east.

- We acquire the target using the TGP with the functions outlined in the section above and slave all weapons and sensors to the target.

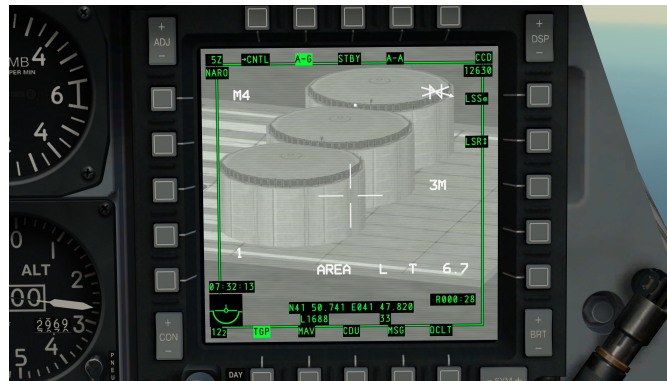


Figure 3.7: TGP as SOI on right MFCD

- On the DSMS we now select both GBU stations. INS-guided CBU cannot be programmed to be dropped in pairs. So we will have to drop both bombs individually.



Figure 3.8: DSMS on left MFCD CBU selected

- The HUD symbology is similar to the one provided for the GBU, so we repeat, what we did before. The plane needs to be steered in a way that the pipper on the HUD is as exactly as possible on the center line and the plane should not be turning or changing altitude.
- When the bomb can reach its target, a message is displayed. We now drop the two bombs by pressing the trigger twice.
- Despite the high altitude, the bombs should hit the target precisely. Cluster bombs are quiet impressive while hitting the target:



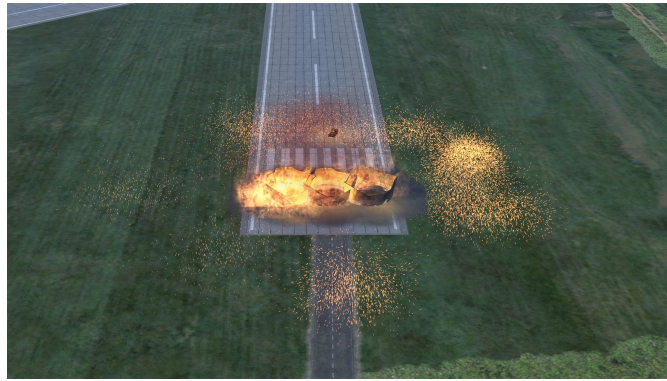


Figure 3.9: CBU hitting the target

- As this was the last attack, we continue flying west to the open sea to leave the target area and not impede civilian life more than necessary. Looking back at a successful raid looks stunning:



Figure 3.10: View on target area on fence out

## 4 Return and Landing

After delivering the weapons payload and hopefully hitting the targets, it is time to return to base. To avoid disturbance of civilian life, we fly westward to the sea and then north to fly back along the coast.



Figure 4.1: A-10C on its way back home

### 4.1 Fence Out

- Master Arm switch to “Safe”.
- The lights are turned on again (HOTAS Pinky FWD).
- Laser to “Safe”.
- TGP “Off”.
- Left MFCD is turned to “TAD Page”.
- Right MFCD is turned to “STAT Page”

### 4.2 Intercepting Glide Path

While flying north over the sea we reduce our altitude to 4000 feet. To avoid excessive speed, the air brakes can be used. As we cannot see our destination from the cockpit, now it comes in handy that we tuned our TACAN to the station of Senaki-Kokhi and selected a course of 88°. This means we can use our HSI to find it. It should look like this before the right turn on the landing course:



Figure 4.2: HSI short before reaching glide path

If this is flown correctly, we are roughly 20 miles from the destination on the landing course at an altitude of 4000 feet.



Figure 4.3: External view during approach

### 4.3 Landing

As visibility is quiet good we can now choose to either turn on the ILS system or land the aircraft on visuals. The visual approach is made easy by the Total Velocity Vector (TTV) on the HUD in connection with the Angle of Attack indicator to the left of the HUD. Preparation for landing requires the following steps:

- Reduce speed to 180 knots (if needed airbrakes can be used).
- Deploy flaps to decrease landing speed.
- Check landing lights are “On”
- Align the aircraft with the runway in sight.

- Place TTV on the beginning of the runway, where the aircraft should touch down.
- Speed is adjusted according to the indication of the Angle of Attack indicator (i.e. reduce speed to increase angle of attack and vice versa). This is, how it should look like:



Figure 4.4: HUD view on short final

- Make sure that the minimum approach speed is not breached (in our case roughly 130 knots)
- When crossing the runway threshold, flare aircraft for a gentle touch down.



Figure 4.5: External view on final

- After touch down, keep nose up for air braking.



Figure 4.6: Touch down

- Deploy airbrakes and start braking gently to slow the aircraft.
- When aircraft decelerates below 50 knots, turn on nose wheel steering to navigate on the airport.
- You need to come to a complete stop to conclude the mission.

## Conclusion

Congratulations, you have just finalised your first sortie in the Fairchild A-10C Warthog. I hope you enjoyed the scenario and the tutorial was helpful. If you find a mistake or have some suggestions for improving the tutorial, any feedback is highly appreciated. I strongly recommend to repeat the mission several times to get a feeling for the procedures and flight characteristics. Have fun!

## List of Figures

1.1	A-10C in real life . . . . .	5
1.2	Bomb load of your A-10C . . . . .	6
1.3	Target area viewed from the air . . . . .	7
1.4	The two ammunition bunkers . . . . .	7
1.5	The three fuel tanks . . . . .	7
2.1	Location of A-10C on mission start . . . . .	9
2.2	ELEC PWR Panel on the right side of the cockpit . . . . .	10
2.3	APU START under the throttle . . . . .	11
2.4	The APU gauges . . . . .	11
2.5	CDU PANEL . . . . .	12
2.6	Radio Panel . . . . .	13
2.7	FUEL PANEL on the left side of the cockpit . . . . .	14
2.8	TRIM Panel on the left side of the cockpit . . . . .	15
2.9	AHCP on the front dash . . . . .	16
2.10	Countermeasure Panel on the right side of the cockpit . . . . .	17
2.11	NAV Mode Select Panel on front dash . . . . .	17
2.12	LASTE Panel below throttle . . . . .	18
2.13	DSMS on left MFCD . . . . .	18
2.14	Hold position before runway entrance . . . . .	19
2.15	Line up on runway . . . . .	20
2.16	Rotation at 127 knots . . . . .	20
2.17	Landing gear and flaps retraction . . . . .	21
3.1	Load out of your A-10C . . . . .	22
3.2	TGP as SOI on the right MFCD . . . . .	23
3.3	DSMS on the left MFCD . . . . .	24
3.4	HUD view approaching the target . . . . .	24
3.5	Time of release . . . . .	25
3.6	Bomb hitting a target . . . . .	25
3.7	TGP as SOI on right MFCD . . . . .	26
3.8	DSMS on left MFCD CBU selected . . . . .	26
3.9	CBU hitting the target . . . . .	27
3.10	View on target area on fence out . . . . .	27
4.1	A-10C on its way back home . . . . .	28
4.2	HSI short before reaching glide path . . . . .	29
4.3	External view during approach . . . . .	29

4.4	HUD view on short final . . . . .	30
4.5	External view on final . . . . .	30
4.6	Touch down . . . . .	31