DIGITAL COMBAT SIMULATOR

F-86F
Flaming Cliffs

Quick Start Guide

EAGLE DYNAMICS

DCS

http://www.digitalcombatsimulator.com

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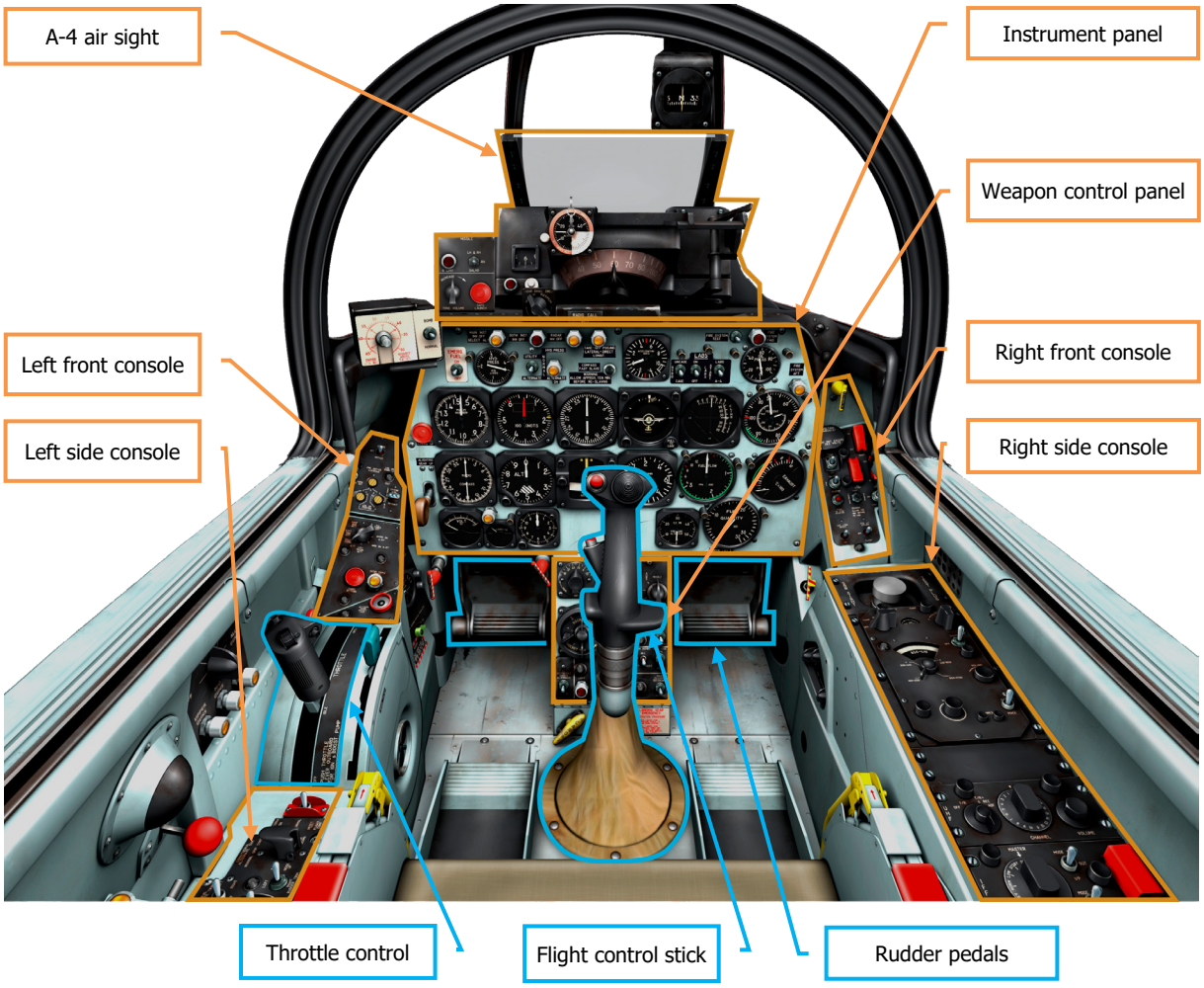
F-86F Cockpit

The F-86F features a conventional cockpit layout. The flight controls are conventional, with a centrally mounted control stick, left-handed throttle handle, and foot-operated rudder pedals. The forward cockpit is dominated by the instrument panel and the A-4 gun sight positioned above it. The side panels house various aircraft systems controls and indicators



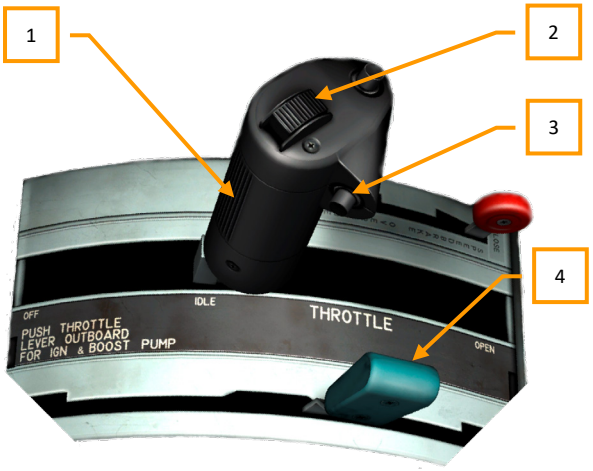
Flight Control Stick

The stick is used to control the attitude of the aircraft and thus, the trajectory which aircraft flies. Left and right motions perform the rolls for the turns, forward and aft motions perform the nose up and nose down actions to climb or descend respectively. The stick provides some other controls for the pilot: the 4-way trim hat, the main fire button, the rocket launch (bomb drop) button, and the special button for the extended nose wheel steering activation.

1. Missile launch and bomb release button **R.Alt**+**Space**
2. Gun and AA missile fire button **Space**.
3. Nose wheel steering button. **L.Alt**+**Q**.
4. 4-way trim hat:
   R.Ctrl+**.** – aft (nose up);
   R.Ctrl+**;** - forward (nose down);
   R.Ctrl+**,** - left roll ;
   R.Ctrl+**/** - right roll.

Throttle Sector

The throttle sector consists of the throttle grip – the lever type control located on the left side of the cockpit and the flaps lever. Moving throttle grip aft and forward the pilot controls the engine RPM and thus – the engine thrust. The throttle grip comprises the additional controls: the air brake slider switch and microphone push-to-talk button.



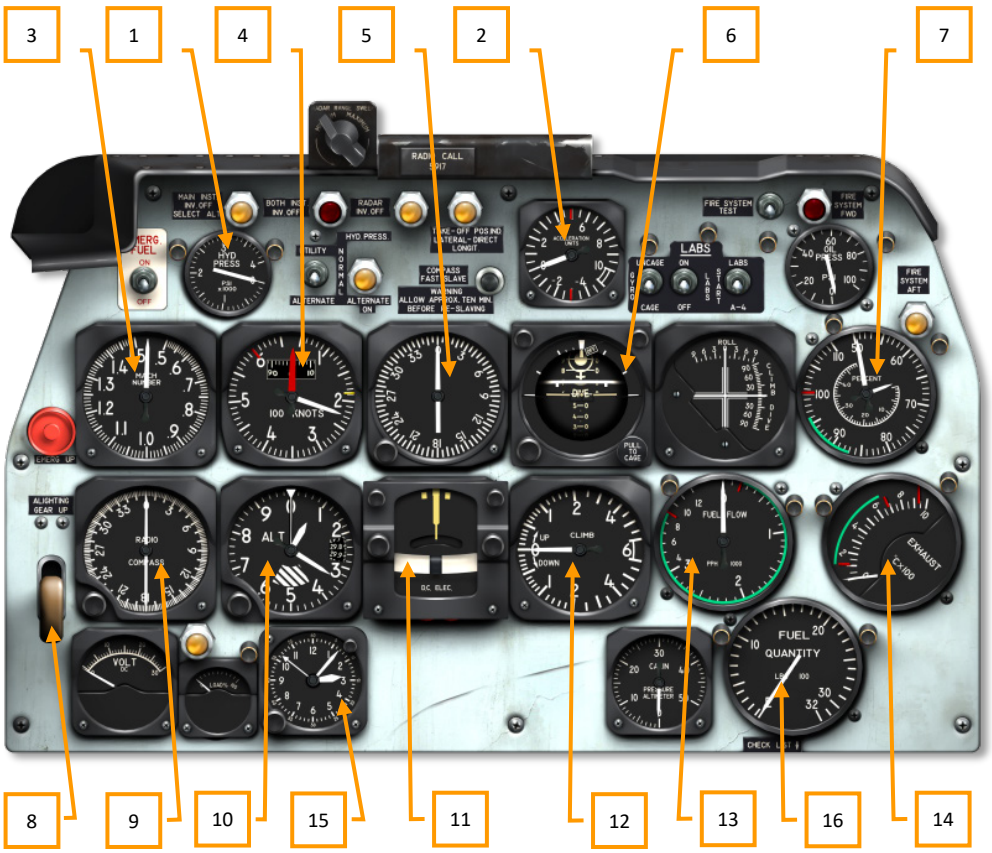
1. Throttle grip.
2. Air brake slider **B**.
3. Microphone button.
4. Flaps lever **F**.

Rudder pedals

The rudder pedals deflect the rudder and control the yaw movements of the aircraft. While on the ground the pedals are used for steering when nose wheel strut is unlocked by pressing corresponding button on the flight stick L.Alt+Q .

Instrument panel

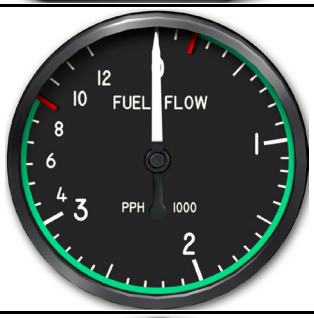
The instrument panel includes a variety of flight instruments and indicators. The primary flight indicators are grouped together in the center of the console.



1. Hydraulic pressure gauge;
2. Accelerometer;
3. Mach speed indicator (M);
4. Airspeed indicator;
5. Heading indicator;
6. Attitude indicator;
7. Engine RPM indicator;
8. Landing gear lever;
9. ADF;
10. Altitude indicator;
11. Turn and slip indicator;
12. Vertical velocity indicator;
13. Fuel flow meter;
14. Exhaust gas temperature (EGT);
15. Clock;
16. Fuel gauge.

1.	Hydraulic pressure reads in psi x1000.	
2.	**Accelerometer** displays the g-load factor which the aircraft is currently stressed with. Red markings delineate the normal g-envelope for this type of the aircraft.	
3.	**Mach speed indicator (M)** ensures that pilots have a precise understanding of how fast their aircraft moves relative to the speed of sound, crucial for safe and efficient high-altitude flight.	
4.	**Airspeed indicator** displays the airspeed in knots x 100. The yellow mark outlines the max allowed airspeed in landing configuration, the red one shows the structural airspeed limit. The current airspeed reading shown by the white needle - 328 knots of instrumental airspeed (KIAS). Pilots must avoid exceeding these limits.	
5.	**Heading indicator** displays the heading the aircraft is flying to. The current reading on the picture is 226 degrees.	

6.	**Altitude indicator** displays the pitch and roll values contributing to the current aircraft attitude. This is a mechanical device and may not withstand the high angle maneuvering. ***Note:*** *The symbolic miniature aircraft remains static and is depicted as a dot flanked by two bars on both sides. The bright white bar, known as the relative horizon bar, moves dynamically. Importantly, when reading the pitch angle, focus on the position of the aircraft symbol rather than the horizon bar.*	
7.	**Engine RPM indicator** uses two needles: the short inner dial indicating 0 – 50% RPM, the larger outer dial indicating from 50% upward.	
8.	The **landing gear lever** is used to retract and extend the landing gear. This can be done by pressing G.	
9.	**ADF (automatic direction finder)** identifies the relative bearing of an aircraft from a radio beacon or known radio station. It primarily works with Non-Directional Beacons (NDBs).	
10.	**Altimeter**. The altitude indicator employs a short needle to indicate thousands of feet of altitude, while the long needle represents hundreds of feet. In this specific example, the displayed altitude is 2,840 feet. It's important to note that the altimeter provides the air pressure altitude, which often does not directly correspond to the actual altitude above the terrain spread out beneath the aircraft.	

11.	**Turn and slip indicator (Turn coordinator)** provides information about the rate of turn or the rate at which the aircraft's heading changes. It helps pilots maintain coordinated flight during turns by indicating how quickly the aircraft is rotating around its vertical axis and how much it slips. *Turn indicator* – a yellow needle. The more rotating speed around vertical axis – the more needle is out of center. *Slip indicator* – a slightly bent tube with a ball inside moving to the side of slipping. Always try to keep the ball centered to achieve a perfect turn.	
12.	The **vertical velocity indicator** shows how fast the aircraft descend or climb in feet per minute (fpm). Especially suitable when maintaining the leveled flight at constant altitude or when descending for landing with safe vertical speed not exceeding 1500 fpm. If you've used to meters per seconds velocity readings, then do the simple math – roughly divide fpm by 200.	
13.	**Fuel flow meter** displays the current fuel consumption in lbs. per hour (pph) x1000. The green zone corresponds to the normal operation parameters.	
14.	**Exhaust gas temperature (EGT)** is assumptive indication of overall engine operation. Green zone is safe. Red marks delineate the critical margins. The temperature readings correspond to degrees ºC x 100.	
15.	The **Clock** is used to display the current astronomical time.	

16.	**Fuel gauge** displays the remaining fuel in tanks in lbs x 100.	

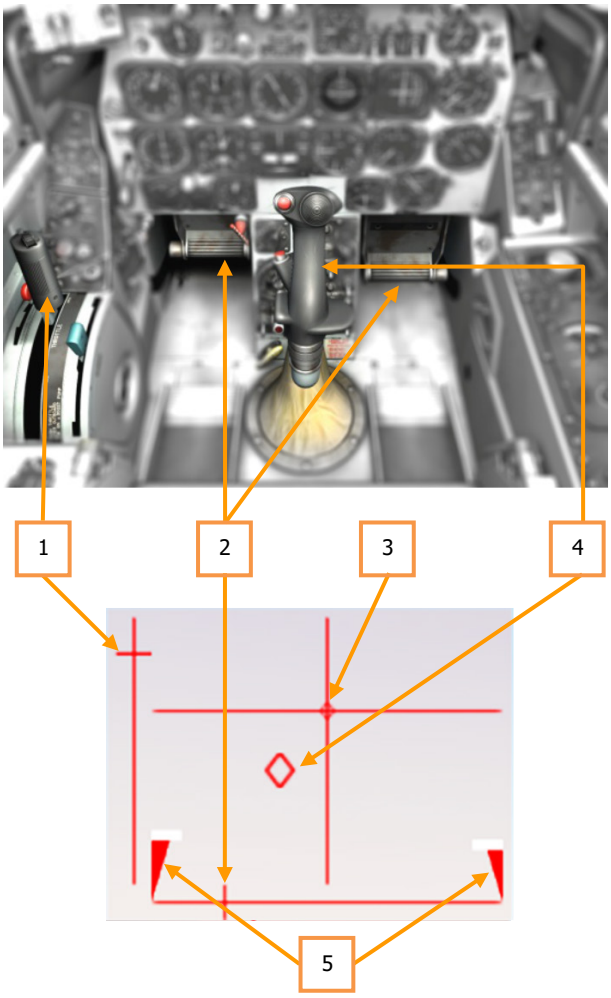
FLIGHT CONTROLS

Joysticks

Because of the natural similarity to the real flight controls, the joystick devices are extremely useful when it comes to play a flight simulator. As we've said above, the flight direction and pitch (nose up\down) are controlled with a flight stick, while the speed is typically a function of the throttle grip longitudinal movements and yaw is a function of rudder pedals inputs. More on that, the pedals are also used to steer the aircraft while rolling or taxiing on the ground.

Many consumer joysticks on the market combine the stick, throttle, and rudder controls into a single device. Meanwhile, the rudder function is achieved through a twist motion of the stick handle. Each available motion on the joystick represents the individual input axis and must be assigned to the corresponding action in the simulator before flying. How to do this you can find in the DCS User manual.

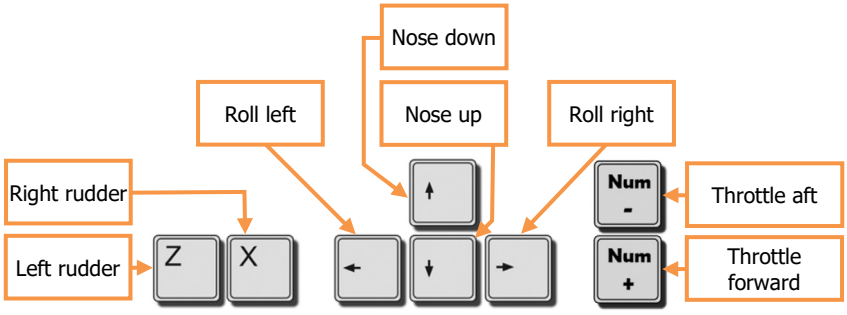
When flying from the cockpit, you can toggle the Controls Indicator display by pressing **R.Ctrl**+**Enter** to see a visual reference of the positions of your flight controls.



1. Throttle grip and corresponding indication.
2. Rudder pedals and indication.
3. Trim position.
4. Flight stick and corresponding indication.
5. Indication of the brake force applied on the L and R wheels.

Keyboard

If you have no joystick you can fly on the keyboard anyway. Use arrow keys to control roll and pitch, **Numpad+** and **Numpad-** – to throttle control and **Z** , **X** – to control the rudder.

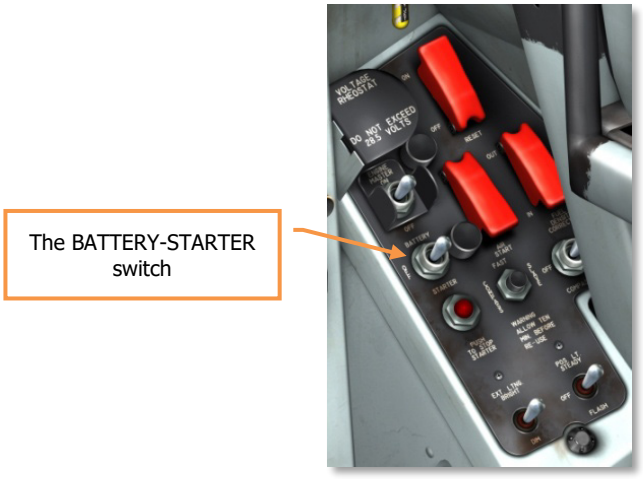


PROCEDURES

Cold start

In order to bring the life into the aircraft from cold and dark one must start the engine:

1. First, feed consumers with the energy by pressing **R.Shift**+**L** (BATTERY–STARTER switch to BATTERY position).

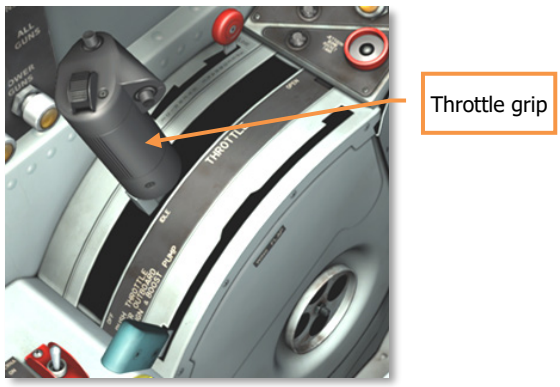


2. Press **R.Shift**+**Home** to start the engine. Monitor the rise in RPM on the corresponding gauge until it stacks at the idle values of 34-38%.
3. Close the canopy **L.Ctrl**+**C**.

Taxiing

To roll out:

1. Gently increase the engine RPM to 65% by moving the throttle forward **Numpad+**. Once pulled out, move throttle back **Numpad-** to idle and roll by keeping the momentum.

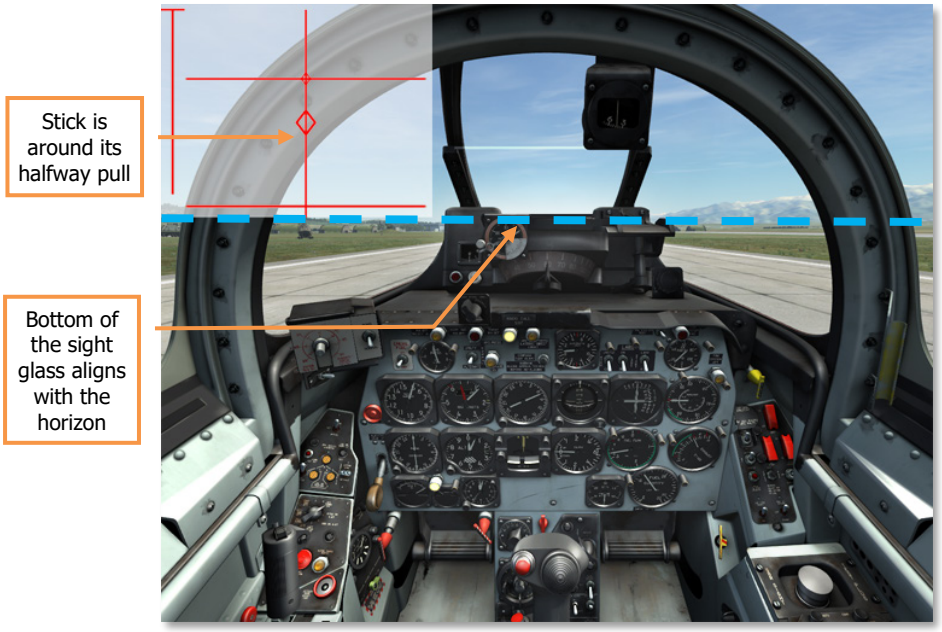


2. Apply the brakes W to stop.
3. Steer left or right by using rudder pedals Z , X . But first, unlock the nose wheel steering unit by pressing L.Alt+Q. Maintain a safe taxiing speed by constantly adjusting the engine RPM and using wheel brakes.

Take-off

Steer to the runway and align yourself along the centerline.

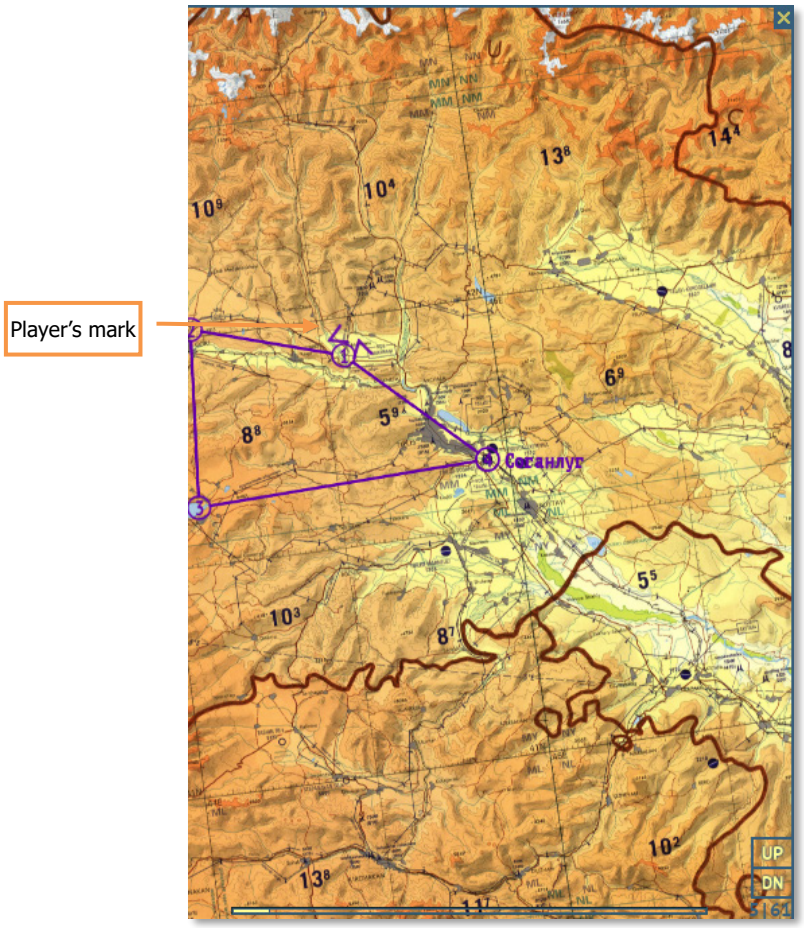
1. Press F to deploy the wing flaps.
2. Press W to stop.
3. Pressing Numpad+ increase power to maximum. Release the W button leave the bird to go for the run.
4. Use gentle pedal inputs (Z , X) to keep your running path centered. Disengage wheel steering L.Alt+Q at 50 knots of air speed. Starting from this moment the air speed is enough for the aircraft to have full rudder control.
5. At the speed of 100 knots smoothly pull back ↓ on the stick halfway down until the bottom of the sight glass aligns with the horizon. Once the nose starts rising, push the stick forward a bit and fix the position until fully off the ground in order to avoid hitting the runway with a tail.



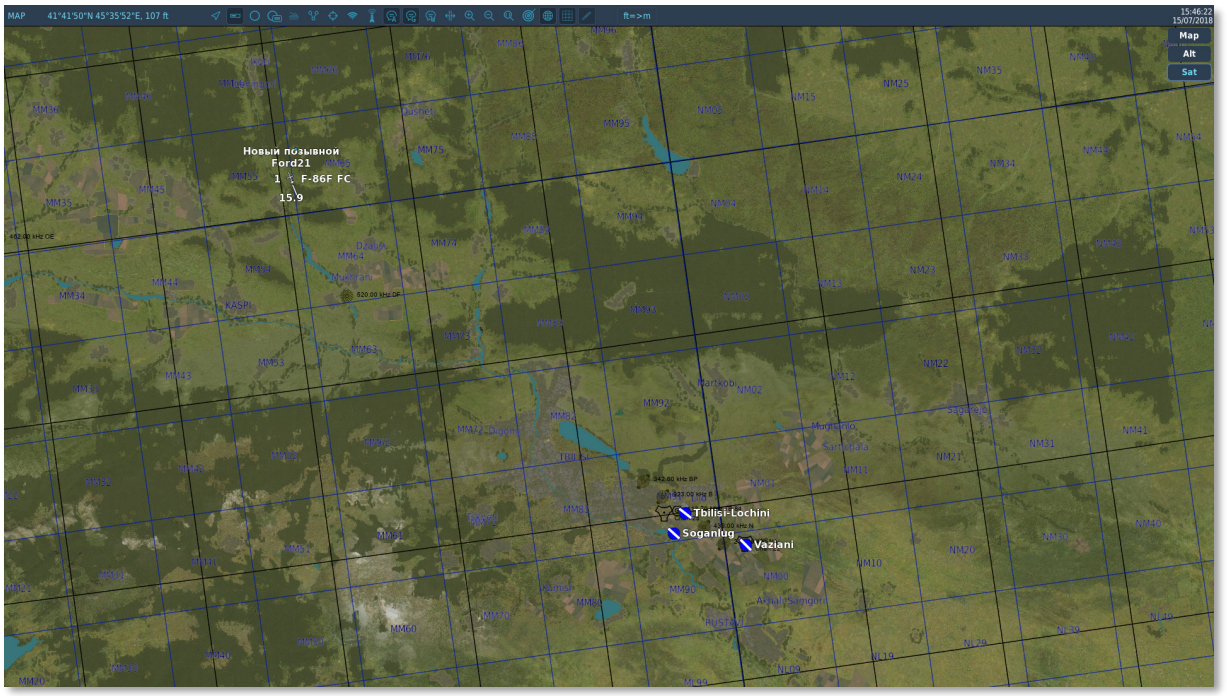
6. After taking off from the runway, retract the landing gear by pressing G.
7. Retract the flaps by pressing F when speed reaches 140 KIAS and the altitude is no less than 150 feet.
8. Maintain the climb angle sufficient enough for speed and altitude to rise.

Navigation

To help with the navigation you can call up the kneeboard R.Shift+K. Use [and] to switch between the map's tabs. You can mark your position by pressing R.Ctrl+K .



You can also call up for the full map view by pressing the F10 key. That's why this view is often referred as the "F10 map". This view comprises of many useful navigation tools including the top tool bar.



In-flight emergency situations

Engine surging

Excessive angles of attack during maneuvering, excessive throttle application or unpredictable ingestions of foreign matter can cause interruption in the airflow and lead to the compressor stall with following surging and possible backfire with a loud “bang”.

If it happens do the following:

1. Pull the throttle back to IDLE **Numpad-**.
2. Adjust attitude to some negative pitch and free fly at approximately 185 KIAS.
3. Smoothly push the throttle back to the desired position and continue the flight **Numpad+**.

Air start

If the engine is stalled in the air, you can try to bring it back to life:

1. Pull the throttle back to IDLE **Numpad-**.
2. Adjust attitude to add some negative pitch and fly at approximately 185 KIAS.
3. Check the RPM indicator. If the compressor auto-rotation speed is about 23–34 % press **R.Shift**+**Home** to ignite the engine.

4. Monitor the RPM increases and reaches 40-50% in success.
5. Smoothly push the throttle back to the desired position and continue the flight Numpad+.

Landing

Once in the vicinity of the airport, lower the RPM Numpad- and slow down to 180 - 185 KIAS (see the yellow marking on the airspeed indicator. Use the airbrake B, if needed.

1. Lower the landing gear G and the flaps F .
2. Align yourself with the runway at 1000 feet of altitude and 3 miles' distance. Descend at 140 knots of the airspeed. **Constantly monitor the air speed, the vertical speed and descending angle by keeping the horizon at the upper side of the sight glass**.
3. Keep RPM at no less than 63%. If the speed falls below 120 knots, you might stall and crash.

4. At the threshold lower the vertical speed by pulling the stick backward slightly ↓. Pull the throttle to the idle position Numpad-.
5. Gently touch the runway with both main wheels at the speed of **115** knots. If you have more than 50% of fuel you should increase the touchdown speed. Regardless, speed below 110 knots is not permitted because of the high probability of a crash.
6. Once on the ground, lower down the nose wheel and let the aircraft run, keeping yourself on the centerline by applying the rudder corrections Z and X. Apply wheel brakes gently W to shorten the run distance. At the speed below 50 knots enable nose wheel steering L.Alt+Q.
7. Retract the flaps F and airbrake B after the run and taxi to parking.

Engine shut down

To shut down the engine, move the throttle to the idle position **Numpad-** and press **R.Shift**+**End**.

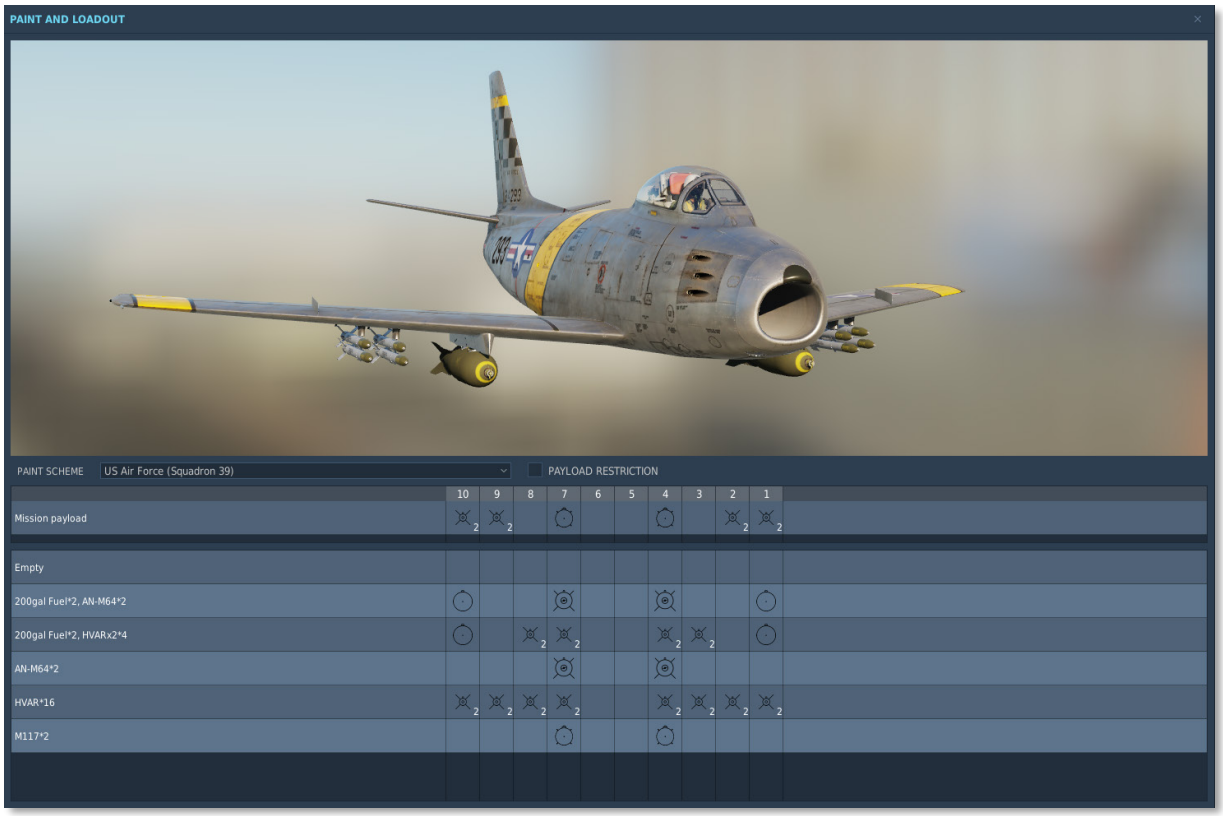
WEAPON DEPLOYMENT

F-86F armament:

- 6 x 12.7 mm (0.50 in) Colt-Browning M4 machine guns in the nose, with 300 rounds per gun.

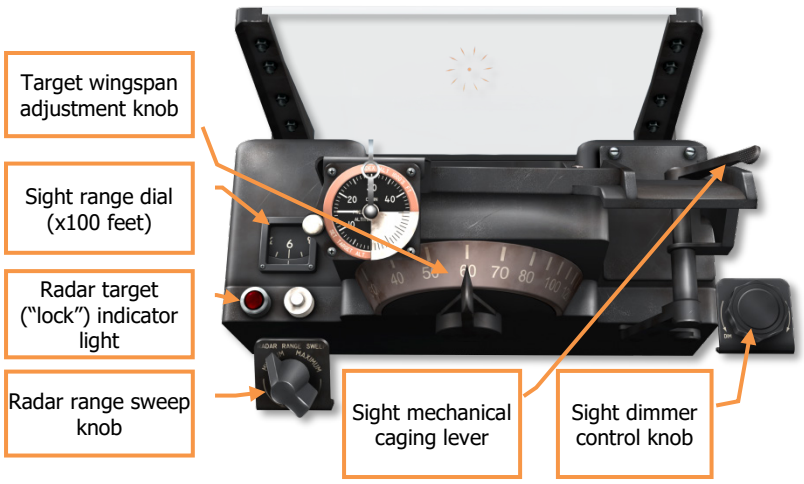
Ten external hard points are used to carry:

- 2 x AN-M64 or M117 dumb bombs.
- 16 x HVAR rockets.
- 2 x AIM-9B air-to-air missiles.



A-4 Gun-Bomb-Rocket Sight

Weapons aiming is accomplished using the A-4 gun-bomb-rocket sight. For air-to-air combat, accurate target range is automatically fed to the sight by the AN/APG-30 range-finding radar mounted in the nose. In case the radar malfunctions or provides poor results, aiming can be accomplished by manually entering target range and wingspan data. The A-4 sight also provides computed aiming against ground targets when employing bombs and rockets.



The A-4 sight uses a complex system of gyroscopes to calculate aim. These are sensitive to aircraft maneuvering, which can damage the equipment or cause errors in calculations. To prevent this, the sight is "caged" at all times other than an active target attack. Press R.Alt+R.Shift+H to decrease the sight brightness in darker conditions and R.Shift+R.Ctrl+H to increase when needed.

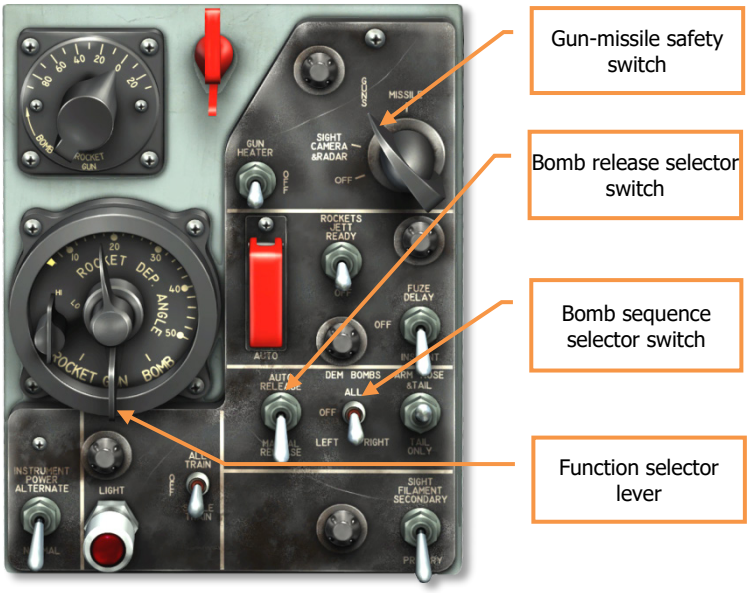
A-4 Sight modes of indication

Прицел **A-4** имеет три режима работы:

- NAVIGATION mode – selected by pressing 1 . This mode is default upon the simulation start.
- AIR-TO-AIR mode – selected by pressing 6 and used in air combat engagements.
- AIR-TO-GROUND mode – selected by pressing 7 and used for aiming targets on the ground.

Weapons Control Panel

The weapons control panel is located on the center console below the instrument panel. This panel includes a number of important controls for configuring weapons for fire.



- **Gun-missile safety switch.** In the Air-to-air 6 and Air-to-ground 7 modes must be set to GUNS for any weapons to fire but missile. Set switch to MISSILE in order to deploy AIM-9B against aerial targets. Pressing 1 (navigation) sets the switch into the OFF position.
- **Bomb release selector switch.** Sets bombs for AUTO or MANUAL RELEASE mode. In manual release mode, bombs are released when the pilot presses the **bomb-rocket release button** R.Alt+Space. on the control stick. In automatic release mode, the A-4 sight automatically provides a release signal when the calculated release point is reached after the bomb-rocket release button is **pressed and HELD down** R.Alt+Space.
- **Bomb sequence selector switch**. Sets the release sequence of bombs between: LEFT, RIGHT, or ALL.
- **Function selector lever.** Sets the gunsight mode based on the selected weapon type.

Aerial gunnery

Air-to-air

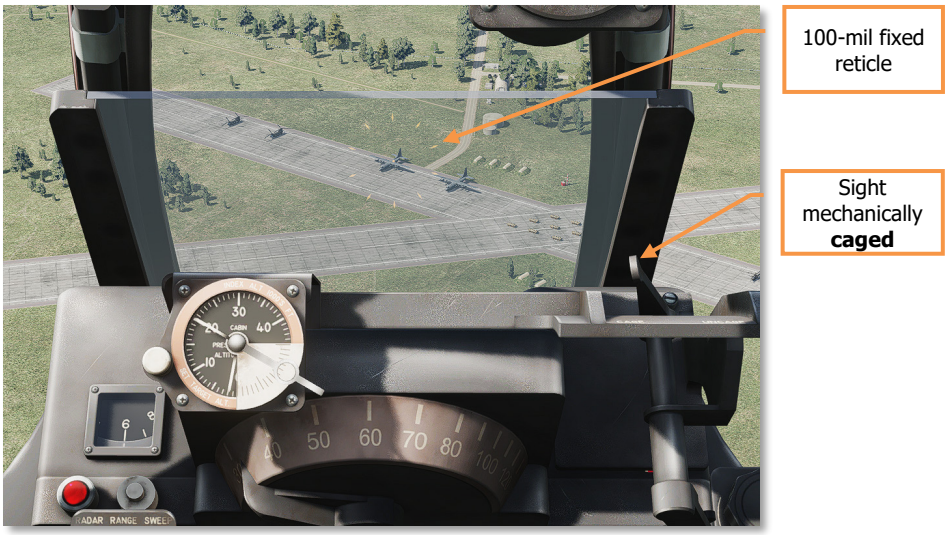
To aim and engage the air targets:

1. Press 6 to switch to the air-to-air mode.
2. Switch **GUNS-MISSILE** selector to GUNS position by pressing C. This will move the sight's mechanical caging lever to UNCAGED position and unlock the floating reticle (a diamond ring).
3. Maneuver the aircraft to place the reticle over the target.
4. With the reticle tracking over the target for at least one second, press Space to fire the guns.

The ranging radar may suffer from ground interference when operating at low altitudes (below 6,000 ft).

Air-to-ground gunnery

When attacking ground targets with guns, the A-4 gunsight must be caged, and the sight's reticle is used as a fixed 100-mil aiming reticle.

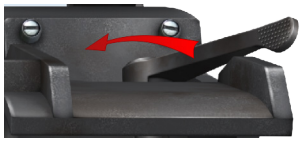


1. Select Air-to-ground mode by pressing 7. This will automatically move the **GUNS-MISSILE** selector to the GUNS position and the caging lever to the CAGED position. The sight's reticle will be fixed.
2. Maneuver the aircraft to place the reticle over the target.
3. With the reticle tracking over the target for at least one second, press Space to fire the guns.

Note: The caged reticle does not provide a computed aiming solution. Assess and adjust the aiming point by considering the bullet fall. Fire a short burst to check the aiming error, readjust aim as needed, and fire the full burst for effect on target. The 50-caliber machine guns have a limited maximum effective range of about 1,000 yards (~900 m).

AIM-9B missile employment

1. Select Air-to-air mode be pressing 6. This will switch the **GUNS-MISSILE** selector to the MISSILE position and cage the sight to have the sight's reticle fixed.



2. Maneuver the aircraft to place the reticle over the target.

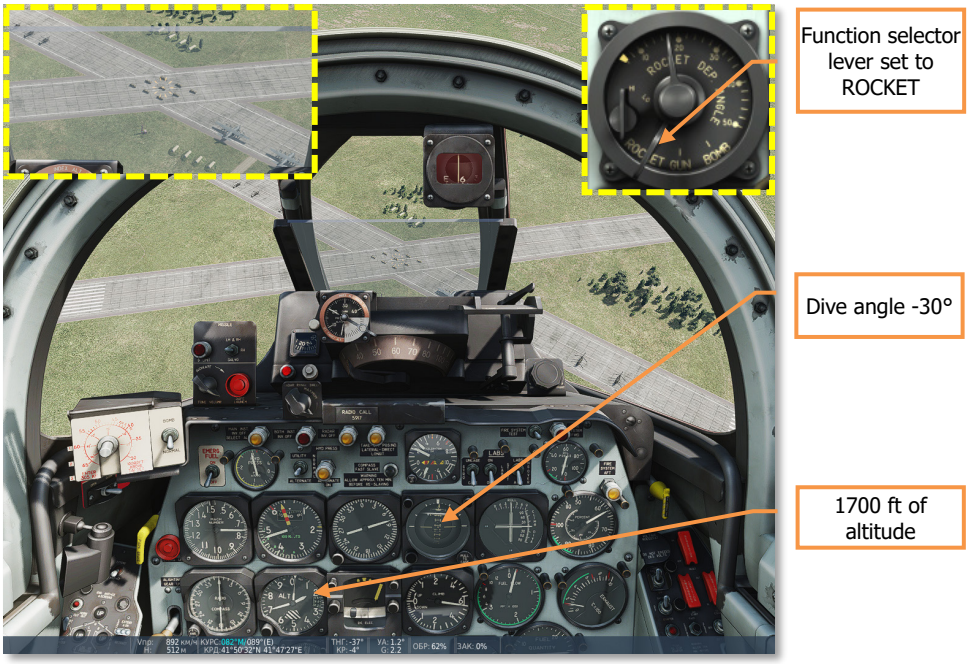
3. Wait until growling sound of the missile seeker changes to high-pitched tone and the LOCK lamp is lit. Consider the distance, keeping in mind that the lock might be obtained at ranges that don't match the effective missile range parameter.

8. Depress **Space** and wait about two seconds for the missile launch.

Rockets

Rockets are powerful, but unguided munitions. They are best used against area targets (in particular concentrated groups of lightly armored vehicles) at close range for maximum accuracy.

Rocket attacks are best performed in a dive of at least -30°. This requires the attack to be planned and executed well with sufficient altitude to perform the dive, aim, fire, and turn away from the target at a safe distance. For best results, begin the attack at an altitude of at least 3,000 feet above the target. Complete the attack and turn off the target at an altitude of no less than 1,500 feet.



1. Press 7 to move **GUNS-MISSILE** to the GUNS position.
2. Press D to select ROCKET position on the function selector. This will UNCAGE the sight and floating reticle.
3. Maneuver the aircraft to place the reticle over the target.
4. Place the reticle over the target, wait about 3 seconds, then press R.Alt+Space to fire the rockets.

Bombs

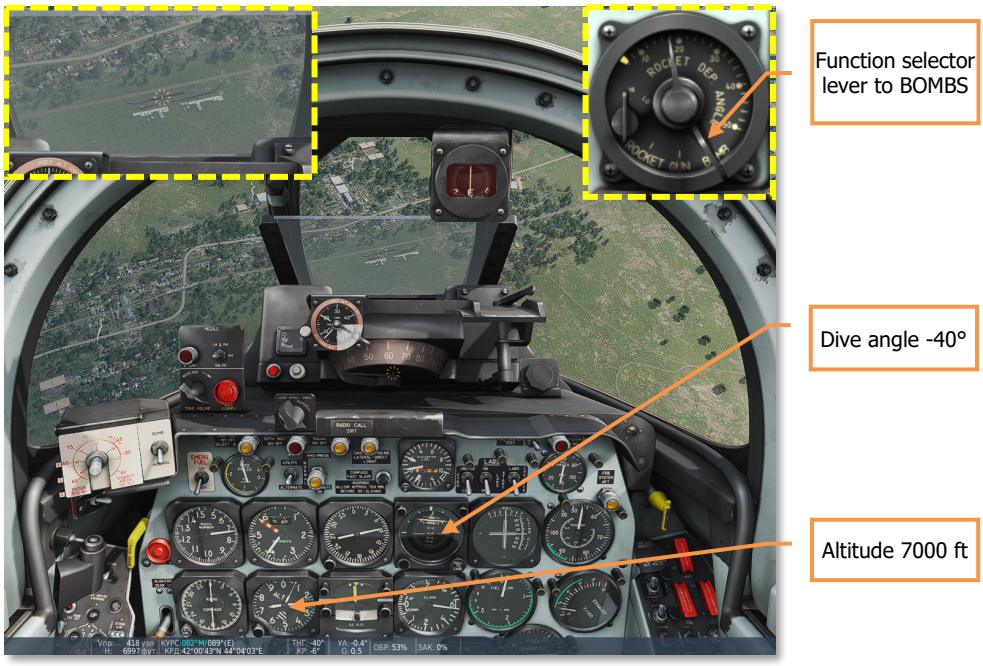
Like rockets, bombs are unguided munitions. Using them effectively takes practice, especially given the Sabre's limited payload of only two bombs, which can be dropped simultaneously or individually. Accurate bombing results are best achieved using steep dive angles of 30° or greater, for example:

- 30° suit for 6000 ft. of altitude;
- 40° for 7000 ft.

For best results, begin the attack at an altitude of at least 15,000 feet above the target and 290 KIAS. Complete the attack and pull up at an altitude of no less than 3,000 feet.

To help yourself to accommodate you can call up the information bar be pressing L.Ctrl+Y.

If you need to change from imperial units to metric go to the F10 map F10 and click on the label ft=>m. Ok let's move on…



1. Press 7 to move **GUNS-MISSILE** to the GUNS position.
2. Press D to select BOMBS position on the function selector. This will UNCAGE the sight and floating reticle.

Note: if you select the guns at this moment C the bomb release is also possible by pressing R.Alt+Space. The same is effective for guns by Space when bombs have been selected.

3. Deploy the airbrakes **B**, move the throttle back to idle and dive to the target. The most convenient way to do this is by rolling upside-down, directing the nose to ground and finishing with another half-roll pointing the nose to the target.

4. Check the dive angle against the horizon by the angular scale lines drawn on the canopy glass left and right. For every 5 extra dive degrees, re-calculate the drop altitude by adding an extra 500 ft. or vice versa for every 5° of decreasing dive angle subtract 500 ft. from the drop altitude.

5. Level the wings, remove any bank or slip. Place the reticle over the target and press **R.Alt**+**Space** at the required altitude.

6. Pull up immediately after the drop. Retract the airbrake **B** and push the throttle to exit the target area.