

Third Wire Strike Fighters 2 Series

F-5C "Skoshi Tiger"

United States Air Force

Volume III VERSION 1.0



F-5C variants included in the Package:

USAF F-5C version with armor plates and refueling probe (1965 - 1967)

VNAF F-5C with armor plates and no refueling probe (1967 - 1974)

CREDITS:

Sophocles

- 3D Model, Cockpit, textures

Ravenclaw_007

- 3D Modeling, Animations, Weapons, Beta testing, Project "God-father"

Baffmeister

- Flight model, weapons edits, Beta testing

Crusader

- Avionics and data tweaks, Beta testing

Guuruu

- Sounds and Afterburner effects, Beta testing

Guest contributors:

GKABS

- Pilot figure

Special Thanks to the staff and members of **Combatace.com** whose passion and efforts have enabled this game to endure, and to provide so much fun and excitement!

Additionally, many thanks to the following Combat-Ace Modders, who either actively contributed to the project over the years, or who invested their time either providing much needed hints and help, or researching various aspects of the model.

Brain-32

NeverEnough

Russouk2004

- Modeling advice, initial cockpit.cfg + more
- Initial work on the Flight model
- Always answering questions when I needed help..Cheers!!

Dag

- RoNAF textures and research (to be included in a dedicated future RoNAF F-5A module)

Derk

- Many, many references!!!

Blade

- Excellent mini-tutorial on damage textures

Finally, thanks to TK and **Thirdwire** for creating such a fantastic game.

USAF F-5C USER MANUAL



We are proud to present the F-5C *Skoshi Tiger*, a combat veteran of the Vietnam War, and one of the most enduring American military aircraft designs ever produced during the Cold War period. This third Volume depicts the following variants; the USAF F-5C and the VNAF F-5C. It has been our goal to provide to the simmer a highly detailed model and texture base which preserve the beautiful lines of this aircraft; and to engineer flight model files and a cockpit/gauge file-set that are authentic and add to the immersion of the flying experience within the Strike Fighters 2 series.



INSTALLATION INSTRUCTIONS

1. Copy the contents of the "To Mods Folder" to your SF2 Mod root directory of choice, which is typically:

C:\Users\user\Saved Games\ThirdWire\StrikeFighters2.

Allow directory merging and overwrites, provided the overwrites pertain to "fake pilot" entries, as well as weapons made by ravenclaw_007, which are included in this and many other releases.

2. Add the entries of "ADD_TO_SOUNDLIST.txt" to your SOUNDLIST.INI (located in the "*user\Saved Games\ThirdWire\StrikeFighters2\Flight*" folder). If one does not exist, then you will need to extract it using the 3rdWire CAT extract utility. You are simply required to substitute the "XXX"s with the next sequential number in the sound file section of the file.

NOTE 1:

Both Regular and Higher resolution cockpit textures are included in their own distinct folders in the package. The user may alternate between the two by "commenting out" the relevant line in the *F-5C_SkoshiTiger_COCKPIT.INI*

[CockpitData]

//Directory=cockpit

Directory=cockpit_Lo-Fi <---This is the default

In order to "activate" the higher resolution textures you would "de-comment" the previous line and comment out the next line, thus:

[CockpitData]

Directory=cockpit <---This is now Hi-Res

//Directory=cockpit_Lo-Fi

NOTE 2:

Another frame-rate friendly option for those with older hardware is to use the Next level of Detail Model as the primary external model. This simply involves changing the first line in the *F-5C_SkoshiTiger.ini* from this..

[LOD001]

Filename=F-5C.LOD

to this..

[LOD001]

Filename=F-5C_002.LOD

Much effort was made to provide those with lower end systems an alternative lower poly-model to be able to enjoy the F-5C, so please take advantage of this _002.LOD model should you experience frame-rate issues. While not as "rounded" as the Higher poly version, it is nonetheless just as detailed and extensive.

NOTE 3:

For those who may find loading times excessive, the .jpg files in the texture folders can be reduced to 50% of their size without sacrificing too much surface detail.

FEATURES

- * Two model set including the USAF F-5C version (1965 - 1967), and the VNAF F-5C variant.
- * Specular color and Normal (bump) maps on all models
- * Seven Level of Detail models (LODs) for each model, providing an almost seamless transition from distance to distance; and perhaps more importantly, ensuring that the frame-rate "impact" of the aircraft is as low as possible.
- * Two sets of highly detailed external Fuel Tanks by ravenclaw_007; both the Factory variety and the Sargent Fletcher variants.
- * Extensively fine-tuned flight parameters in three distinct aircraft data configuration files for all 3-D models, emphasizing the F-5C's agile and highly maneuverable characteristics - courtesy of Baffmeister.
- * 3 high resolution texture sets; thoroughly researched historic depictions of the Aircraft fielded by both USAF and VNAF squadrons.
- * Accurate serial numbers and pilot name decals for both the 4503rd Tactical Fighter Squadron and 110th commando squadron.
- * Quality sound-set included. Base sounds, by Guuruu, were sourced from existing recordings of various aircraft at air-shows and were modified to match the prominent characteristics of the F-5A General Electric turbojets, the "buzz" of the M39 Pontiac 20mm machinegun, and the flap/Air-brake, undercarriage deployment and retraction sequences of the Freedom Fighter.
- * Super detailed 'Virtual Cockpit' with animated throttle control, rudder pedals, control stick, landing gear lever, canopy, canopy lever, drag-chute lever, weapons selectors and weapon station arming flick switches.
- * Accurate and functional representation of the Norair F-5A gun sight, with animated Mils selector and accompanying animated combining glass (Mechanics by Crusader).
- * A full complement of highly (or should I say "insanely" detailed USAF weapons carried by the F-5C Skoshi Tiger, all by ravenclaw_007.
- * Comprehensive Loadouts representing the weapons carriage evolution of the F-5C in USAF service from 1965 to 1967.

* Complex animation of canopy opening mechanism, and animated Turbine blades; both thanks to ravenclaw_007.

* GKAB's superb highly detailed crew figure with authentically modeled oxygen mask and flight helmet.

* All new afterburner, emitter, and engine smoke effects by Guuruu



The Cockpit

Main Instrument Panel



- | | |
|---|--|
| 1. LANDING GEAR POSITION INDICATOR LIGHTS | 17. FUEL QUANTITY INDICATORS |
| 2. DRAG CHUTE T-HANDLE | 18. NOZZLE POSITION INDICATORS |
| 3. ENGINE FIRE WARNING LIGHT | 19. FUEL FLOW INDICATORS |
| 4. FLAP POSITION INDICATOR | 20. CABIN ALTIMETER |
| 5. ATTITUDE INDICATOR FAST ERECT SWITCH | 21. VERTICAL VELOCITY INDICATOR |
| 6. GYRO POWER SWITCH | 22. TURN AND SLIP INDICATOR |
| 7. ACCELEROMETER | 23. BEARING - DISTANCE - HEADING INDICATOR |
| 8. AIRSPEED - MACH INDICATOR | 24. CLOCK |
| ATTITUDE INDICATOR | 25. COURSE INDICATOR |

9.

10. ALTIMETER

11. MASTER CAUTION LIGHT

12. ENGINE TACHOMETER INDICATORS

13. EXHAUST GAS TEMP. INDICATORS

14. HYDRAULIC PRESSURE INDICATORS

15. CANOPY UNLOCKED WARNING LIGHT

16. OIL PRESSURE INDICATORS

26. HORIZONTAL TRIM INDICATOR

27. SIGHT RETICLE BRIGHT. CONTROL KNOB

28. SIGHT FILAMENT SELECTOR SWITCH

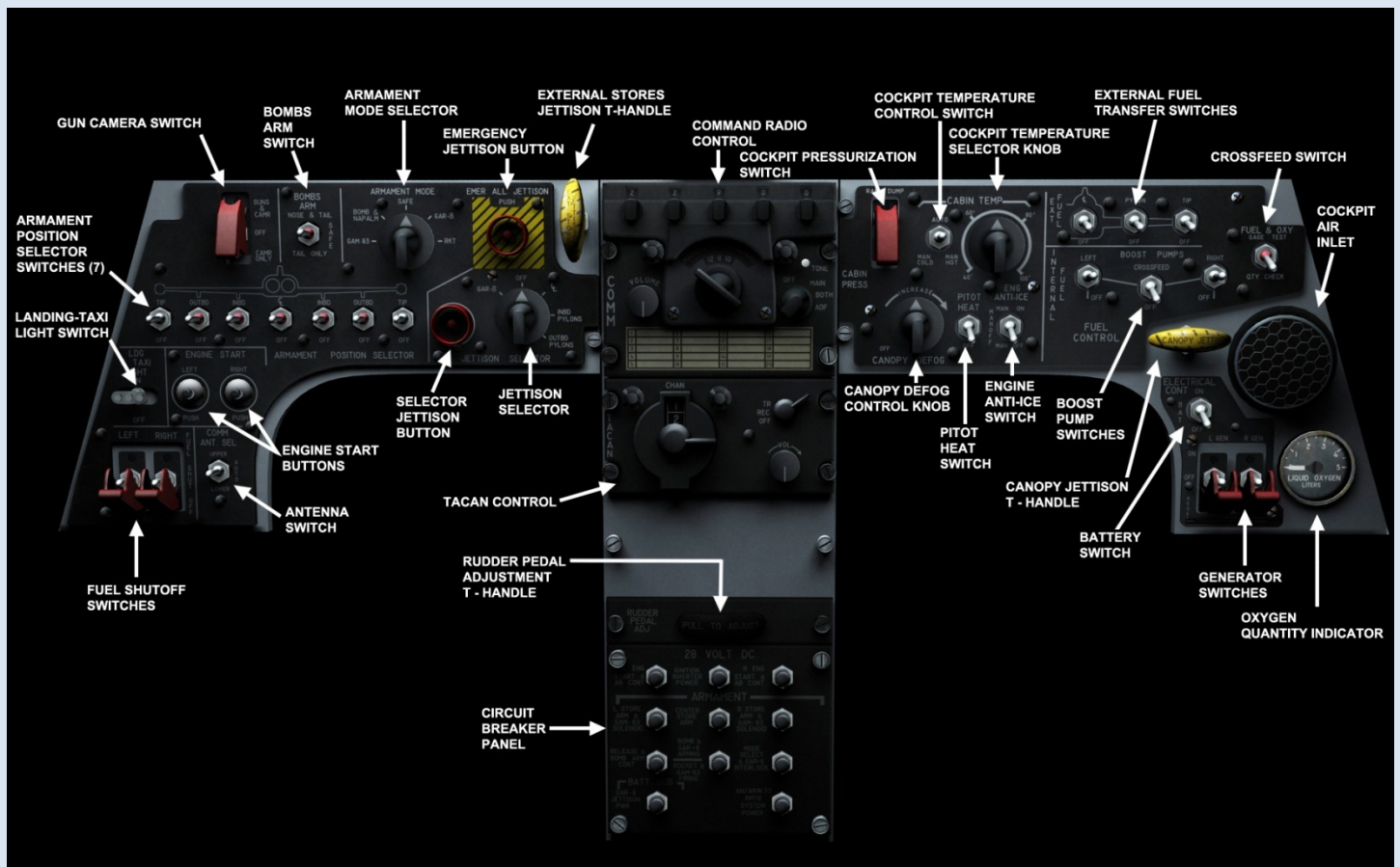
29. MISSILE VOLUME CONTROL KNOB

30. DOWNLOCK OVERRIDE BUTTON

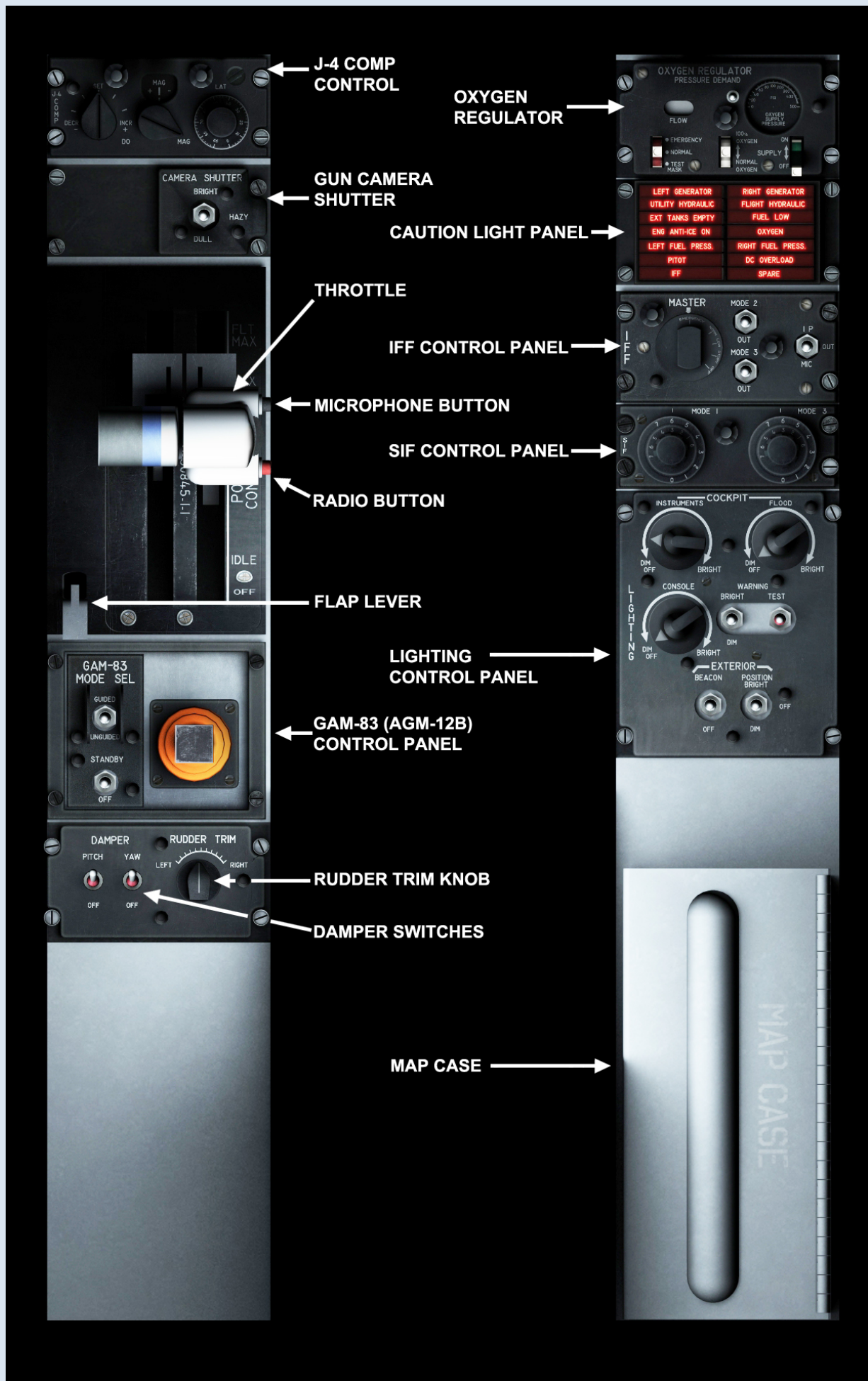
31. LANDING GEAR LEVER

32. LANDING GEAR WARNING SILENCE BUTTON

Vertical Control Panels



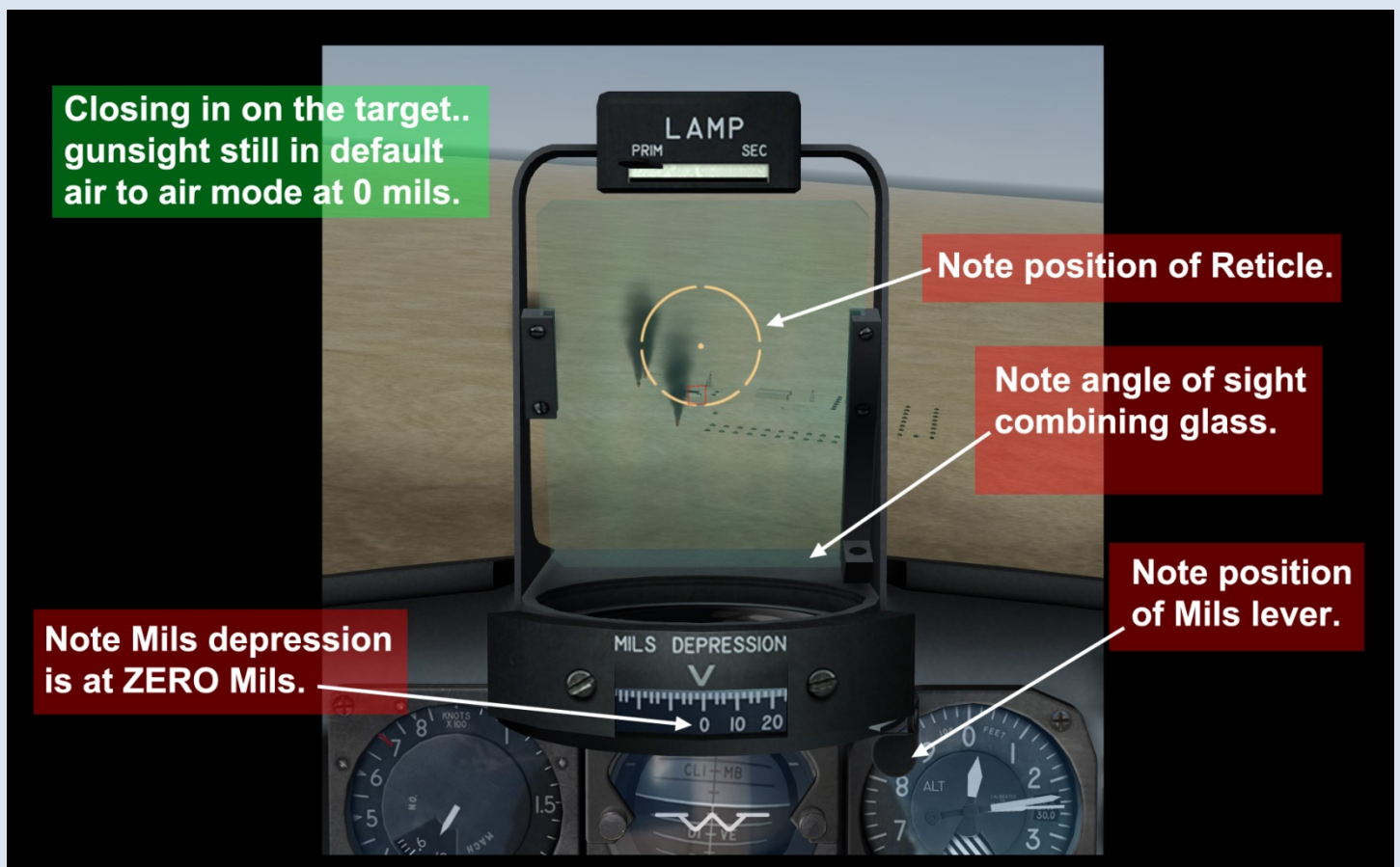
Side Consoles



The Gun Sight

The designers of the F-5A elected the simplest and most reliable gunsight conceivable. The low-cost, optical-mechanical reticle display was manually adjustable from 0 to 200 mils depression. It was collimated to avoid sighting errors. The gunsight was acceptable for aiming AIM-9B missiles, guns, rockets and bombs.

It was possible to "replicate" this simple, mechanical operation within *Strike Fighters 2* series parameters, and thanks to Crusader's cockpit.ini entries, we have the following functionality: The site itself is animated so that the Mils lever and the combining glass of the site move according to the Mills selected (activated when cycling through air to air weapons ; and more importantly, air to ground weapons with "Backspace" and "\" Backslash accordingly). The following in-game screenshots show this in action for an air to ground attack on an enemy Generator building.



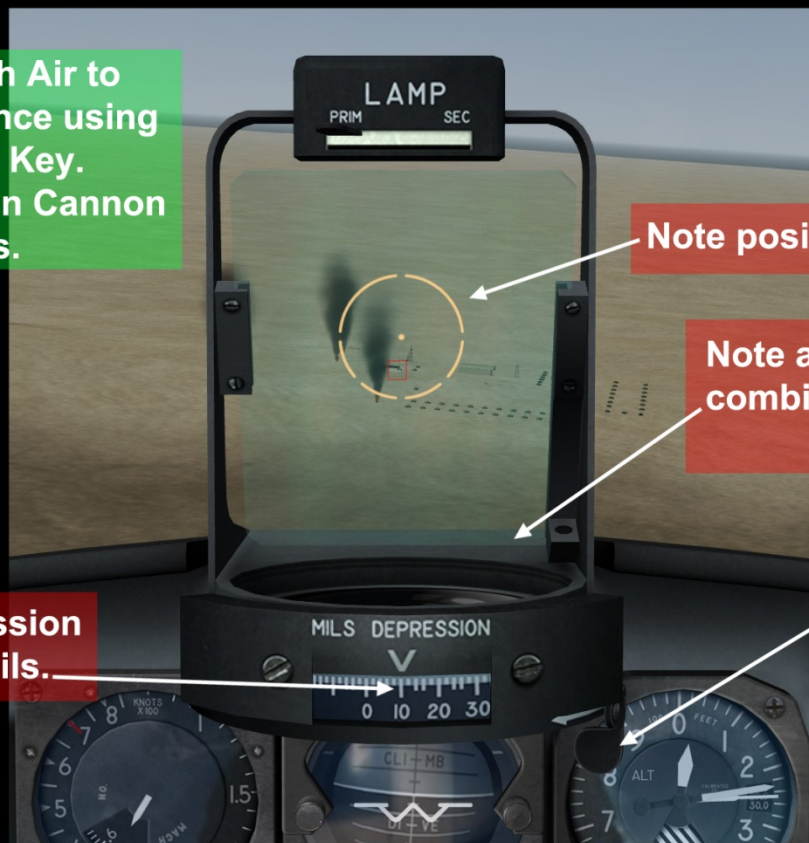
Cycling through Air to Ground ordinance using (\) "Backslash" Key. Gunsight now in Cannon mode at 10 mils.

Note position of Reticle.

Note angle of sight combining glass.

Note position of Mils lever.

Note Mils depression is now at "10" Mils.



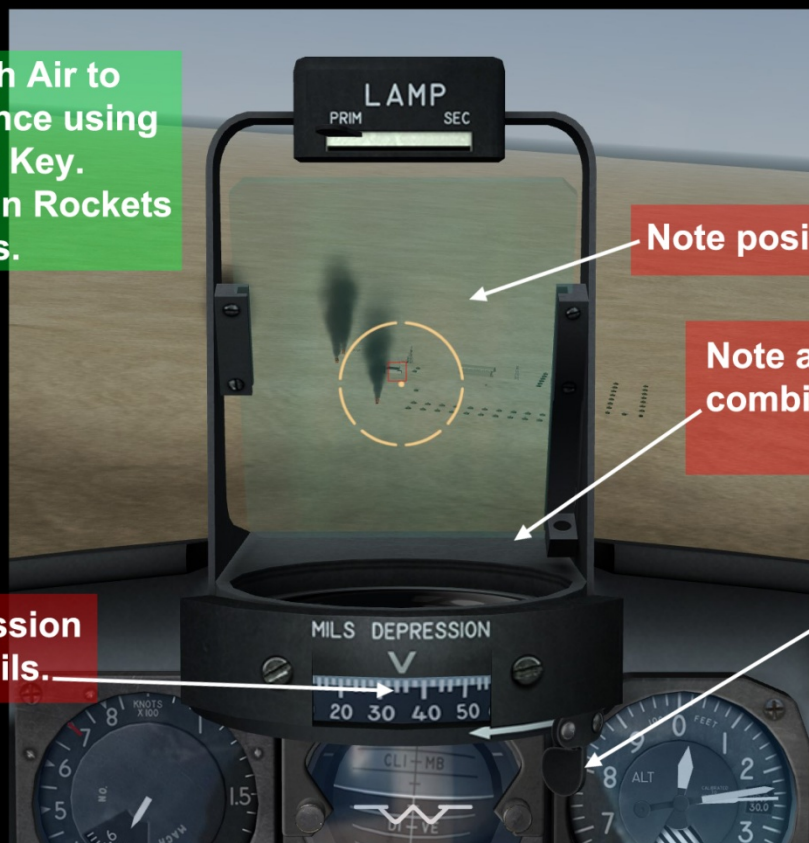
Cycling through Air to Ground ordinance using (\) "Backslash" Key. Gunsight now in Rockets mode at 36 mils.

Note position of Reticle.

Note angle of sight combining glass.

Note position of Mils lever.

Note Mils depression is now at "36" Mils.



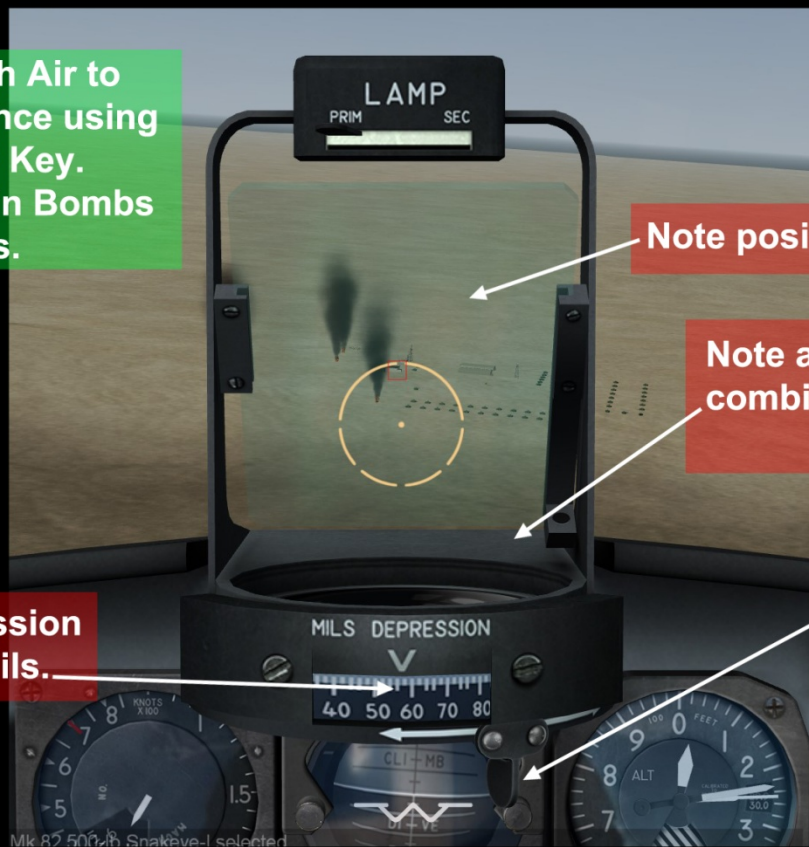
Cycling through Air to Ground ordinance using (\) "Backslash" Key. Gunsight now in Bombs mode at 58 mils.

Note position of Reticle.

Note angle of sight combining glass.

Note Mils depression is now at "58" Mils.

Note position of Mils lever.



Gun Camera "still" a split second after releasing a couple of MK.82 "Snakeyes" ...



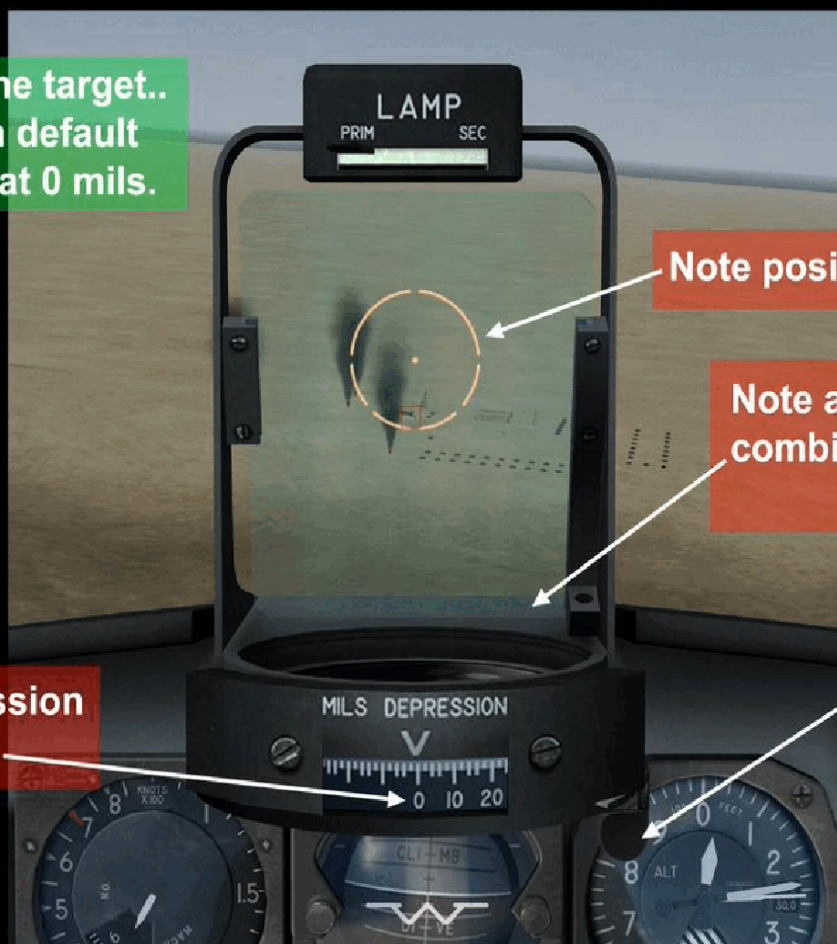
BOOM!!!

"mission complete..RTB"



Animated

**Closing in on the target..
gunsight still in default
air to air mode at 0 mils.**



Note position of Reticle.

**Note angle of sight
combining glass.**

**Note position
of Mils lever.**

**Note Mils depression
is at ZERO Mils.**



Pilot's Notes

F-5C Limit and Reference Speeds. [Indicated Airspeeds]

FLAPS: **300kts** for both leading and trailing edge.

NOTE: The F-5C uses full flaps for take off but due to a game bug you must manually select full flaps for take off when player flown. The AI will use full flaps although you can hear the flap sound cycling between flap 1 and flap 2.

LANDING GEAR: **240kts**

DRAG CHUTE: **165kts**

CANOPY: **50kts**

NOSE WHEEL STEERING: **65kts**

MAXIMUM INDICATED AIRSPEED: **710kts** [redline]

MAXIMUM MACH: **1.72 Mach** design limit but thrust/drag limited to about mach 1.50 in a 60deg dive from 50,000ft.

TAKE OFF ROTATION SPEEDS

13500lbs: **155kts** [full internal fuel and two sidewinders]

20500lbs: **195kts** [about the maximum weight possible with included stores]

NOTE: Use full flaps for take off! Adding 6kts for every 1000lbs above 13500lbs should give good aft stick/rotation speeds.

CLIMB SPEEDS

Military Power:

13500lbs: **375kts** with a transition to mach 0.89

20500lbs: **310kts** with a transition to mach 0.74

Maximum Power:

13500lbs: **595kts** with a transition to mach 0.93

20500lbs: **480kts** with a transition to mach 0.85

FINAL APPROACH SPEEDS

With 500lbs fuel remaining and some empty racks use **160kts**. Add 5kts for every additional 500lbs of fuel.

NOTE: Target touch down speed is 20kts less than final approach speed.



The U.S. Air Force, not a full-fledged operational customer for F-5s, nonetheless took a special squadron of Freedom Fighters into combat in Vietnam in 1965 as an extensive evaluation of the aircraft's capabilities. The premise was to compare F-5 operations with those of the F-4C, F-100, and F-104. The operational test was called Skoshi Tiger, the name generally associated with many aspects of this project.

The Skoshi Tiger aircraft were hybrids. Though sometimes called F-5As, these combat jets also are referenced in Air Force documentation as F-5Cs. They incorporated fixed, angled refueling probes on the left side of the forward fuselage. They also added armor plate and jettisonable stores pylons. The rudder limiter was removed, and a new gyro system was installed. They carried an Air Force-style Southeast Asia camouflage scheme.

The in-flight refueling boom could be removed. Its MA-2 nozzle was compatible with the KC-135 tanker boom-to-drogue adapter kit. To fortify the F-5 against a hostile ground fire environment, 1/4 inch thick face-hardened steel armor plate was mounted externally between fuselage stations 194.0 and 253.5 as well as between fuselage stations 483.0 and 537.75. The forward plates, below the cockpit, protected the pilot and the control mechanism. The aft plates protected vital hydraulic and control areas near the tail. The armor added 236 lbs to the weight of the Skoshi Tiger

All five pylon-stations were jettisonable on Skoshi Tiger F-5s. They incorporated explosive attaching bolts to accomplish this. A cam and 1-hook fitted at the aft end of the pylon and quick disconnects for electric contacts, air, and fuel, helped assure clean separation from the aircraft when the pylon was jettisoned. Skoshi Tiger F-5s also used multiple ejector bomb racks to increase the stores carrying flexibility over that of contemporary F-5s.

Colonel Frank N. Emory was tagged to command the Skoshi Tiger squadron; his deputy was Lt. Col. W. F. Georgi. At this stage in the planning, the total temporary duty commitment for the evaluation was estimated at approximately eight months. The objective was to determine the combat effectiveness of the F-5A in comparison with other fighter aircraft in the USAF inventory, and also flying in Southeast Asia. Colonel Emory's Skoshi Tiger squadron was activated as the 4503'd Tactical Fighter Squadron (Provisional) at Williams AFB, Arizona, on 26 July 1965. By the end of July 1965, Skoshi Tiger had a home.

Four hours after the Skoshi Tiger F-5s landed at Bien Hoa in Vietnam, two of the Freedom Fighters, piloted by Maj. Roy L. Holbrook, Jr. and Capt. James W. Thar, flew the unit's first combat sorties as they struck at a Viet Cong concentration estimated to be as high as 500 men in war zone D. The brace of F-5s each carried four 500-lb bombs and 500 rounds of 20-mm cannon ammunition for this inaugural mission. Each F-5 made five bomb runs and two strafing passes over the target, with no return fire noted. That began a regimen intended to log 50 hours a month for four months on each of the Skoshi Tiger F-5s.

On 2 February 1966, Skoshi Tiger began Phase 111 of the F-5 combat evaluation with accelerated in-country missions flown from Bien Hot for 10 days. The jets logged 348 combat sorties in this phase, spewing 51,749 rounds of 20-mm ammunition, firing 456 rockets, and dropping 376 BLU-1B napalm bombs, 54 CBU-2A canisters, 466 MK-82 bombs, and 428 M-117 bombs. The load carried by the F-5s during this phase averaged 2,603 lbs per sortie. The marauding Skoshi Tiger jets were credited, according to intelligence reports, with the destruction of 312 structures and the damaging of 245 more during Phase III. Twenty-six bunkers were destroyed by the F-5s, and 21 sampans were sunk and eight more damaged.

The conclusion of Skoshi Tiger saw the equipment and personnel assigned to the 10th Fighter Commando Squadron (FCS), Third Tactical Fighter Wing, activated at

Bien Hoa in the Republic of Vietnam on 8 March 1966. The 10th Fighter Commando Squadron served the USAF in Vietnam until the squadron was deactivated on 17 April 1967. At that time, aircraft and equipment were transferred to the Vietnamese Air Force (VNAF).

*(From: Warbird Tech Series 44 - Northrop F-5 F-20 T-38 - by FA.Johnsen)

Skoshi Tiger Combat roles and Configurations

The F-5s carried a 150-gallon centerline fuel tank on all but five bombing sorties. This configuration left four stores positions open for ordnance. The F-5s used 50-gallon wingtip fuel tanks on all sorties but the 32 logged combat-patrol and escort sorties, for which the wingtip tanks were replaced with one AIM-9B missile on each wingtip. The final Skoshi Tiger report indicates the practice of carrying (and firing) air-to-ground rockets on the inboard pylons was discontinued during the F-5 evaluation in an effort to reduce engine POD. The F-5s typically carried four 750-lb M-117 bombs on interdiction sorties into Laos and North Vietnam. On the few un-refueled missions into these areas, only two M-117s were mounted to the small F-5s.

The F-5C in use with the VNAF



Definitive authorisation was given by the Department of Defence to transfer former USAF " Skoshi Tiger" program Northrop F-5A/C and F-5B in order to equip one Squadron under the Military Assistance Program, planned in March 1967 but postponed for a short time.

The 522nd Squadron of the 23rd Wing based at Bien Hoa AFB stood down in September 1966 while the first batch of 32 Vietnamese pilots (only 1 failed) transiting from Douglas A-1 to Northrop F-5 (via Northrop T-38A) was sent to USA, Williams AFB in October 1966 till April 1967 for training; ground crew was trained in Vietnam and sent to Clark AFB (Philippines). The initial 17 Northrop F-5A/C and 2 F-5B, originally belonging to the 3rd USAF Wing, were unofficially transferred to the Republic of Vietnam on at Bien Hoa AFB 17-04-67 and officially on 01-06-67 at Tan Son Nhut AFB where 27 pilots arrived combat-ready and 160 airmen and officers were trained to maintain the new fighter; the ground crew obtained the help of 75 jet mechanics for the initial months. The air-to-air refuelling system was removed in order not to allow operations over North Vietnam (an unofficial statement).

Planned utilisation was 35 hours per month, with a desired in service rate of 75 percent. These figures were only achieved the following. By December 1969 the rate was 34 hours utilization per aircraft/month; 34 weather aborts had lowered this rate. In-commission rate was 85.2 %; the 522nd Squadron did well in combat and most close-support missions could be completed. Two losses were exclusively on ground attacks.

*(From <https://www.the-northrop-f-5-enthusiast-page.info/>)

Specifications*



Engines:

Two General Electric J85-GE-13 turbojets, rated at 2720 lb.s.t., 4080 lb.s.t. with afterburning.

Performance:

Maximum speed: 925 mph (Mach 1.4) at 36,000 feet.

Maximum cruising speed without afterburning: 640 mph (Mach 0.97) at 36,000 feet.

Stalling speed: 147 mph with flaps extended.

Initial climb rate: 30,400 feet per minute.

Service ceiling: 50,500 feet.

Takeoff run: 2650 feet with two Sidewinder missiles.

Landing run from 50 feet with braking parachute: 3900 feet.

Range with maximum fuel: 1387 miles.

Combat radius with maximum payload: 195 miles.

Combat radius with maximum fuel and two 530-pound bombs: 558 miles.

Fuel:

Two internal fuel tanks composed of integral cells with total usable capacity of 583 US gallons. One 150 US gallon drop tank could be carried on the fuselage centerline pylon, two 150 US gallon droptanks could be carried underneath the underwing pylons, and a 50-gallon tank could be carried at each wingtip, bringing total fuel capacity to 1133 US gallons.

Dimensions:

wingspan: 25 feet 3 inches

length: 47 feet 2 inches, height 13 feet 2 inches.

wing area: 170 square feet.

Weights:

8085 pounds empty, 11,477 pounds combat, 13,433 pounds gross, 20,677 pounds maximum takeoff.

Armament:

Two 20-mm cannon in the fuselage nose. Two AIM-9 Sidewinder missiles could be carried at the wingtips. Five pylons, one under the fuselage centerline and four under the wings that can carry up to 6200 pounds of ordinance or fuel tanks. A variety of bomb, rocket and gun packs can be carried from the centerline pylon, while underwing loads can include, bombs, unguided rockets, gun packs, or external fuel tanks.

*(From http://www.joebaugh.com/usaf_fighters/f5_2.html)

Paint Schemes



The Skoshi Tiger F-5Cs carried an Air Force-style Southeast Asia camouflage scheme. From photographic evidence it appears that the demarcation lines of the 3-tone scheme were more "feathered" on aircraft further along on their deployment than earlier examples.

Agreement

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Sophocles

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