

for J.L.W.



COMBAT SIMULATION

What you have is **STILL** a W.I.P.

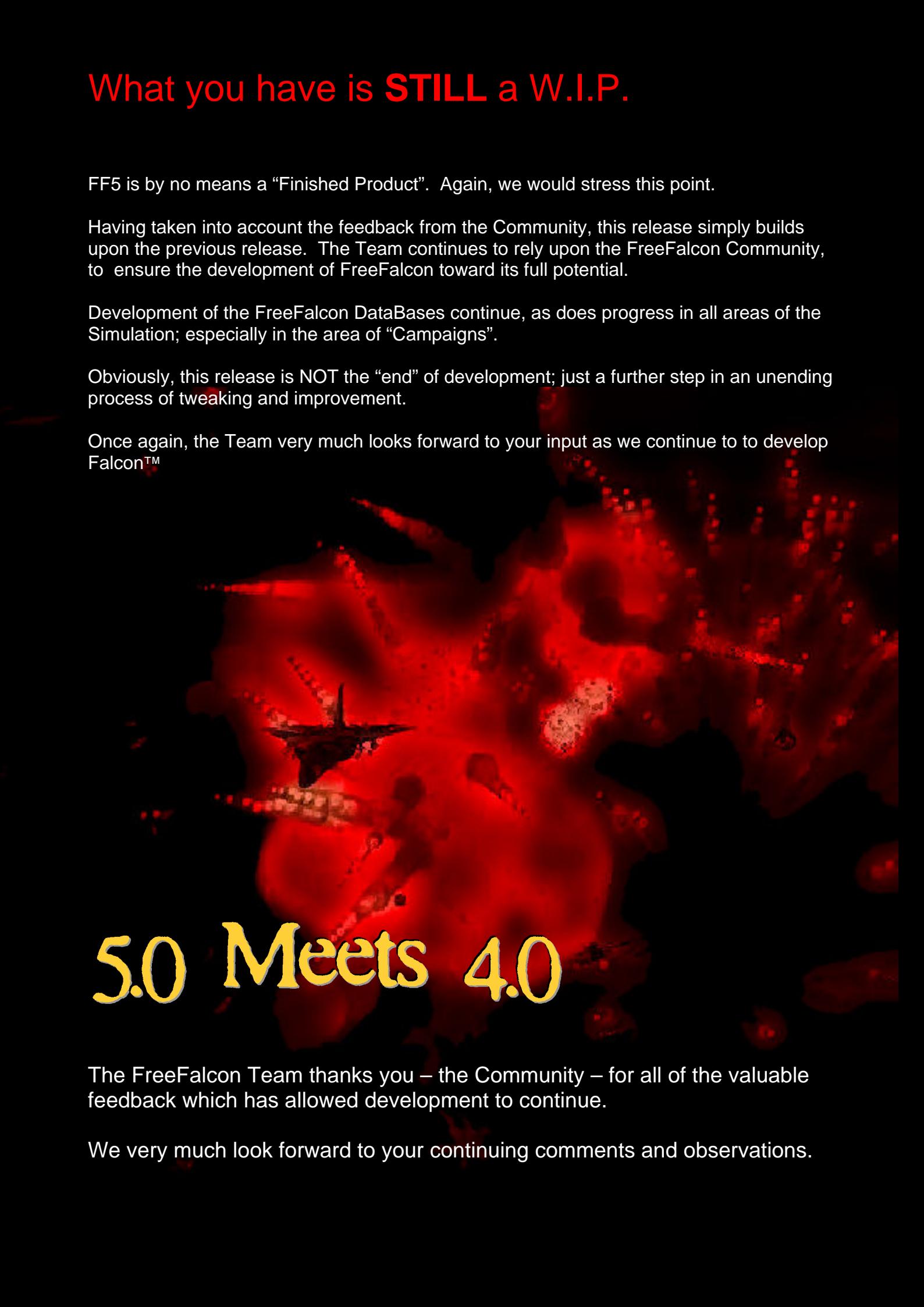
FF5 is by no means a “Finished Product”. Again, we would stress this point.

Having taken into account the feedback from the Community, this release simply builds upon the previous release. The Team continues to rely upon the FreeFalcon Community, to ensure the development of FreeFalcon toward its full potential.

Development of the FreeFalcon DataBases continue, as does progress in all areas of the Simulation; especially in the area of “Campaigns”.

Obviously, this release is NOT the “end” of development; just a further step in an unending process of tweaking and improvement.

Once again, the Team very much looks forward to your input as we continue to develop Falcon™.



5.0 Meets 4.0

The FreeFalcon Team thanks you – the Community – for all of the valuable feedback which has allowed development to continue.

We very much look forward to your continuing comments and observations.

S. CONTENTS

READ THIS → This is an “Automated” Document. Most Pages are ACTIVE...!

By clicking on the title icons, you will be taken directly to the selected page.

You can return to the Contents of this document by clicking on various “Snakes” “Pictures” and “Icons” located at the bottom of many pages.

For ease of Navigation, you should also use the BOOKMARKS Tab (to the left)

Not all contents are listed on the CONTENTS Pages.

Please use the **BOOKMARKS** in the left margin for a COMPLETE listing of Contents.



About this Companion

F.A.Q.



MULTIPLAYER

- Snail's Slow Guide To Multiplayer
- Khronik's Chronic MP For Dummies
- derStef + Skratch Multi Miscellany
- RifleFighter's TeamSpeak



3D Pits

It's The 'Pits



Build a Falcon Rig



BREVITY Codes



Wild Blue Yonder

- ↳ Weather
- ↳ FF5 Enhancements
- ↳ Naval Ops + Harriers
- ↳ Keystrokes
- ↳ Config Editor



Official 3rd Party THEATREs

Projects

*The Phantom
The Tornado
The LEGACY*



The Learning Centre

AVIONICS

- ☛ Star Navigation
- ☛ Landing the F-16
- ☛ A.I. Management
- ☛ Rockets
- ☛ RECON
- ☛ CCIP + Bombing



DewDog's TE War College

The U.I.
FF On-Line
Campaigns



Tactics

- Dicta Boelcke
- Basic Air Combat Manoeuvres
- THREAT & Missile Evasion
- F4 Phantom Tactics



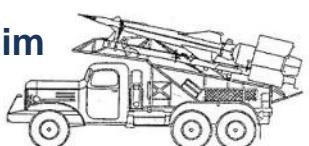
CobraWeather

TOOLS

*T Manager
F4XChange
TODMixer*



SAM Sim



The Aragorn Tapes:

- The Gilman Louie Interview
- The Bin Laden Interview



Gorny's:

- Advanced Tactics School
- Gorny the Flyboy



Gorn's Arts & Crafts II



COMMUNITY INTERVIEW

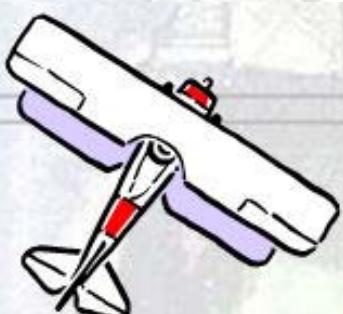


F-16 GROUND TECHNICIAN HORNET DRIVER

TrackIR & Joe's Alternative



TouchBuddy & Joe's Alternative



A BaldEagle Chat



Do the Hustle



Appendices

How To



Miscellany



Random Considerations



Shimmer with Bat



2D Vs 3D



SKINNING

- Nth Korean TACAN
- Falcon Timeline
- The COBRA
- Sample FMs
- Victory Conditions



FreeFalcon is a dedicated group of 3D modelers, skin artists, programmers, campaign builders, tweakers and just plain old enthusiasts. Our diverse group includes people from North America, Western Europe, Eastern Europe, Antarctica, Australia, South America, South Africa and Asia.

We range from sixteen, to sixty-something years old, with current and former Army and Naval Aviators, F-16 Ground Crew, Active Fighter Pilots flying combat missions in Iraq, Computer programmers, Lawyers, Students, Engineers, Teachers, Skilled laborers, Commercial Pilots, Writers, Educators, and Burnt-out Rock Stars.

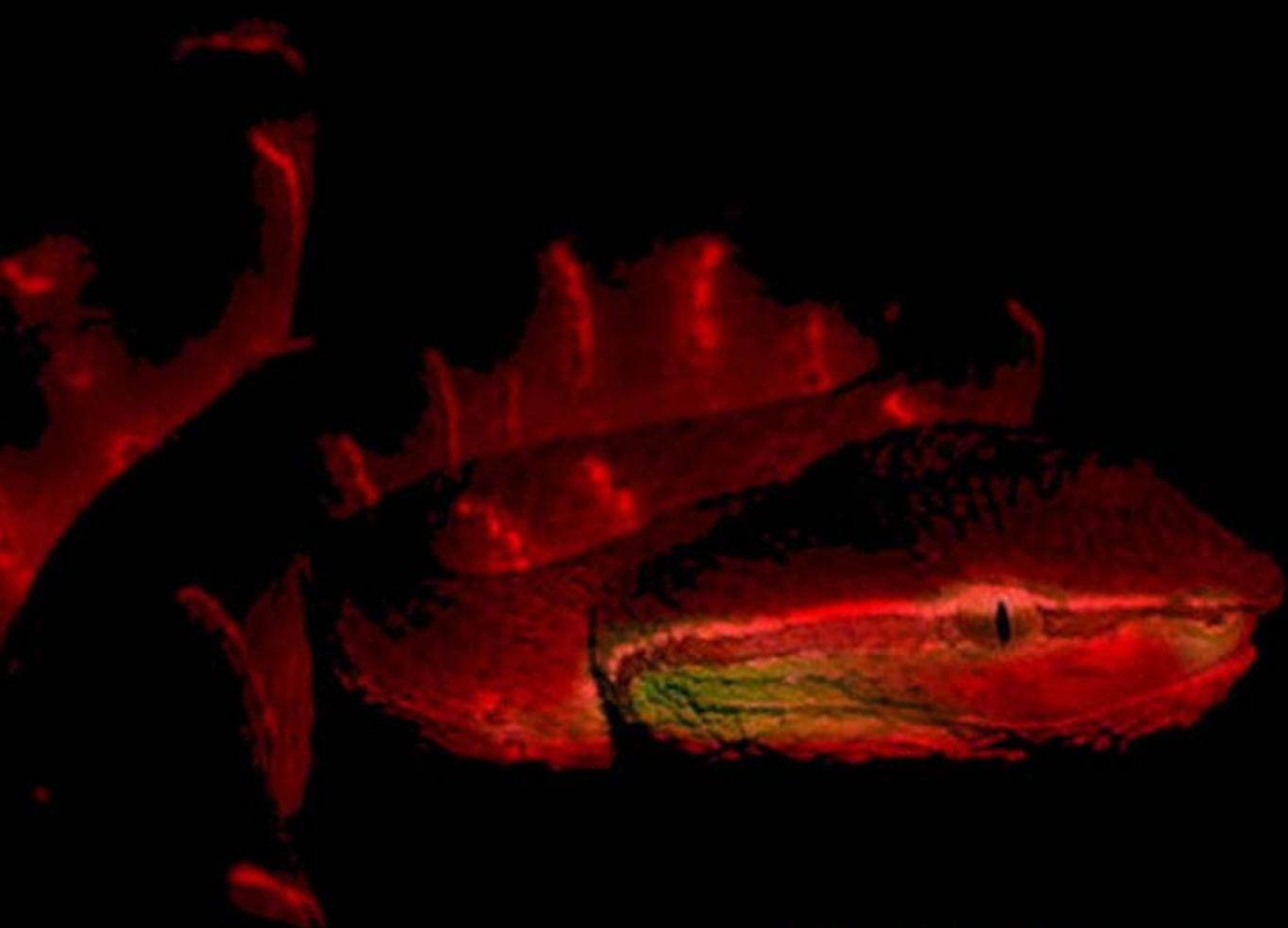
The one thing we all have in common: The love of the world's finest Military Flight Simulator.

Falcon 4.0™ was released ten years ago, and - over the years - we have seen many improvements as different groups have striven to improve our beloved sim.

FreeFalcon continues the effort.



Remember – the pictures and icons are to help you navigate the document



FF5.0

This Companion is not a Stand-Alone Guide to Falcon™.

This Companion will not teach you how to fly the Viper.

It is assumed that you will follow the “**Study Programme**” outlined in the FF4.0 Manual in your _the_Manual Folder. A *Study Programme* is also outlined in this document.

This Companion presents an eclectic variety of information for both n00b & Veteran.

A pre-existing knowledge of Falcon4.0™ is assumed. This Companion is largely lost on those who have not followed the “Study Programme” outlined in the FF4.0 Manual.

Besides - a firm knowledge of Falcon 4.0™ is a ‘given’ to the serious simmer.

Most significantly, this Companion **WILL** introduce you to the new features of this release. There have been changes both cosmetic and fundamental.

It is recommended you read BOTH this Companion AND the FF4.0/RV Manual.

This Companion will give some description of the processes running in the background; the machinations of the *FreeFalcon 5.0* simulation experience.

This Companion will **NOT** concentrate on technical details/aspects of the Software. **GSST™** (*Gorny’s Special Simpleton Terms*) will be used wherever possible.

Where relevant, it will refer you to the FF4.0 Manual.

This Companion **WILL** provide a variety of TUTORIALS, to educate both the n00b and the Veteran alike. See the *Disclaimer Pg. 448*.

This document is intended for the average “Pilot on the Street”. For those who wish to access it – more detailed information is available in both the Appendices and the FF4.0/RV Manual.

Be warned → This Companion does include the Gorny “lite” approach...!

If you are an Uptight Anal Retentive, this Companion may be detrimental to your overall mental health.

This being the case, may I refer you to the “Blow Me, You Humourless Twat” Section.

Hopefully, the Edutainment methodology will make your visitation to this Companion far more relaxed, than is the norm.*

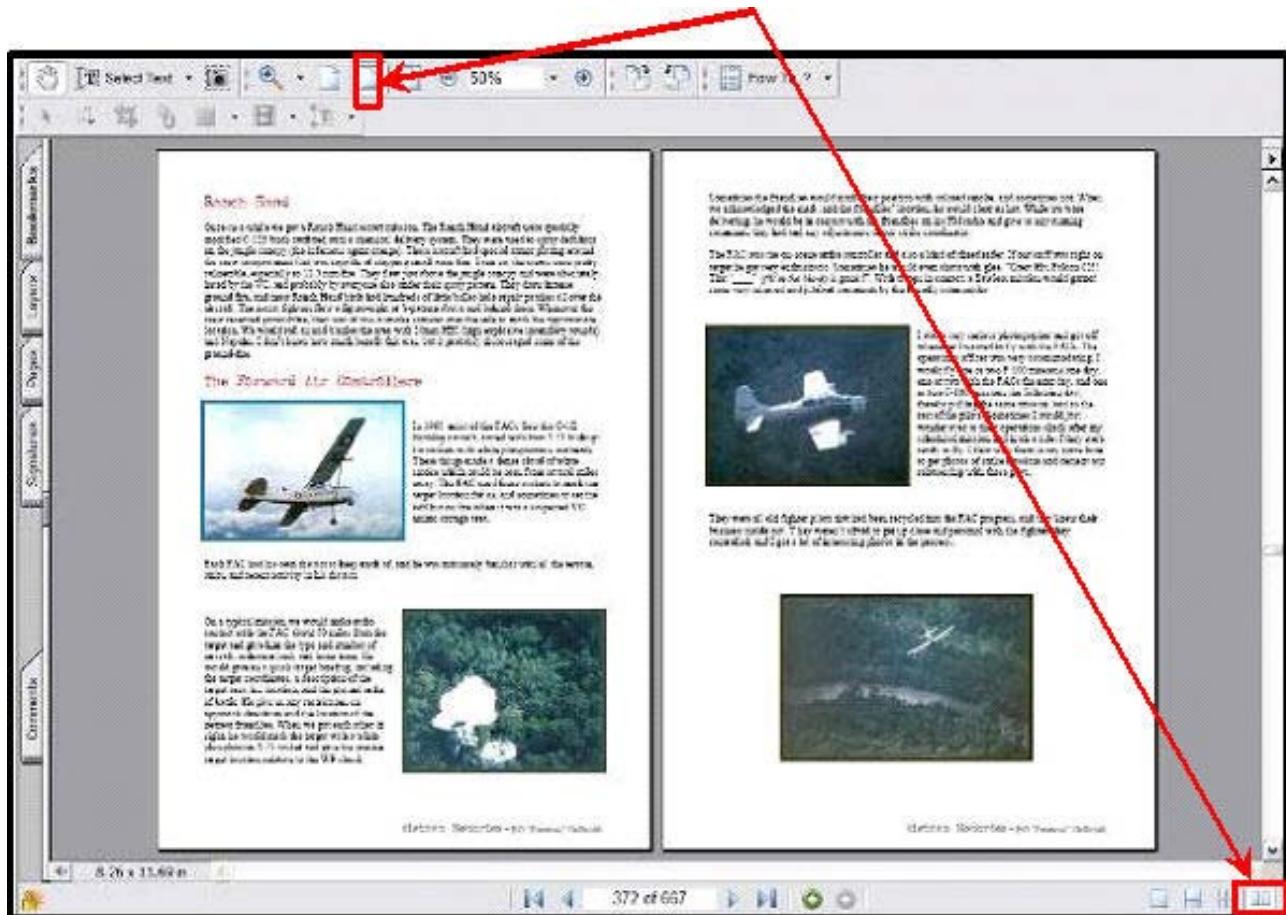
And enlightening

And fun.

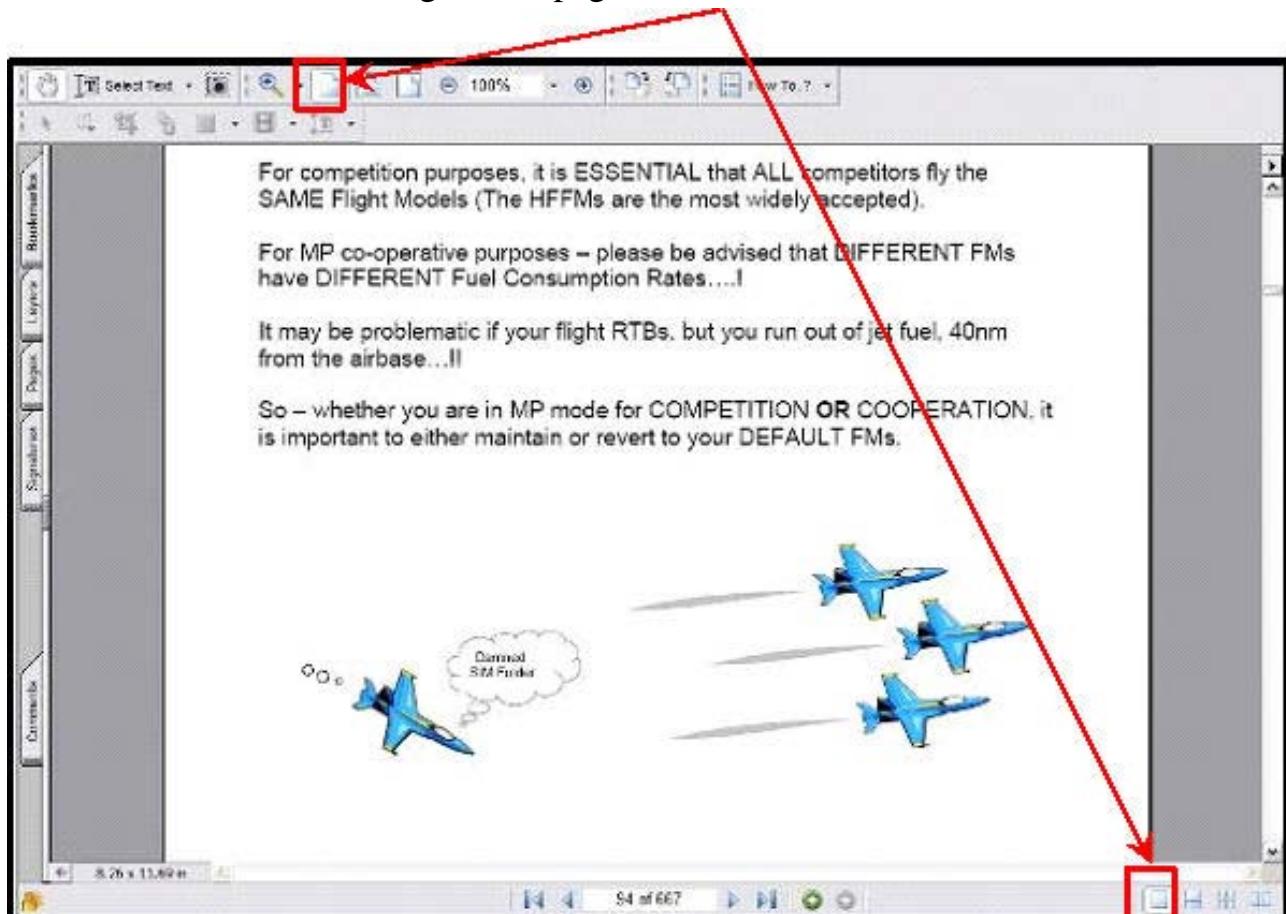
Ara' 必勝

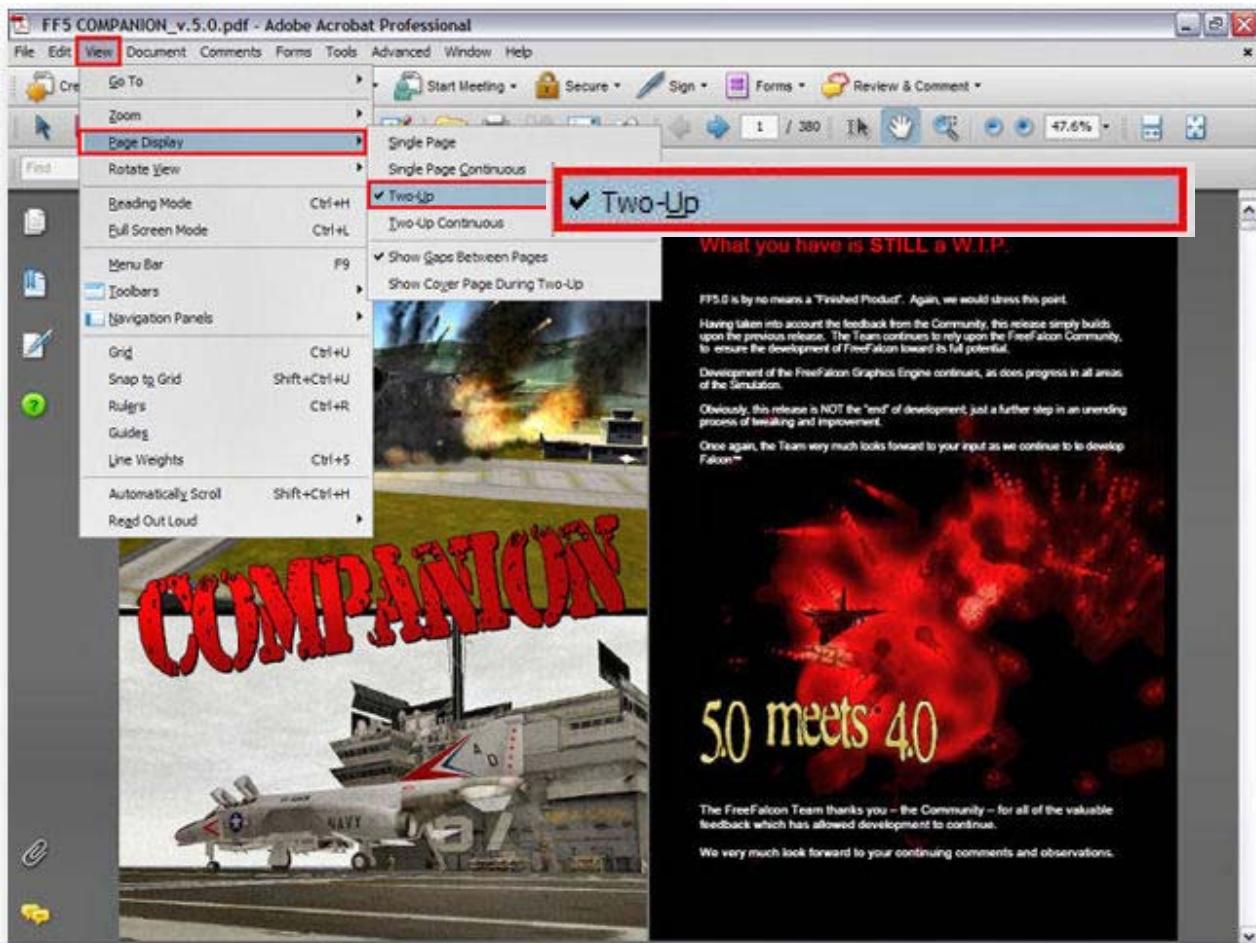
*No offence to Norm.

For ease of Navigation, a 2-page spread is recommended.



For actual reading, that 2-page can be re-sized to “Actual Size”





The screenshot shows the Adobe Acrobat Professional interface with a PDF document titled "FF5 COMPANION_v.5.0.pdf". The toolbar at the top includes a "Two-Up" view icon, which is highlighted with a red box. The main content area displays text describing weather conditions: "Sunny", "Fair", "Poor", and "Inclement". A separate text block at the bottom discusses the construction of randomly generated varied patterns of high stratus clouds in Sunny weather.

Sunny is clear skies and solid sunshine. But just like in real life there is a chance of very high stratus clouds of varied patterns. There is a 30% chance of stratus clouds in Sunny weather.

Fair is sunny weather, but with clouds. The amount of clouds is determined by the cloud options available in the FFViper Config Editor. Like sunny weather, fair weather has a 60% chance of high stratus clouds.

Poor is solid overcast. You will have a band of solid clouds with a fixed cloud base under which you will have random visibility ranging from very good to possibly fog but no rain. Visibility distance under the cloud base in fog is determined by a calculation of 4x the middle altitude of the cloud thickness. So depending on that altitude your visibility might range from 8000' to over 16 miles. Above the overcast weather will be clear with no chance of stratus clouds.

Inclement is solid overcast with possible thunder sounds if you have that enabled in the Config Editor. You will have a band of solid clouds with a fixed cloud base under which you will have random visibility ranging from very good to possible fog. Visibility distance under the cloud base in fog is random, ranging from a minimum of 3000' to 100000'. Above the overcast weather will be clear with no chance of stratus clouds."

Here is an example of randomly generated varied pattern of high stratus clouds in Sunny weather. As stated above there is a 30% chance of stratus clouds appearing and the construction of them can be varied.

LISTEN to the COMPANION...!

The screenshot shows the Adobe Acrobat Professional interface with the menu bar open. A red arrow points from the text "Read Out Loud" in the bottom left corner to the "Read Out Loud" option in the "File" menu. The "Read Out Loud" option is highlighted with a blue selection bar. The rest of the menu items are listed below it.

File Edit View Document Comments Forms Tools Advanced Window Help

Go To Zoom Page Display Rotate View Reading Mode Ctrl+H Full Screen Mode Ctrl+L Menu Bar F9 Toolbars Navigation Panels Grid Snap to Grid Shift+Ctrl+U Rulers Guides Line Weights Ctrl+5 Automatically Scroll Shift+Ctrl+H Read Out Loud

In my 2D Pit, how can I see my Piper in CCP? See the CCP Note in the Learning Section. (click here)

The switches don't "move" in all of my 3D Pits. Correct. You DO - however - have moving switches.

There seem to be "Bugs"...? Naturally. And - together - yourself and the Free Falcon.

How can I stop the terrain shimmer with my nVidia GPU? See the "But Does The Skinny" Section.

My load times are really slow... It takes 15 min to enter the 3D world...! Ensure you have killed all background processes. This is **ESPECIALLY** true of Anti-Virus software. With Norton running, I can expect a 16 minute load. With Nemo disabled, it goes from 16 minutes to 12 seconds. Try End-In-All or XP Smoker. If you are running an ATI Card, make sure that End-In-All doesn't kill any of your ATI processes.

For Falcon - which is more important - my CPU or my GPU? Your CPU. See the "Build A Rig With Ranger" Section. (click here)

OVERCLOCKING my GPU won't cause a problem, right? WRONG. Overclocking has caused problems with FreeFalcon5. Avoid it.

Can I still use TaxEdit and F4Browse? NO. The Database is LOCKED. See the DATABASE WARNING Section. (click here)

It 1gb of RAM enough? Barely. 2Gb is enough. 4Gb rocks.

I want to make a Skin for FreeFalcon. Should I use 512 textures or 1024 textures...? See the Skin Textures 512 Vs 1024 Tutorial in the Learning Centre Section of this Companion.

My Hor-Pit refilling doesn't seem to work...! There's no "option"...! Some 3rd Party Cockpits do NOT include this option with their "pit". You'll need to copy in the ORIGINAL FreeFalcon "menu.dat". You don't have it...? Please check in your Docs EXTRAS folder. We've included it there for your convenience.

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What is "Combat Angels", and WHY would one use it...? See the Random Considerations Section of this Companion. (click here)

Is FreeFalcon the "Hollywood" version of Falcon...? Well - better the "Hollywood" version than the "Bollywood" version, eh...?

My jet is dropping craft, but NO FLARES...! Check your EWS Programs. Select Default Program "2" or "4".

Should I use "application preference" for my Anti-aliasing Setting...? No. If you want to use AA, you have to check it hand, not application preference.

Has the aiming reticle for the rocket been fixed...? Yes. See the ROCKETS Section in this Companion.

My "Bubble Slider" is missing...! It has been removed. The Bubble has already been optimised.

Can I use my Allied Force Pit...? Yes - IF you fly Allied Force - No. No, you can't.

I can't get that "3D" look in my 3D Pit. Like in the Videos I see posted...! A Track-IR is required to move around the 3D pit, as seen in many videos. See the Track-IR Section.

When I change to the 3D Pit, my HUD Symbology / Overlay going out of "calibration"...! Centre your Track-IR. See Qwaz's Note in the Miscellaneous Section.

Should I use Vista or XP...? Windows XP is the recommended OS. Vista has issues, many of which we cannot support.

My UI Settings seem to have changed...! See the RANDOM CONSIDERATIONS Section for tips. (click here)

Is this RedFiper...? No. This is FreeFalcon. FreeFalcon is in no way associated with the RV Group.

11 F R E E F A L C O N 5 . 0

12 F R E E F A L C O N 5 . 0

Read Out Loud

Bet ya' didn't know that...!

Ara'

F.A.Q.

To install, should I use my Allied Force or my ORIGINAL MicroProse Falcon 4.0™ CD?

Neither. Simply run the installer, as is...

Is it possible to remove all lame jokes from this document?

Is it possible for the_Norwegian to NOT be handsome...?

Is the new 3D Pit fully compatible with my 6DoF Track IR™?

Yes.

Where can I find support for this product?

See the **FF on the 'Net Section.** ([click here](#))

Is it LEGAL for me to have this product on my Hard Drive?

FreeFalcon has ALWAYS complied with the directives of the IP Owner.

Is it LEGAL for you to be so talented?

Please, please...! Stop. Enough. I prefer the term 'Gifted'.

In my 2D 'Pit, how can I see my Pipper in CCIP? It seems to be beneath the HUD?

See the **CCIP Note in the Learning Section.** ([click here](#))

The switches don't "move" in all of my 3D Pits...!

Correct. You DO – however - have moving switches in your Viper 'Pit.

There seem to be "Bugs"....!?

Naturally. And – **together** – yourself and the FreeFalcon Team will eradicate them. *See Page ii*

Where can I find the ORIGINAL FALCON4.0 MANUAL...?

See the **Study Programme Section.** ([click here](#))

My load times are really slow...! It takes 15 mins to enter the 3D world...!

Ensure you have killed all background processes.

This is ESPECIALLY true of Anti-Virus software. With Norton running, I can expect a 16 minute load. With Norton disabled, it goes from 16 minutes to 12 seconds. Try End-It-All or XP Smoker.

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NO. The Database is LOCKED. See the **DATABASE WARNING** Section. ([click here](#))

WHERE are my COCKPITS...???

The Cockpits are in a SEPARATE Package; a SEPARATE Download.

Is 1gb of RAM enough?

Barely. 2Gb is enough. 4GB rocks.

I want to make a Skin for FreeFalcon. Should I use 512 textures or 1024 textures...?

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What is "Combat Autopilot", and WHY would one use it...?

See the **Random Considerations Section** of this Companion. ([click here](#))

Is FreeFalcon the "Hollywood" version of Falcon...?

Well – better the "Hollywood" version than the "Bollywood" version, 'eh...?

Better a "movie" than a SLIDE SHOW...!

My jet is dropping chaff, but NO FLARES...!

Check your EWS Program. Select Default Program "2" or "4".

Should I use "application preference" for my Anti-Aliasing Setting...?

No. If you want to use AA, you have to check it 'hard', not application preference.

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Centre your Track IR. See Qawa's Note in the Miscellany Section. ([click here](#))

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Windows XP is the recommended OS. Vista has issues, many of which we cannot support.

My UI Settings seem to have changed...!?

See the **RANDOM CONSIDERATIONS Section** for tips. ([click here](#))

Is this RedViper...?

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FREED FALCON

CHOICE IN FLIGHT

F F . X T R E M E



Weather



Various Enhancements



Naval Ops + Harriers



Keystrokes



Config Editor



FreeFalcon Weather



What types of weather are in FreeFalcon?

There are several types of weather.
They are: Sunny; Fair; Poor; Inclement.

What are the conditions of each type of weather?

Sunny is *clear skies and solid sunshine*. But just like in real life there is a chance of very high stratus clouds of varied patterns. There is a 30% chance of stratus clouds in Sunny weather.

Fair is *sunny weather, but with clouds*. The amount of clouds is determined by the cloud options available in the FFViper Config Editor. Like sunny weather, fair weather has a 60% chance of high stratus clouds.

Poor is *solid overcast*. You will have a band of solid clouds with a fixed cloud base under which you will have random visibility ranging from very good to possibly fog.

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Inclement is *solid overcast with possible thunder sounds if you have that enabled in the Config Editor*. You will have a band of solid clouds with a fixed cloud base under which you will have random visibility ranging from very good to possible fog. Visibility distance under the cloud base in fog is random, ranging from a minimum of 3000' to 100000'. Above the overcast weather will be clear with no chance of stratus clouds."

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[Is weather dynamic in FreeFalcon...?](#)

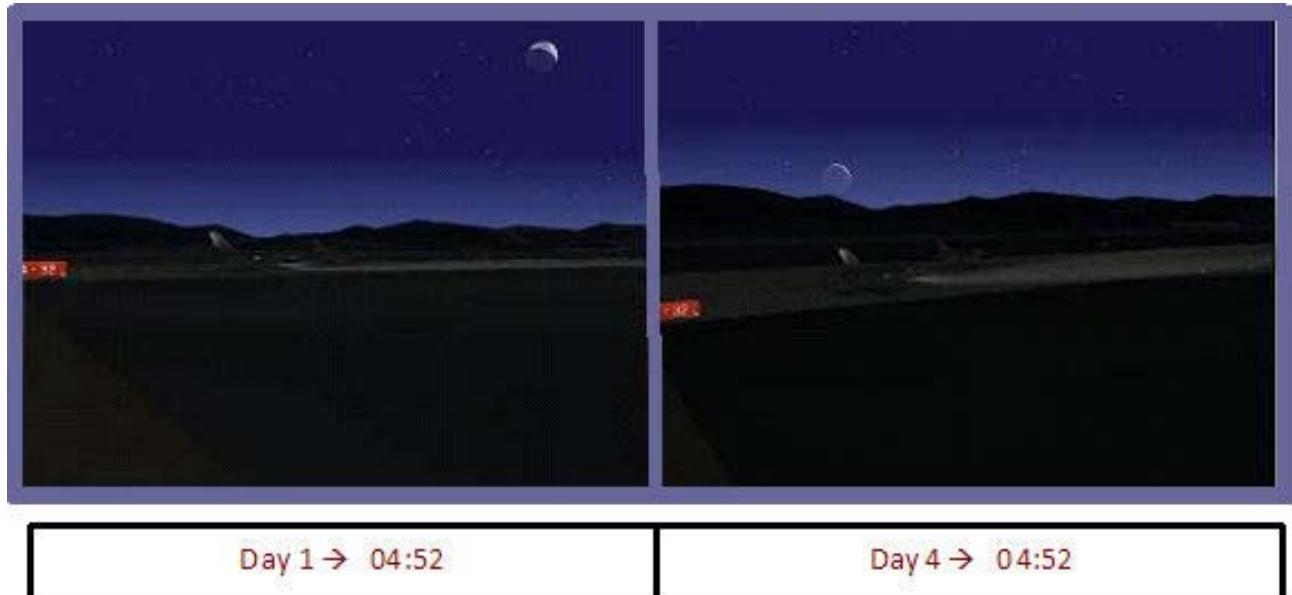
No. It is not.

[Are the Sun & Moon dynamic in FreeFalcon...?](#)

Yes. Just as in Real Life, in campaign the rising of the sun and moon will occur at different times each day. The phases of the moon will also change. The total time period in FREEFALCON covers 48 days. Day by day, the days increase in length and - compared to real life in South Korea - sunset is about 18:59:20 on April 10th. This is equivalent to Day 1 in Falcon4. Over the next 48 days in FreeFalcon, the sun will set later each day, and - on Day 48 - it will set at 19:22:14. Sunrise follows a similar pattern, however – compared to Real Life data, it rises one hour early on day One ¹. However, this adjusts day by day so that - by Day 48 – the Sun is only 10 minutes early.

Your campaigns can last as long as 48 days and you will probably get many nighttime flights. However to customize the times with moon positions you need to make your own missions in the TE Editor. Information on how to create Tactical Engagements after Day 1 is provided in this Companion Guide.

FreeFalcon has special lighting between the hours of 20:00 and 03:00. Valleys have a very soft lighting as though lit by moonlight. This effect occurs whether there is actually a moon up or not. It creates a very enjoyable lighting for night missions, and - if you haven't flown during those hours - I suggest you try it. Both the rising of, and phases of the Moon reflect Real Life phenomenon. ² An example of this can be seen in the following picture.



¹ [Editor's Note](#) → Living in this area, I forgo the “data” and opine that the time is VERY close to Real Life

² See [APPENDIX](#) at the end of this Section

Are the headings on your planning map and HUD compass tape True or Magnetic?

They are True. Even the magnetic compass in your cockpit is showing True. This is not correct of course, as one should have to compensate for magnetic declination. But in Falcon 4.0, this is not necessary.



How does wind effect weather?

The clouds in Fair weather, and the clouds which comprise the overcast band in Poor and Inclement weather, will move in the same direction and at the same speed as the wind. In your cockpit, if you want to know the wind direction and speed in knots - press the SEQ on your Data Command Switch, and this information will appear on your DED Display.

How can I change the weather type in my mission?

There are several ways. When you enter FreeFalcon - Go to the Setup page & click on the Graphics tab. There is a 'Weather Conditions' option there. Open that and select the type of weather you want. This will apply to all flights. Additionally, when you first enter the UI of a mission (*TE, Training, Campaign, Dogfight or Instant Action*) you can change the weather type there. Before entering the 3D world, click on your Setup → Graphics → Weather Conditions. It will show 'Locked'. Click to Unlock and then select the type of weather you want. The same method is used in the Tactical Engagement Editor when you are making a mission and want to specify what type of weather conditions it will have. Additionally you can customize all types of weather from wind direction and speed to the level and thickness of clouds and overcast types of weather..!
(See [Editing Weather](#) below.)

What are the 'Haze' and 'Dynamic Lighting' options in Setup/Graphics?

Haze is the ground mist you see in the valleys in early mornings and late evenings. You can enable or disable this feature in the Setup/Graphics. While in the 3D world you can enable/disable this feature by using the keystroke combination of CTRL-X, H.

Dynamic Lighting effects the brightness of the terrain in early mornings and late evenings. You can enable or disable this feature in the Setup/Graphics. While in the 3D world you can turn this feature on or off by using the keystroke combination of CTRL-X, G.
In both cases if you change in the 3D world, this also changes your Setup/Graphics setting until you reset, as you desire.

Are there stars in FF? Yes. Two options are provided. One provides more and brighter stars; one less, with less-bright stars. See the Starry Starry Night Section for details. Choice is available via your FF Config Editor.

More Stars.



Less Stars.



Can I edit the lighting conditions of sky and terrain in FreeFalcon...?

Within limits. These conditions are controlled both by the FF engine and the tod.lst file in your Falcon4/terrdata/korea/weather folder. This is editable using notepad. RGB values can be edited for lighting conditions as well as Specular, Star and Bad Weather. If you choose to edit them and need a backup, there is the tod.lst.default in the Tod folder. Rename it and place in the weather folder if needed. You must be aware that the FF Engine and tod.lst work together. There are time periods in which the engine is in complete control in early morning and more dramatically in the evening around 18:30 hours. In these periods the engine will change terrain lighting automatically regardless of what the tod.lst has. You can override that change using the keystrokes **CTRL-X, G** whilst in the 3D world. It will also activate stars automatically, yet you can add additional periods for stars. Additionally the engine reads ahead in the tod.lst file and transitions the lighting over the period between changes listed in the tod.lst. E.g. between 19:00 and 20:00, the engine will change the settings gradually - approximately every 15 minutes.

EDITING WEATHER.

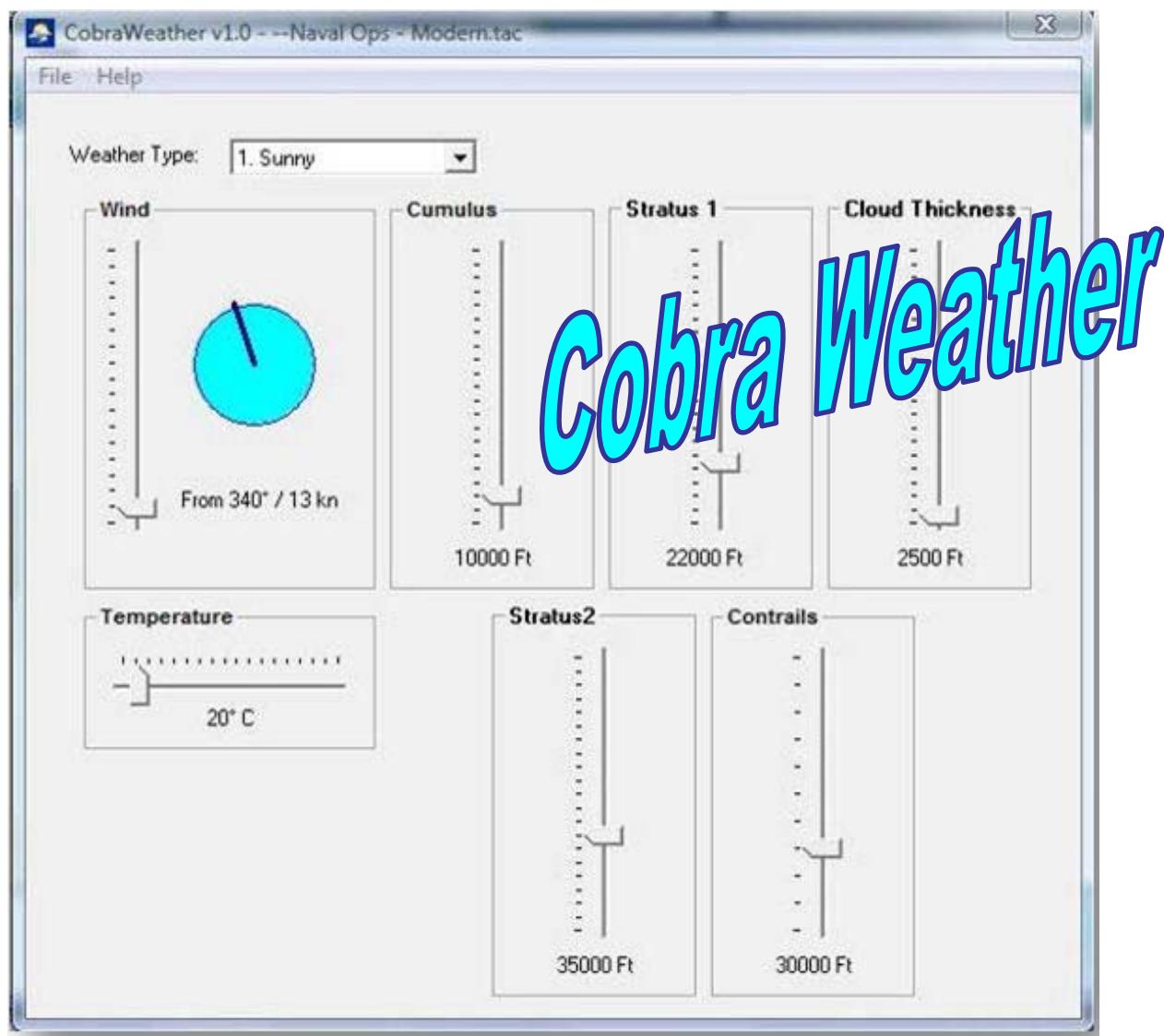
Few people take the time to learn how to edit weather but an understanding of the procedures really gives you an insight into the fantastic weather engine in FF. You can make just about any conditions you want and improve your flying skills in different difficult weather situations. For example - A subtle editing of the weather was integral to the creation of the Training Mission 33 ILS Landing Advanced.

There is a tool which you can use to edit your weather → **CobraWeather v1.0**, a 3rd party tool developed by Sakis "Monster" Giokas.

To save you hunting through the internet, this wonderful tool has been placed in your Utilities/TOOLS Folder.

Pyonggang, North Korea

Local Time: 6:10 PM KST		Lat/Lon: 38.4° N 127.3° E										
Tropical Weather: South Indian Ocean: Tropical Cyclone Melanie Tropical Cyclone 09s												
Current Conditions Updated: 3 hr 11 min 7 sec ago		5-Day Forecast for Pyonggang										
Observed at: Pyonggang, Korea, North Elevation: 1230 ft / 375 m		<table border="1"><thead><tr><th>Wednesday</th><th>Thursday</th><th>Friday</th><th>Saturday</th><th>Sunday</th></tr></thead><tbody><tr><td> 28°F 12°F -2°C -11°C Clear</td><td> 32°F 16°F 0°C -8°C Scattered Clouds</td><td> 33°F 15°F 1°C -9°C Clear</td><td> 37°F 21°F 3°C -6°C Scattered Clouds</td><td> 32°F 15°F 0°C -9°C Clear</td></tr></tbody></table>	Wednesday	Thursday	Friday	Saturday	Sunday	28°F 12°F -2°C -11°C Clear	32°F 16°F 0°C -8°C Scattered Clouds	33°F 15°F 1°C -9°C Clear	37°F 21°F 3°C -6°C Scattered Clouds	32°F 15°F 0°C -9°C Clear
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Temperature: 21°F / -6°C Humidity: 61% Dew Point: 13°F / -10°C Wind: 7 mph / 11 km/h / from the West Wind Gust: - Pressure: 30.15 in / 1021 hPa (Falling) Visibility: 19.0 miles / 30.0 kilometers		 Meet Locals										
Raw METAR Flight Rule: VFR () Wind Speed: 7 mph / 11 km/h / Wind Dir: 270° (West) Ceiling: 100000 ft / 100000 m		 미지에게 무자비한 징벌을!										
 View the weather history												
Updated: 9:00 AM KST on January 01, 2008												
Tuesday Night Clear, Low: 8°F / -13°C, Wind light												



CobraWeather is simple to use for editing Tactical Engagements, but does have some limitations. The scales move by increments of 500' and the wind direction changes in a minimum of ten degree 'clicks' on the blue compass. Stratus 1 in the picture will change to "Overcast" when *Poor* or *Inclement* Weather Type is selected.

Descriptions of the sliders are as follows:

Weather Type

Wind & Direction Compass

Cumulus

Stratus 1

Overcast

Cloud Thickness

Temperature

Stratus 2

Contrails

– 1 = Sunny 2 = Fair 3 = Poor 4 = Inclement

– Wind in knots and direction in compass degrees.

– Elevation above MSL for Base of Clouds in Fair weather.

– Level of lower stratus layer in Sunny and Fair weather

– Base of clouds in Poor and Inclement weather

– Thickness of the layer of Overcast clouds.

– In degrees Celsius.

– Level that high stratus clouds may form in Sunny & Fair.

– Level that aircraft contrails are drawn.

Wind direction and speed are important in determining which direction you will depart from an airbase; the ILS landing approach to an airbase; and, the amount of drift your aircraft will experience as shown by the offset of symbols on your HUD.

WEATHER EDITING TIPS

General

To use Cobra Weather you first create your TE and then use File/Open in Cobra Weather to load the TE for editing. When done, you click on File/Save.

When you create a TE and save it, the wind direction will generally be out of the North / Northwest, with wind speed approximately 11 kts. This is done so that USA aircraft will depart already heading towards North Korea with a minimum of crosswind. If you would prefer your flight depart heading south on takeoff, then click on the blue compass to select a heading for winds out of the South.

In all types of weather, the Contrails slider is the level at which Contrails from engines will automatically appear. The density of the contrails fades- in starting at 10% below the level you set. In the above example, contrails will start to form at 27000' (10% of the 30000' level).

Sunny weather

There is a 30% chance of thin stratus clouds in Sunny weather. You can set the level at which they will appear by adjusting Stratus 1 for the lower stratus, and Stratus 2 for the higher stratus clouds. Note that Stratus 2 should always be set higher than Stratus 1.

Fair weather

There is a 60% chance of thin stratus clouds in Fair weather. You can adjust stratus levels as described in Sunny above.

The Cumulus slider is where the Base of Cumulus clouds will be. (*Please note that the 'Cloud Thickness' slider does not apply to Fair weather*). If the base of Fair weather clouds is too low in the mountains, you will get a bad shimmering effect. If you want to create low clouds in the mountains, use Poor or Inclement weather instead.

Poor and Inclement weather

As noted above, the Stratus 1 slider will change to Overcast. The Cloud Thickness slider sets the depth of the overcast clouds. The Overcast sets the level, which is the **middle** of the overcast clouds. So - for example - if you set Cloud Thickness to 4000' and Overcast to 8000', then you would enter the cloud bank at 6000' from below, and exit through the top at 10000'.

The main difference between Poor and Inclement weather is visibility underneath the overcast base. In Poor, you will have a band of solid clouds under which you will have random visibility ranging from very good to possibly fog. Visibility distance under the cloud base in fog is determined by a calculation of 4x the middle altitude of the cloud thickness. So depending on that altitude, your visibility might range from 8000' to over 16 miles.

In Inclement, visibility distance under the cloud base in fog is random, ranging from a minimum of 3,000' to 100,000'. You also may hear Thunder Sounds if you have them enabled in your Config Editor.

Take care when lowering the 'middle' level for the Overcast base. While this works fine for Poor weather, you may find your conditions underneath rapidly deteriorating in Inclement weather. The random function of visibility is greatly increased to create bad visibility in Inclement weather just like in real life. The lower the cloud base, the worse the visibility.

In both Poor and Inclement above the overcast weather will be clear with no chance of stratus clouds.

Below, a pilot searches for a pass through mountains, the tops of which are literally cut off by clouds from Inclement weather...!



Fog

You can force Fog conditions using either Poor or Inclement types. Usually Inclement would be preferred, as the visibility distance is a fixed calculation as described above. Simply set your Cloud Thickness as desired and then set Overcast level so that the center of the Thickness will be near ground zero. The closer you get to ground zero the 'thicker' the Fog will be in visibility.

In the pic below, Cloud Thickness was set to 4000' and Overcast set to 2000'



One may even achieve a complete whiteout...!

The pic below was taken with Cloud Thickness at 4000' and Overcast set to 1000'.



APPENDIX → Moon Position, Time and Phases

Day	Time	Phase	Compass heading (deg)	Inclination (deg)
1	03:01:00		90	0 Rising
2	03:23:10		83	0 Rising
3	03:44:10		76	0 Rising
4	04:09:50		69	0 Rising
5	04:38:20	New	64	0 Rising
6	Sunset 19:03:10		291	15
7	Sunset 19:04:22		286	30
8	Sunset 19:05:25		279	45
9	Sunset 19:06:15		273	60
10	Sunset 19:07:07		262	60
11	Sunset 19:07:12		248	70
12	Sunset 19:08:05	1 st Qtr	226	70
13	Sunset 19:08:35		200	70
14	Sunset 19:09:38		176	70
15	Sunset 19:10:30		159	70
16	Sunset 19:10:44		148	60
17	Sunset 19:12:00		139	45
18	Sunset 19:12:35		131	30
19	Sunset 19:12:55		124	10
20	20:08:20	Full	125	0 Rising
21	21:18:00		127	0 Rising
22	22:18:00		125	0 Rising
23	23:07:00		122	0 Rising
24	00:00:01		130	15
25	00:00:01		118	5
26	00:20:26		107	0 Rising
27	00:44:34	Last Qtr	99	0 Rising
28	01:09:36		92	0 Rising
29	01:30:24		84	0 Rising
30	01:52:25		77	0 Rising
31	02:21:40		72	0 Rising
32	02:44:55		65	0 Rising
33	03:15:20		60	0 Rising
34	03:52:20	New	57	0 Rising
35	04:36:30		55	0 Rising
36	Sunset 19:20:40		290	30
37	Sunset 19:21:00		282	45
38	Sunset 19:21:15		272	60
39	Sunset 19:22:00		262	60
40	Sunset 19:22:05		246	70
41	Sunset 19:22:10	1 st Qtr	231	70
42	Sunset 19:22:20		213	70
43	Sunset 19:22:22		194	70
44	Sunset 19:22:22		178	60
45	Sunset 19:22:22		163	50
46	Sunset 19:22:22		152	45
47	Sunset 19:22:22		140	30
48	Sunset 19:22:22	Full	130	5



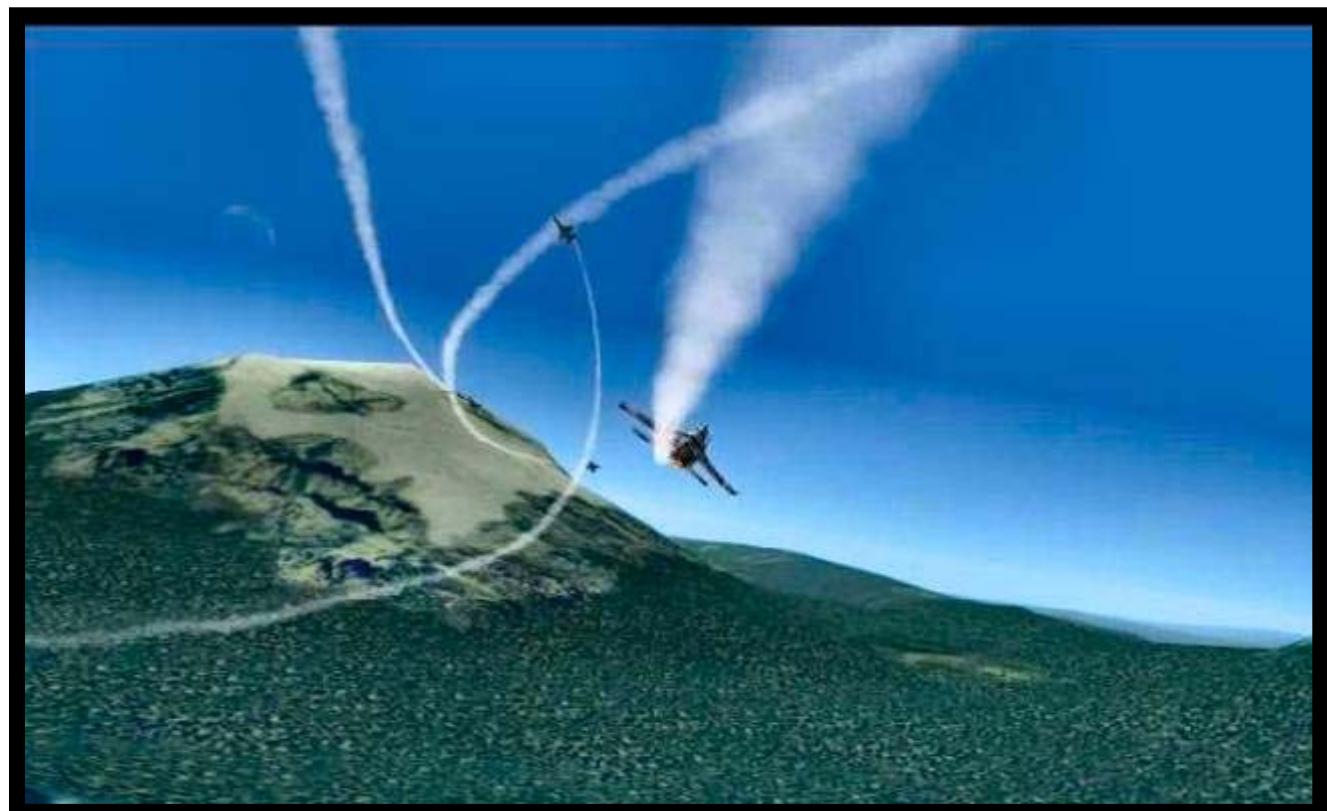


FULL MOON DAY 21 – 05:00:00

DOG'S POP QUIZ

What entry would one edit to get the effects in the picture below?

What value would one put in the entry...?



Answers on Page 457

FF5



FOG OF WAR

Clouds

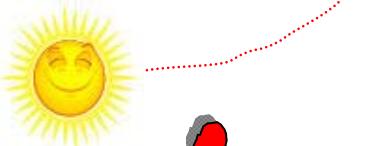


FF5.0 offers a choice of Clouds...!

These clouds have been optimised for the DX Engine – translucency and “billboarding” issues largely eliminated. New textures mean fuller, realistically-sized clouds.



Check out the FreeFalcon Weather Section for further information on the dynamic nature of FF weather.



Enhancements



Various Improvements in FreeFalcon 5.0

- ✓ **WIDESCREEN Support**
- ✓ Fixed the "Missile Glow" that sped along the ground as SAMs were launched
- ✓ Added new choices for Sun Texture
- ✓ Added new choices for Cloud Texture
- ✓ Further streamlining of FF Config Editor
- ✓ Engine streamlined for improved FPS
- ✓ Added MP taxi-time Options to FF Config Editor
- ✓ Improved Trees, native flora of Korea
- ✓ Many new 2D Pits
- ✓ Many new, functional 3D Pits
- ✓ Improved Carrier Ops
- ✓ Helicopters now sit ON the ground, not IN it
- ✓ Training Missions improved and streamlined
- ✓ Ripsaw washed his pink shorts
- ✓ DBS Radar Fixed
- ✓ All-New User Interface
- ✓ New Intro Movie & Original Soundtrack
- ✓ Database streamlined for redundant entries
- ✓ Updated TacRef
- ✓ Much improved Particle System – new effects; new textures
- ✓ Different trails for different aircraft types / missile types
- ✓ Improved smoke and burning effects
- ✓ Ara's New ESC font (*Ara' rocks...!*)
- ✓ Updated Rack Data

- ✓ More realistic day to night transitions
- ✓ Selectable GRayscale MFDs
- ✓ Improved Stars. Star navigation now possible
- ✓ Improved ambient lighting
- ✓ Lunar cycles match Real-Life
- ✓ New skins for many aircraft
- ✓ New aircraft added to Database
- ✓ Improved FMs for MANY aircraft
- ✓ Many improved models; more DOFs
- ✓ Ships "ramming" Carriers largely fixed
- ✓ A/C waiting to depart, no longer "sink" into Carriers
- ✓ A/C no longer "float" above the deck after landing
- ✓ Streamlined Install – reorganisation & deletion of MANY redundant folders/files
- ✓ DPRK TACANs added for ATC at captured bases
- ✓ Updated TE Planes List
- ✓ Models streamlined for FPS
- ✓ New AB Flames - A/C generation-specific
- ✓ Flares now follow the laws of gravity, and fall downward, regardless of AoA
- ✓ Improved spawning of A/C in Multi-Player
- ✓ Improved wind effects
- ✓ Helos now withdraw from combat when out of stores
- ✓ Additional squadron patches
- ✓ Improved AI responses to certain orders
- ✓ Tweaked Blackout/Redout times to mirror Real-Life
- ✓ Tweaked some SAM firing rates to mirror Real-Life more closely
- ✓ Tweaked Engineer Unit efficiency to mirror Real-Life more closely
- ✓ Smoke now comes from damaged engines; not fuselage
- ✓ Vehicle + Object specific fire/burning effects
- ✓ Vehicles no longer fully functional when damaged
- ✓ Enhanced Touch-Buddy© support
- ✓ Many CTD fixes and Pie-Hang fixes
- ✓ Some memory-leaks fixed
- ✓ Enhanced support for 2D 'Pit builders
- ✓ Ship-Radar adversely affected by damage
- ✓ Carriers made more durable; No sinking due to A/C collisions
- ✓ New carrier skins and models

- ✓ A/C no longer fly into (or through) mountains
- ✓ Missile sounds adjusted for relative missile size
- ✓ New in-game Cursors
- ✓ Snail seeking mental help
- ✓ Many new models
- ✓ Engine smoke locations now accurate for all aircraft
- ✓ Sounds tweaked for in-pit realism
- ✓ NEW SOUNDS
- ✓ New, realistic vortex trails. A/C specific and based on RL parameters
- ✓ New UI Soundtrack
- ✓ New FF5.0 intro Movie
- ✓ Improved Flight Modelling for most "front-line" A/C
- ✓ New ROTOR animations for Helos
- ✓ New damaged trees. When they burn, they BURN...!
- ✓ Bubble tweaked for more effective A-A engagements
- ✓ Bubble tweaked for less Agg/Deagg stutters
- ✓ New PROP animations
- ✓ Weathered ordnance textures
- ✓ Witness missiles targeting missiles during Naval battles...!
- ✓ New Tools
- ✓ Catapult Steam
- ✓ Improved Chaff
- ✓ Developed with input from Active Real Life Ground Crew
- ✓ Developed with input from Active Real Life Fighter Pilots
- ✓ Pilot Breathing Effect, now tied to aircraft stress and "G"
- ✓ New A/C Icons
- ✓ Animated Jet Blast Deflectors on Carriers
- ✓ "Billboarding" (spinning) of clouds largely reduced
- ✓ Emergency Jettison envelope tweaked to reflect Real Life parameters
- ✓ New skyfixes and skyfix-editing tools.
- ✓ Animated Canopy in some 2D Pits...!
- ✓ New Night-Lighting for some Carriers
- ✓ MULTIPLE MFD SUPPORT in 3D Pits...!!!
- ✓ FIXED AND FUNCTIONAL CAMPAIGNS...!!!
- ✓ Most REALISTIC OOB in Falcon History
- ✓ Most REALISTIC loadout DB ever seen in Falcon.



Naval Ops



IMPROVED NAVAL OPS

Falconeer Aviators – REJOICE...!

No longer will your wheels be above or below deck in carrier ops.

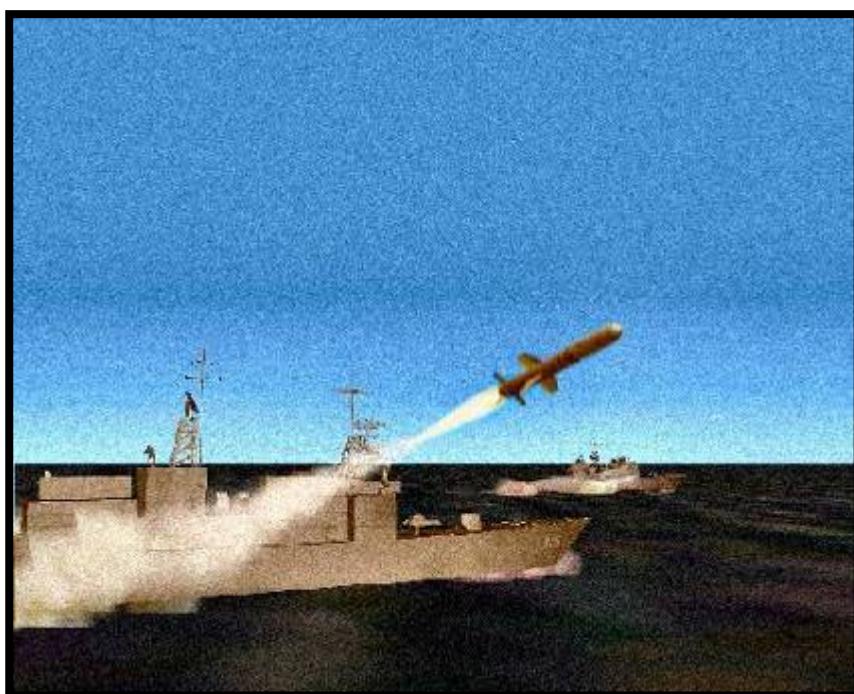
One may now fly every type of naval aircraft, AND will have no problems getting the aircraft airborne from the carrier. FF Carriers now have operational BLAST DEFLECTORS...!

FF5.0 also includes new Naval template TE's, which have various Carrier Groups, and almost every flyable Naval Aircraft assigned to one or more of the available Carriers...!

Some TEs include the same carriers and aircraft that are used in all the Korean campaigns. So now, one may practice one's Carrier Op techniques in the TE before risking failures in carrier squadron Campaign Missions...!

You can find a list of the carriers and aircraft assigned to each in the relevant Appendices at the end of this section.

The colourful Charles de Gaulle and CV-66 America have been added to the mix, and many carrier skins have been upgraded. Furthermore, aircraft will now be placed in the correct takeoff position.



Due to faster load times one may now commit to the mission in the normal two (2) minutes prior to takeoff and, still be placed on the carrier deck.

TAKEOFF

The Kuznetsov and HMS Invincible have one launch position.

The Essex, Forrestal and Charles de Gaulle have 2 each.

The Reagan, Nimitz, Kennedy, America and Connie have 4 each.

On carriers with multiple positions you will randomly be placed on one of the launch positions.

Whether joining as Ramp, Taxi or Takeoff you will enter the 3D world at Takeoff time and in the correct launch position.

You will be facing forward for takeoff regardless of the heading of the carrier.

In Real-Life, ‘hooks’ are not required for take-off. So – in FF, “lowering your hook” before take-off, really simulates connecting to the catapult. Therefore, your hook will NOT be shown in the “down” position. When you “lower your hook” (actually – you are simulating attaching to the catapult), a message will appear in the upper left corner saying, “Attached to Catapult”.

At the same time on all carriers (*except the Essex and HMS Invincible*), a jet blast deflector will rise behind your aircraft. Increase power to maximum RPM and “release your hook” (actually – activate the catapult) for launch.

It is always a good procedure to check your flaps when carrying maximum load-outs.

The F-4B, F-4C, F-4J and Super Etendard are quite sensitive.

If unable to depart with full flaps on these you should reduce your load-out.



IMPORTANT NOTE → If you have wingmen in your flight you must give them a ‘Rejoin’ command as soon as you are airborne. Otherwise they will return to their home base on land.

In flights off carriers that are solely AI aircraft, the AI will appear airborne fifteen (15) seconds before their Takeoff time.

CHEwBAKKA's Guide To Carrier Landings

This is a general description that is meant to fit a variety of aircraft, and allow the pilot some time and safety margin for his preparations.

For more 'aggressive' and refined procedures see **Wolfhound's Guide**

The factor that makes the biggest difference for the different aircraft is the landing speed. Try to find the best landing speed for your aircraft before you attempt to land at a safe altitude.

To do this: pop out the flaps, the speedbrakes and the gear (*below 300KIAS*) and then slow down and try to find the slowest speed you can hold an AOA of about 3-5 degrees whilst maintaining level flight.

Preparations

Send your wingmen to RTB as soon as you're feet wet and clear of enemy fighters. AI pilots don't land on carriers (since the term AI implies at least some intelligence, these guys probably know better than to try a 'controlled' crash of a multi-million dollar plane on a billion dollar ship). They will go for the alternate, and it makes no sense to have them burn their fuel just to watch you land.

You can get rid of your unused bombs now.

This is not strictly necessary in Falcon4.0TM, but the lighter your jet is, the easier it can be controlled on final. If you decide to keep your unused ordnance, it is OK. It does not make the explosion any bigger when you crash. Nowadays, RL pilots tend to bring unused ammo back on deck, since the ordnance has become more expensive, and procedures have become safer.

Call AWACS for vectors to the carrier group (QQ7). AWACS will give you vectors and – more importantly - the TACAN channel of the carrier.

Hit T-ILS on the ICP, enter the channel, push ENTR, push the DCS up once to get back to the scratchpad and push 0 on the ICP to change the TACAN band from X to Y (for dynamic TACAN) then push ENTR again. You can do all this on the backup panel as per the F4 manual if you want, but by using the ICP you can keep your eyes on the instruments.



Switch the ILS/NAV switch to NAV and if you are in range for the TACAN you should be getting bearing and DME to the carrier on the HSI.

You can also head for the waypoint that is supposed to be over the carrier, but the carrier will have moved and is usually between 5-15 miles away from this waypoint.

Switch the ILS/NAV switch to NAV and if you are in range for the TACAN you should be getting bearing and DME to the carrier on the HSI.



Switch your radar to SEA-Mode and SP. When you see a lot of returns in an area of about 2 miles around that will be your carrier group

Now that we have found the carrier, we'll need to follow the procedures outlined below.

- Do a low pass over the carrier (*you've all seen TOP GUN - just like that*).

Since A.I. pilots don't like to land on carriers the airspace should be clear.

Try to fly parallel or straight over the carrier's landing deck ¹ and note the heading of the carrier. It should be pointing into the wind, but this is not always the case.

- The number on the "runway" does not indicate a heading.
It is the number of the ship...!
- Click on the CRS button of the HSI and enter the heading.
- Now head the opposite way the carrier is going and keep going for some miles.
The further out you fly, the more time you'll have to get set up for approach.

¹ For US Carriers, this is the deck which is at a left offset angle to the direction the Carrier is traveling.

Approach

- Now use your HSI to do an instrument approach as described in the F4 manual.



- You have not read that? Well, turn about 90 degrees to intercept the radial that you have just entered for CRS (190 in the example below). When the middle part of the needle starts to come closer to the centre, turn to the heading that you noted in your *Top Gun* flyover.

7 miles out, needle is coming down to the center, time to turn right 190



That was by no means a precision approach like ILS would be, but at least you are coming in from the right direction now. **Note:** When you need less time to make your preparations for landing, skip the part above. Just stay in visual range and line up with a MkII Eyeball.

Start preparing your aircraft now:

- Get down to about 1000ft MSL and level out
- Turn Radar Altitude on and set your ALOW to 100 ft. The carrier's deck is 97ft (*Nimitz-Class*) above MSL so if set at 100 ft and your ALOW is flashing you'll be already below the ramp and likely hit the stern.
- Slow down, pop the speed brakes all the way out
- When you're below 300KIAS drop your gear. When you are flying the F/A-18C/D your speed brakes will automatically retract when you drop the gear. So if you need to lose some more speed in an F/A-18, wait a little longer before you drop your gear
- Unlike RL your weight (well your A/Cs weight) does not matter for the landing on the carrier except that your plane handles easier when it is lighter. So if you'll feel more comfortable you can dump some fuel, but keep at least 2000lbs (*depending on your A/C*) in case you have to go around.
- If you are flying an aircraft with manual flaps or have your F/A-18 set on manual flaps - start deploying the flaps when your airspeed approaches 200KIAS. If you put the flaps out above 225KIAS you may get a flashing 'RDC SPEED' on the HUD - so slow down first.

Be familiar with the modeling of flaps and speed brakes for the various aircraft you are flying. Flaps should be fully deployed, and speed brakes will sometimes retract automatically when certain criteria are met.

- The key to getting arrested (trapped, stopped, kept aboard) on a carrier is to have the arrestor HOOK DOWN.
- Do this now.
- Make sure you have Drift C/O turned off and be prepared for a crosswind landing
→ push SEQ on the ICP DCS to display wind info in the DED.

- The contrast between the dark sea and a bright blue sky can make it difficult to see everything in your HUD with the standard green symbols. If your aircraft allows, switch to red - this can be seen equally well against bright and dark background.
- The usual stuff: Master Arm OFF, Laser Off, landing light on, position lights on (to flash), be polite to the ATC, and turn your radar off (not Rad Alt), etc...

You should be in level flight at 1000ft and about 200KIAS by now - keep it that way until you are about 1 mile out. NOW:

There's a bunch of ships in view - aim for the biggest

- As soon as you can make out the carrier's deck start lining up. If you want more realism go for the offset landing deck that would be used on a real carrier. In this case you aim your nose a little to the right of the carrier first....
- and turn left as soon as you intercept the runway heading.

You need to Call the Ball now, and do it loud.

There is no ball on the carriers in F4, but your family will have some fun when you do so...!

If you like it a little easier, line up parallel and to the left of the carrier's sail.

The deck is longer there, and - since the AI pilots don't like it - the deck will usually be empty.

Touchdown:

- You'll have to do a lot of things real quick now so be prepared:
- Depending on the weight and type of your A/C keep your AOA as low as possible i.e. keep your airspeed up. 200KIAS would kill you in RL, but are fine in Falcon™. You should be able to bring the most planes in at 150-180 knots.
- Come in low, keep your glide slope low - as if you wanted to make a real low and slow flyby
- Watch your altitude - the deck is at 97 feet MSL. If you're lower - you are not going to make it. Be careful when you have to come back up. If you throttle up too much you'll go up too high and your glide slope is going to be too steep
- Aim your FPM slightly behind the ramp
- Some carriers have wires painted on the deck. They are – however – not implemented.

(For reality's sake you can try to catch the number three wire and make sure you have ACMI running to prove it.) All that matters in Falcon4™ to get trapped is to have all three wheels on the deck. Your airspeed and your throttle setting do not matter, as long as you get all three wheels on the deck you'll get arrested.²

- **DO NOT FLARE** - you'd pop right back up and overshoot. The landing gear of naval A/C is build to take abuse - so slam it down.
- As soon as you cross the ramp pull back your throttle to drop the few remaining feet and at the same time push your stick all the way forward. You need your nose down before the deck ends.

² Better than being arrested for playing with yourself on public transport. Not that I'd know... - Ara'

- When you hear your main gear touch down and your nose drops, put your throttle in afterburner (if your plane has one). That way you'll have enough energy to take off again if you fail to get your nose down in time.
- If you see the opposite end of the deck disappear under your nose (you can't see it in the HUD anymore) pull up 15 degrees, make sure to hit AB, retract the gear and hope for the best.
- If you got all wheels on the deck before you fall off at the other end you'll be stopped - no not slowed down to a stop, but STOPPED.

You'll now find yourself sitting on the deck; happy to still have your simulated life.

"OK son, we got ya'. You can throttle back now, you're not going to make the ship go any faster."



Wolfhound's Landing Guide for the F-14

In the F-14 I usually dump fuel to about 3000 lbs, so I can fly a more realistic landing speed. Enter the case 1 landing pattern from behind the ship. Fly at 800 ft and ~400 kts in the upwind leg. Put the hook down (better be early than too late).³ Fly over the ship and count to 5 potatoes, then bank the plane 80 degrees and make a 4G turn and turn to the downwind leg. If you're cool → don't count to 5 and enter the break right above the ship.

In the downwind leg go to 600 ft and dirty up the plane → Brakes out, gear down @ 250 kts; flaps down @ 200 kts. Make the turn to final and, at three-quarters of a mile: Call the ball.

In the F-14 keep your airspeed between 140 and 150 kts (*depending on your weight*). Keep your flight path marker between the 2,5 ° and 5° line on your HUD and aim for the 1 wire.



This is a steeper approach than real life and goes against every rule of a real carrier landing, but this is Falcon...😊

Sometimes, we need to ignore the Real Life rules of carrier ops.

Set your throttle at about 75%. Try not to go to idle thrust. Keep this attitude until touchdown.

Once you hit the deck, pull back the throttle to idle and push the stick forward. (*This goes against the rules of carrier aviation, but in Falcon it gets the nose wheel on deck*). Don't worry about the bolter. You'll find out soon enough if you can't get the nose wheel down, and still have plenty of time to go back to full MIL power. Once your nose wheel is on deck (*or if you do a bolter*), go back to full MIL power (if in the F-14B/D). Thus – if necessary - you can take off again. Simply retract the airbrake, and go around.

Note: RL carriers are hard to sink - F4 carriers were not. BUT – FF5.0 has fixed this...!

If you hit the stern of the carrier (*came in too low*) or the sail - the carrier will NO LONGER sink.

Carriers will sustain damage, just as they do in Real-Life.

³ Remember if you forget the hook and you bolter or the LSO has to remember for you, you owe the LSO's a beer!



The HARRIER

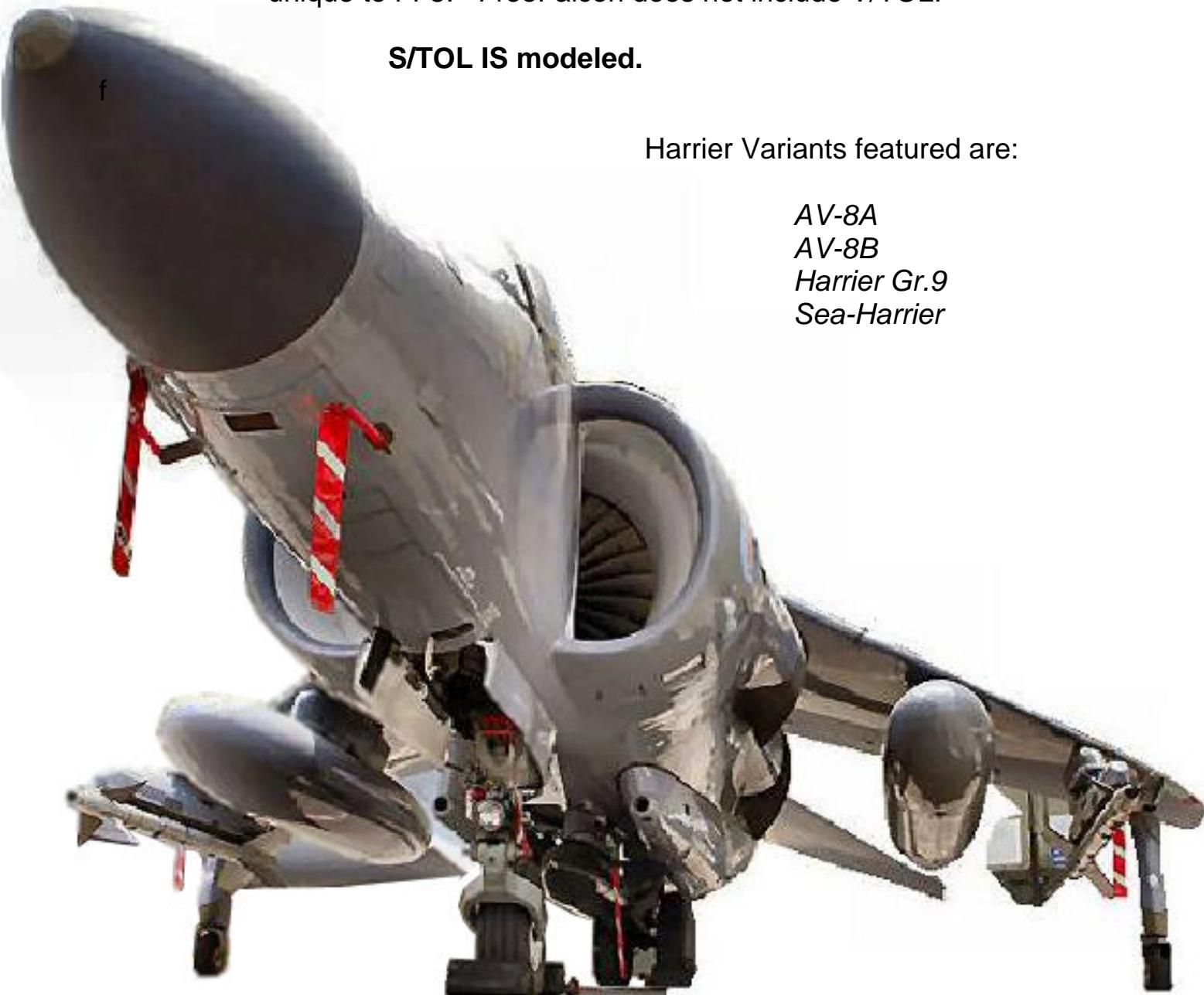
S/TOL is modeled in FreeFalcon5.

Of all the available airplanes, the AV-8B is - perhaps - the most unique to FF5. FreeFalcon does not include V/TOL.

S/TOL IS modeled.

Harrier Variants featured are:

*AV-8A
AV-8B
Harrier Gr.9
Sea-Harrier*



In order to achieve S/TOL, the “flaps” on the Harrier now represent Thrust Nozzles, which may be vectored by the Virtual Pilot.

V/TOL is not modeled in FreeFalcon.

S/TOL - however - IS available.

The "Flaps" on the Harrier have been converted into "Thrust Nozzles".

As you operate the "flaps", think of the thrust nozzles turning toward the ground. The Harrier has ten (10) Thrust Vectoring positions to cycle through. This allows for the lift to be added slowly when coming in to land.

When you first join the aircraft for takeoff, the Nozzles are set to position five, which will allow you to takeoff at 75-80 knots. This simulates a STOL take off. Whether in takeoff or landing mode, it is best to cycle the Nozzles up or down instead of using the full up or full down keystrokes: Because there is a large amount of lift tied to the nozzles, fast changes between Nozzle Vectors can cause unpredictable flight behavior, causing you to crash the aircraft...!

THRUST VECTORING Keystrokes:

Set to ZERO	→	CTRL-F9
Set to FULL	→	CTRL-F10
Decrease Thrust Vector	→	CTRL-F11
Increase Thrust Vector	→	CTRL-F12



Typical Takeoff Scenario:

Thrust Vector → Set to “80” (*CTRL+F12*)

Wheel brakes engaged

Spool Engine

Release brakes

50kts → Pull softly on stick

Retract Gear

Reduce Thrust Vector (*CRTL+F11*)

Typical Landing Scenario:

At five miles out, bring the Harrier to 200 kts at 2,000 ft.

Reduce the throttle and allow the airspeed to drop.

Ensure “hook” is deployed, if landing on Carrier

Engage Wheel Brake

Vector Nozzles in one step increments as speed continues to decrease.

Hold the nose level and allow speed to reduce.

Vector Nozzles until airspeed is 80 kts and nozzles are fully deployed.

Allow speed to continue to drop but hold the nose of the aircraft level.

Manage descent rate with small uses of the throttle.

Touchdown with 10-12° AOA at 55-60 kts.

With practice you will have no problems landing virtually anywhere on the airfield or Carrier...!

LANDING VIDEO → <http://www.youtube.com/watch?v=gLgCzDgHy04>

Note: The AI will prefer to use conventional T/O and Landings. This includes Combat Autopilot.

ROGUE NAVY TEMPLATE

Want to have Naval units engage each other? Use this Template in your TE saved list to create missions. There is a special team called “Rogue Navy”, country of origin - Unknown.

However they are an aggressive threat to both Red and Blue Teams...!

While the Blue and Red navies always travel in a Northerly direction (*unless placed quite close to shore*), the Rogue Navy always travels in a SSW direction. You can - of course - also place them in a Port where they will be docked and stationary.

Naval units will fire upon enemy naval units when approximately within 20 miles.

So you can create Tactical Engagements of your choosing and place opposing navy units close together, so they will at some point merge at that distance, and begin hostilities.

Additionally there are aircraft assigned to the carriers of all Teams.

- Red Team has Su-27 aircraft
- Blue Team has F/A-18C & D aircraft
- Rogue Navy has Rafale-M for A/A + Viggen squadrons for Naval or ground missions.

ADDITIONAL AIRCRAFT

The S-3B Viking and the A-1H Skyraider are now enabled for carrier ops. Furthermore, they are now FULLY functional for weapons delivery by a human player.

A note when making AI only flights for the A-1H: In order for the A-1H piloted by AI to be able to release ordnance correctly, it is recommended that you make TE's for them to attack targets that are *at least 50 miles from home base*.

Flying the A-1H with Combat Autopilot is not recommended.



SINKING THE KUZ'

How to sink the Kuznetsov. Are you THE man?

The DPRK naval carrier group Kuznetsov carries the deadliest navy SAM missile, the SA-N-6, which is the navy version of the land-based SA-10. Without a good attack plan, pilots face certain death...! This Section presents instructions on how to be successful.

FF5.0 has a large inventory of aircraft with Anti-ship weapons; many of the aircraft featuring new 2D and 3D cockpits. Following is a list of weapons you could use and the aircraft that carry them:

AS.34 Kormoran	→	Tornado IDS
AM-39 Exocet	→	Rafale B, C & M Super Etandard Mirage F1C/C5 Mirage IIIE Mirage 2000-D & 2000-9 Mirage 50 & 5F Mirage 5BA
AGM-119 Penguin	→	F-16D HAF & F-16C HAF
AGM-123 Skipper	→	A-6E F/A-18C, D, E & F
AGM-84A Harpoon	→	B-52H & G F/A-18A, C, D, E & F A-6E S-3b CF-18
AGM-84E Slam	→	B-52H F/A-18C, D, E, & F A-6E S-3b CF-18 KF-16C
RB-04E	→	AJS-37
RBS-15F	→	AJS-37 JAS-39A
Scalp-EG	→	Rafale-B, C & M Mirage 2000-C, 5 & D
Storm Shadow	→	Tornado IDS GR4

A "Sink the Kuz" Mission is included in your install.

Go to Tactical Engagement → SAVED. You'll find it there.

One must consider that the Kuznetsov group consists of six ships, so one will have two flights of 4 aircraft each to attack it.

In the TE, the first flight departs from a carrier; the second is land-based flight, departing about 25-30 minutes later, depending on distance to target.

Be aware that the enemy ships will fire against you when you are about 33-37 miles from them. This is further than your ASuW weapon MFD will pick them up, so we are going to use Sea Mode radar to assist in locking on the target.

Your ASuW weapon has an EFFECTIVE maximum range of 40 miles.

Therefore your concentration must be at its peak, whilst 35-45 miles from the target.



Toonces says: Whilst "ASW" is a technically correct term, the preferred way to refer to anti-surface weapons is ASuW. ASW historically refers to Anti-Submarine Warfare. This was changed to USW-Under-Sea Warfare- several years ago, but ASW is still used interchangeably with USW.

PROCEDURE .

1. Launch from the carrier. As soon as you are airborne, give your wingmen a 'Rejoin' command. Change Steerpoint to TGT STPT. Pay close attention to the distance to STPT in the bottom right of your HUD. In the TE this should show about 60>5; with 5 being the TGT STPT.
2. Activate your ASW weapon and Uncage the first one. Next, enable A/G radar and select Sea Mode. Select Snowplow mode, and press EXP to zoom on any returns.
3. Press Target-Designate once. Using your radar cursors, slew the Target Designate icon in your HUD up to the area where your STPT icon was before switching to SP mode. Since the Sea Mode has a range of 40 miles we are looking for radar returns of the ships as we get close to them. Since we are in EXP mode, the returns will show up earlier than 40 miles - but we cannot lock and fire yet until 40 miles out. Therefore - keep an eye on the distance to TGT STPT on your HUD. Note: if you lose focus on where the navy ships should be, simply request AWACS 'Vector to Target' and he will give you a heading and approximate distance to target.
4. While scanning for radar returns we must also keep an eye on our RWR. If the navy unit is scanning you with its radar a ship icon will appear on the RWR. The position of the icon can also assist you in determining the location of the ships in relation to your heading.
5. Once radar blips begin to show up on your Sea radar, slew the cursors so the blips are in the center of the radar immediately under the cross hairs. Checking your HUD distance we can begin to lock on the ships, when within 40 miles. To lock on a target, once again press Target Designate. Keep your eyes on the Target icon on the HUD. Once you designate, try to slew the cursor. If it does not move you are locked onto a target and can fire. (*If you need to go back to SEA mode search, you can undesignate twice to reestablish the SEA mode returns.*)⁴
6. That was easy, wasn't it? You have time on your hands? Oops, we have to manage our wingmen too...! As soon as you lock on a target, give wingmen the '**Attack My Targets**' AND '**Weapons Free**' commands.
7. Continue to Uncage the rest of your weapons and repeat #5 until you are winchester. Keep an eye on the RWR and distance. If you approach within 35 miles, you may want to abort and do a 180° turn to put some distance between you and the target; then begin again. If you gave wingmen orders when very close, you may want to give them a '**Weapons Hold**' AND '**Rejoin**' command before they run into flying SAMs...!
8. When you're Winchester, so should be your wingmen. Give them the '**Weapons Hold**' AND '**Rejoin**' commands and RTB. (*Remember your Victory Roll*)
9. Upon landing return to the UI and take the second flight to clean up any ships that may have survived your first attack. This time you will definitely need to request 'Vector to Target' from AWACS as the navy will have moved quite a ways from the TGT STPT.

⁴ Jojo's complete Step 5 procedure appears on the page below.



JoJo's complete “**Step 5**” for *n00bs...*

1. Set Master Mode → Air to Ground
2. Go to the Wpn Page in your MFD. Weapon Pwr → On.

(For the most realistic simulation, “Realistic Mav Time” should be selected in the FF Config Editor. This means you will need to wait for your weapon to power up.)

3. Set Radar → SEA
4. Uncage Weapon (default key = “U”)
5. Once you see a radar return on the radar screen:

- slew the cursor onto the return
- zoom to "exp"
- slew the cursor on the target
- designate once (*TMS forward – to put the missile seeker on the target*)
- and twice (*so the missile seeker is locked onto the targeted ship*).
- you must see the range scale appear on the right of the HUD.



6. Launch Missile.

With this procedure, even if the “Falcon missile seeker” is optical or IR, you don't need to set the MFD to “Wpn” page to see the target through the seeker.
Besides, if you shoot from 40 nm, you won't see the target on the MFD.

SUBSEQUENT MISSILE LAUNCH:

- * Undesignate once (*TMS back - active MFD will return to radar*)
- * Undesignate twice to unlock the radar (*You may need to “un-zoom” radar picture.*)
- * Uncage weapon
- * Repeat steps **5** and **6**.

TROUBLE SHOOTING:

If, in Step 5, you only designate once, the missile will impact on the point you locked onto the radar. But – as it is a moving target - the targeted ship won't be there anymore...!

If you can't lock the target, ensure that:

- Weapon spool up time is finished on the “Wpn” MFD page.
- “Master Arm” is on.

If Master Arm is off, the Weapon MFD page will remain blank even after “spool up” and “uncage”. If you perform a RAMP Start, Master Arm is set to Off by default...!



DAVE

APPENDIX I ~ NAVAL OPS

In the UI, in the TE / Saved list, one will find two (2) Templates:

- ✓ -- Naval East Sea
- ✓ -- Naval Yellow Sea

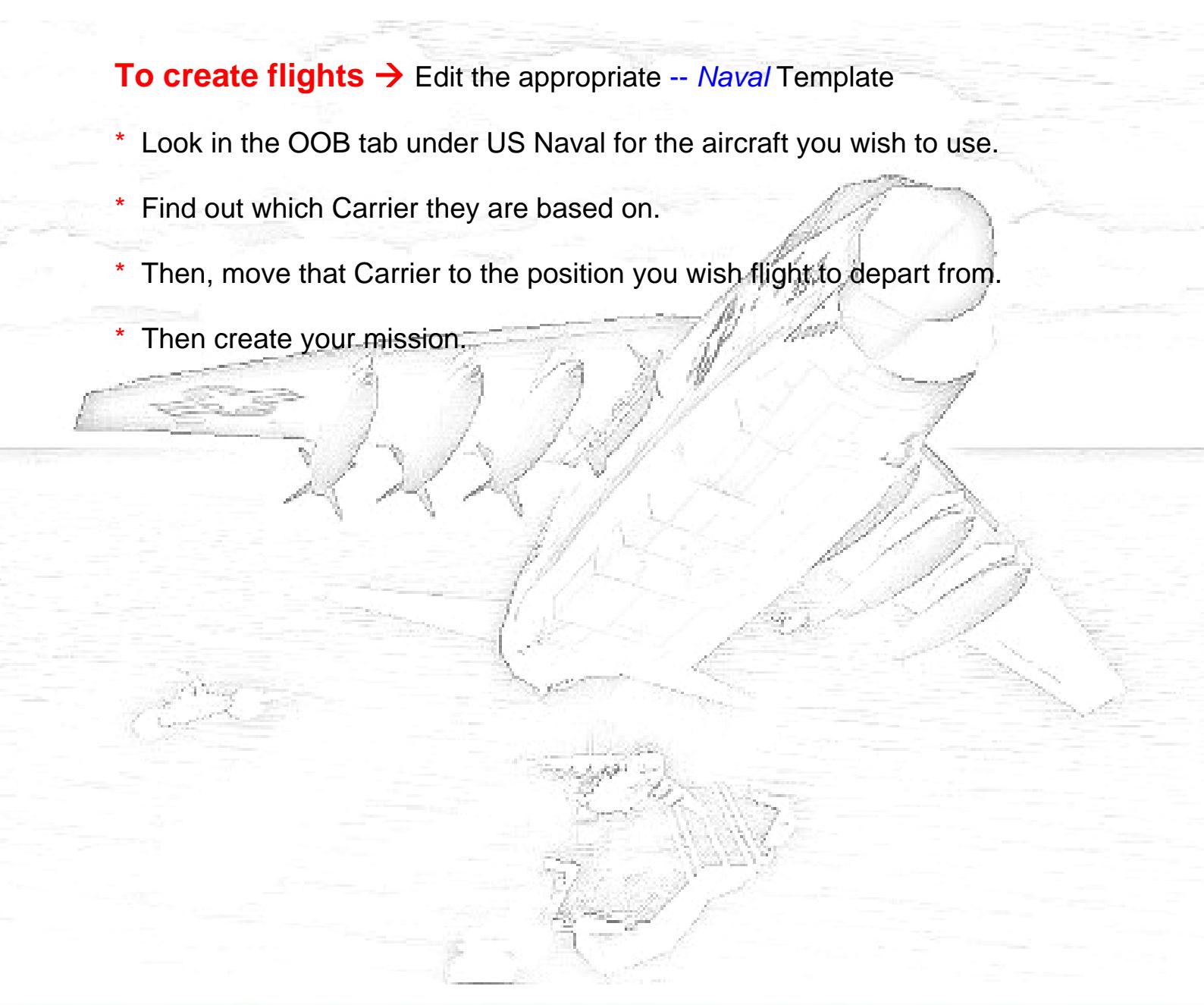
Squadrons are pre-placed on Carriers [see below] with their main land base also listed.

(Note: You WON'T be able to depart from the land base)

Carriers featured in the various Korean Campaigns are included with the same squadrons as in those Campaigns.

To create flights → Edit the appropriate -- Naval Template

- * Look in the OOB tab under US Naval for the aircraft you wish to use.
- * Find out which Carrier they are based on.
- * Then, move that Carrier to the position you wish flight to depart from.
- * Then create your mission.



EAST SEA →

7th - CV-67 Kennedy - Kangnung AB

A-4M
C-2
EA-6B
F-4S
F/A-18A

4th – CV-59 Forrestal - Pohang AB

A-1H
A-4E
F-4C
F/A-18F
OV-10D

32nd Expeditionary Strike - LHD-2 Essex - Pusan AB

AV-8B
F-8E

3rd CVN-68 Nimitz – Kimhae AB

A-6E
A-7D
F-4B
F-14A
F/A-18D

77th - Kuznetsov - Iwon AB

SU-33

YELLOW SEA →

76th CVN-76 Reagan - Suwon AB

A-4B
A-7E
F-4J
F-14B
F/A-18E

9th Charles de Gaulle - Seosan AB

Rafale-M
Super Etandard

35th UK Carrier HMS Invincible - Kunsan Intl AB

Buccaneer

6th CV-64 Connie - Kwangju AB

A-4C
E-2C
F-4N
F-14D
F/A-18C
S-3B



77th - Kuznetsov - Onch'on AB

SU-33

APPENDIX II ~ NAVAL ERAS

In the UI, in the TE / Saved list, one will find three (3) Templates:

- ✓ --Naval Ops - Modern
- ✓ --Naval Ops - ODS
- ✓ --Naval Ops - Vietnam

These three templates contain Carriers and aircraft used in the different, corresponding time periods.

They are representative of the

- Vietnam Era
- Operation Desert Storm Era
- Modern Era.

The Units for each are listed below.

Squadrons are pre-placed on *Carriers* [see below] with their main land base also listed.

(Note: You WON'T be able to depart from the land base)

To create flights → Edit the appropriate --Naval Ops - Template

- * Look in the OOB tab under US Naval for the aircraft you wish to use.
- * Find out which Carrier they are based on.
- * Then, move that Carrier to the position you wish flight to depart from.
- * Then create your mission.

--NAVAL OPS MODERN →

7th - CV-67 Kennedy - *Kangnung AB*

A-6E
A-7D
F-14B
F-14D
E-2C
S-3B
EA-6B

76th CVN-76 Reagan - *Pohang AB*

F/A-18C
F/A-18E
F-14B
F-14D
E-2C
S-3B
EA-6B

9th Charles de Gaulle - *Pusan AB*

Super Etandard
Rafale-M
E-2C

3rd - CVN-68 Nimitz - *Kimhae Intl AB*

A-6E
F/A-18D
F/A-18F
F/A-18C
F/A-18E
E-2C
EA-6B

77th Kuznetsov - *Iwon AB*

SU-33

--NAVAL OPS ODS →

7th - CV-67 Kennedy - Kangnung AB

A-6E
A-7D
F-14A
F-14B
E-2C
S-3B
EA-6B

4th – CV-59 Forrestal - Pohang AB

A-7D
Buccaneer
F-4S
F-4K
E-2C
EA-6B

3rd - CVN-68 Nimitz - Pusan AB

F/A-18D
F-14B
F/A-18A
F/A-18C
E-2C
S-3B
EA-6B

35th UK Carrier HMS Invincible - Kimhae Intl AB

AV-8B

77th Kuznetsov - Iwon AB

SU-33

--NAVAL OPS VIETNAM →

7th - CV-67 Kennedy - *Kangnung AB*

A-4E
E-2C
A-7D
F-4B
F-4N
RA-5C

4th – CV-59 Forrestal - *Pohang AB*

A-4C
A-1H
F-8E
F-4B
E-2C
RA-5C

6th CV-64 Connie - *Pusan AB*

A-6E
A-7D
F-4J
F-4S
F-14A
E-2C

32nd Expeditionary Strike - LHD-2 Essex - *Kimhae Intl AB*

Buccaneer
A-7E
Super Etandard
F-4K
F-8E





Keystrokes

IFF-Scan Power → **Ctrl-i**

(turns IFF Systems on/off)

[Note that some Pits (e.g. F-4) have a functional switch]

IFF-Scan → **RCtrl-Lft_arrow**

(initiates IFF Scan on AA Radar)

Toggle Engine Display → **Shift-Ctrl-h**

(Turns engine display overlay on the monitor on/off)

Cycle Engine → **Ctrl-o**

(Alternates between engines whilst displaying overlay on the monitor)

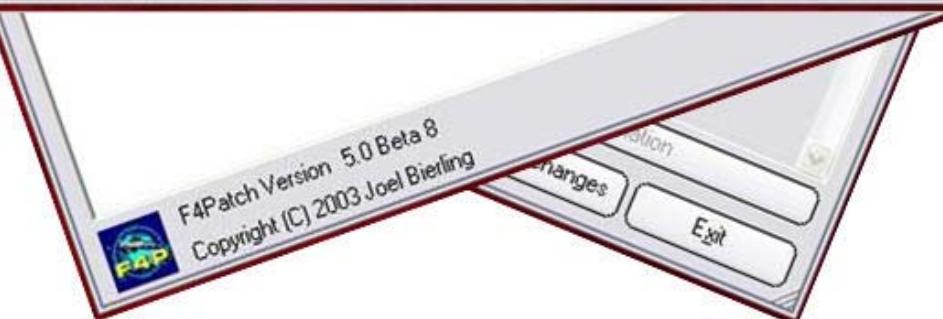
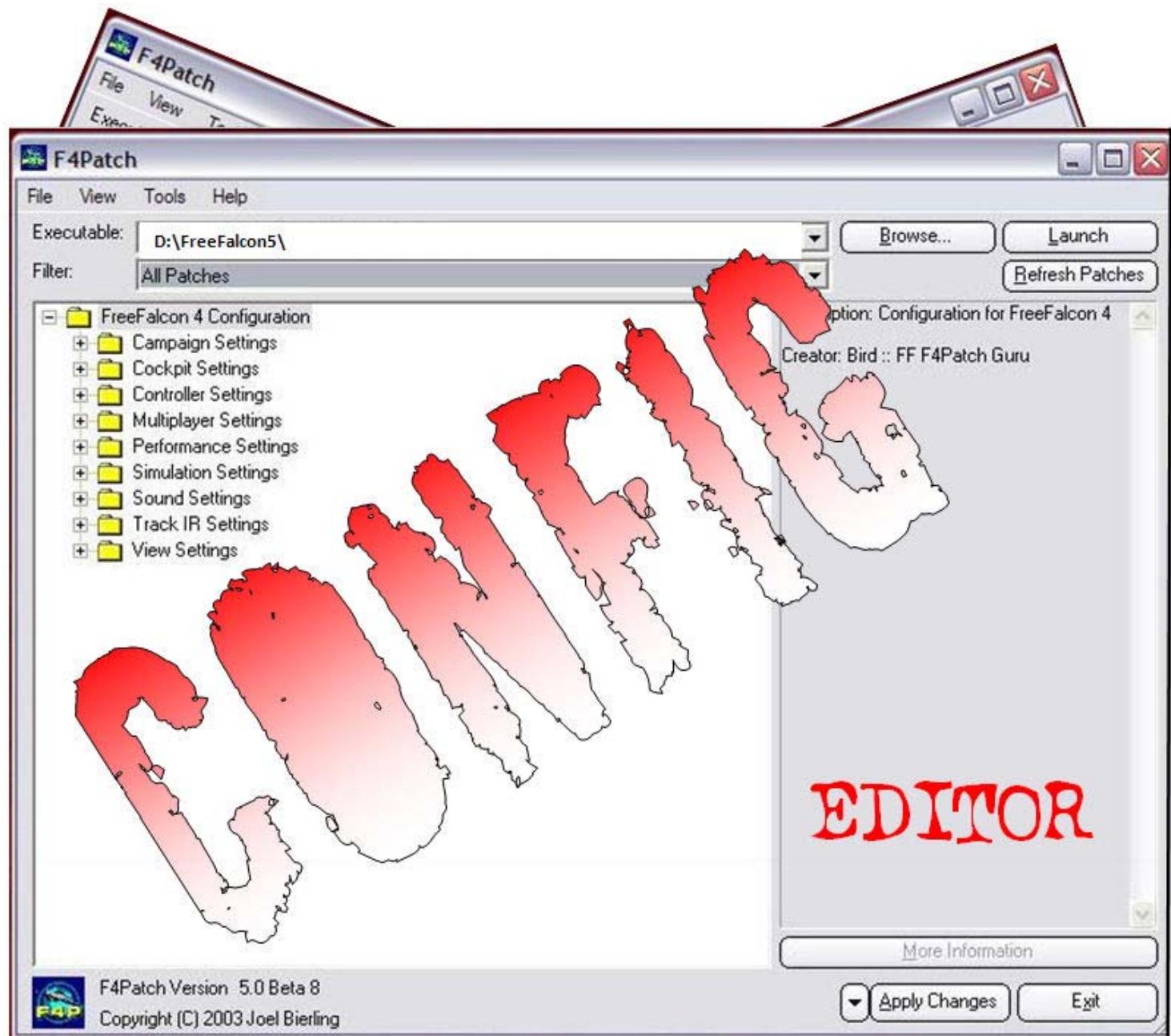
Flap Display Toggle → **Alt-q**

(Turns Flaps display overlay on the monitor on/off)

Pretty Screen Shot → **Shift-o**

(Takes a "clean screenie" with no writing overlaid)



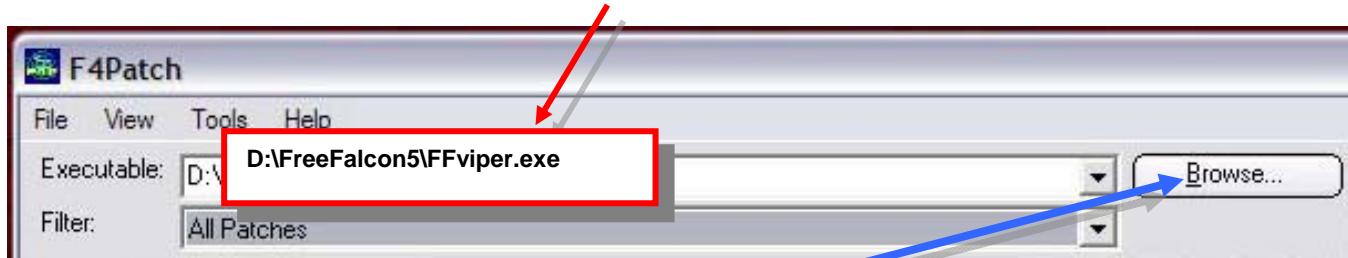


The FF Team have streamlined the F4 Patch into the **FFVIPER Config Editor**.

- * Options are now grouped into more logical categories.
- * For simplicity of use, redundant options have been removed.
- * In the interest of Choice, extra options have been added.

A few things to note →

Ensure that the FF Config Editor is pointing to your **FFVIPER** executable.



This can be selected using the BROWSE button

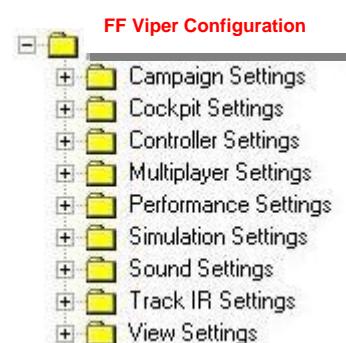
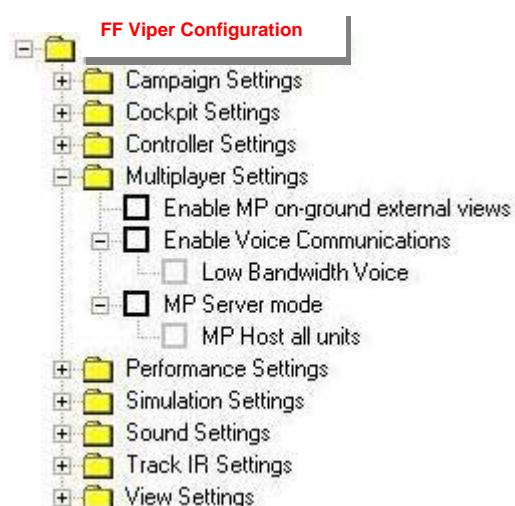
Drop Down Menus →

“File”; “View”; “Tools”; “Help” – You should simply **IGNORE** these menus.
There is **nothing** there which is required or recommended.

Just open your FF Config Editor and make your choices. SIMPLE. ☺

FINDING YOUR OPTION →

In addition to the BROADER Settings Categories, there are also many SUB-Categories to explore.



Make note of the “+” signs in some options.

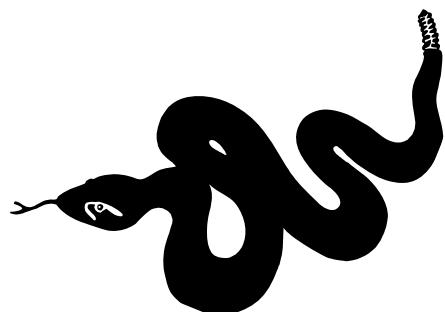
Clicking on this “+” will EXPAND the Option “tree”.

When setting your FF Config Editor, make sure you have expanded every branch and made ALL of your choices before Saving and Exiting.

Some FF VIPER Config Editor Options

- **Large Strike Packages:** This option will cause the ATO to generate 16 ship strike packages if it can. You should use this option **only if you have enough planes** to generate these larger strike packages. Otherwise you may find the ATO will not generate many missions.
- **Radar Jam Chevrons:** Normally, if an aircraft is Jamming your radar, you will see a large “X” on your MFD. However, checking the Chevron Option puts a different type of icon on your Radar A/A MFD. It looks like a ‘chevron’. In military terms the ‘chevron’ is the stripe on your sleeve. In your MFD, the ‘stripes’ will appear upside down...
- **Disable Hi Altitude Fartiles:** Select this option to reduce the “stair-step” line which appears on the terrain at far distances from High Altitudes. With this checked, “real tiles” are rendered instead of the less detailed “fartile”. The CPU has to work harder to display “real” tiles (rendering images that you cannot even see at that distance).
- **Winds Aloft:** Winds aloft will simulate wind effects at altitude. It will have an adverse effect on the accuracy of dropped ordnance, especially dumb bombs. Realistic, but – be sure to take wind speed and angle into account when considering targeting.
- **Cumulus Cloud Options:** Choose from a variety of different Cloud Textures. One may preview the texture by clicking on the “More Information” button in the Config. Editor. Our Beta-Squadron C/O recommends Option “5” .
- **Sun Options:** Choose from a variety of different Sun Textures. One may preview the texture by clicking on the “More Information” button in the Config. Editor. Our Beta-Squadron C/O recommends Sun “2”
- **TE Editor Map Option:** Whilst editing TE’s, some people find it easier to identify such objects as “roads” and “streams” on the Older Style Falcon UI Map. This config option allows you to switch between the current default UI Map, and the older style UI Map

- **Digital Map Option:** Some ‘pits have the Map as part of a “digital” type display. An example would be the F-22 Raptor ‘pit. Selecting this option gives a “digital” looking map display in the cockpit.
- **AWACS background:** This option allows you to change the UI background to one which simulates the Electronic Displays on an AWACS jet. After “committing”, the full-colour map display – now similar to an MFD display - is replaced by an all black background upon which the Countries are outlined in green. .
- **Commit to Taxi Time:** When selecting “Taxi”, this option sets the time - in minutes - you will have spare upon entering the 3D world.. The default setting is TWO (2) minutes. Other choices may be useful for MP, where there are many players to organize. Also – if some pilots have slow loading hardware, the extra minute may be convenient. ***All players must use the SAME setting in MP.***
- **Smart Combat Autopilot:** With this option selected, your jet will follow steerpoints and engage in combat – launching missiles at enemy jets, and generally tooling about the skies fighting things. NOTE: In addition to selecting this option, you’ll need to enter the UI Setup, and choose “combat” from the Autopilot Dropdown Menu. Fantastic for making videos, and for dev’ing purposes.
- **Less Stars / More Stars:** This option changes the number and the brightness of stars. See the [Starry Starry Night](#) Section for details.
- **TIR Minimum FOV:** An important one for “Realism”. The choice of “45” would be the preferred option. With “45” chosen, the pilot may lean forward in his cockpit, and move his face closer to gauges, dials and Displays. With “5” chosen, one experiences the bizarre phenomenon of having the entire world ZOOM in, whenever one moves their head. Thus – the external world is zoomed along with the inside of the ‘pit. It is like leaning forward in your car, and having the distant mountains suddenly RUSH toward you. By choosing “45”, you will move your head realistically within your cockpit, whilst not affecting the outside world. The outside world may STILL be zoomed – of course – by using the mouse wheel or using the “L” key.

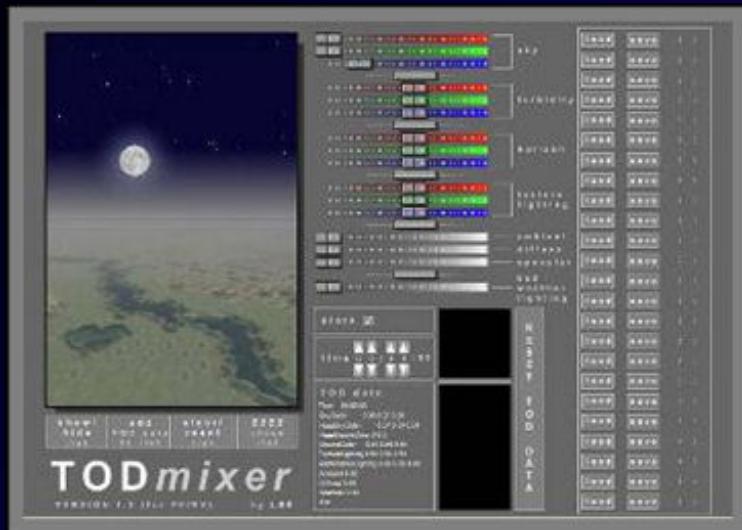




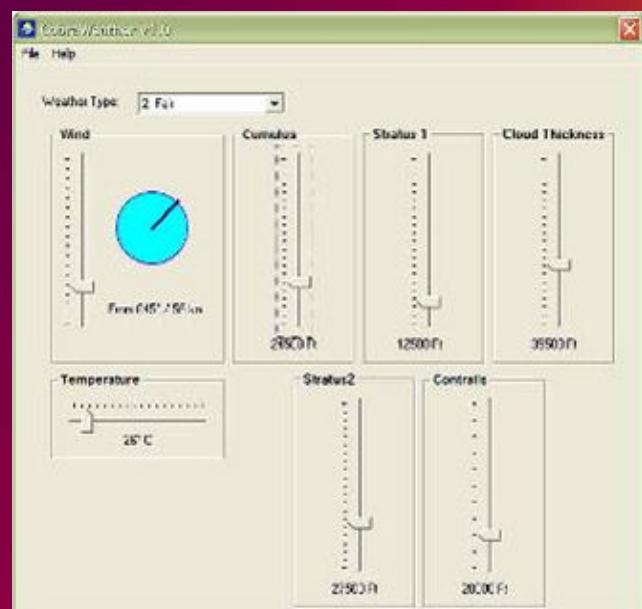
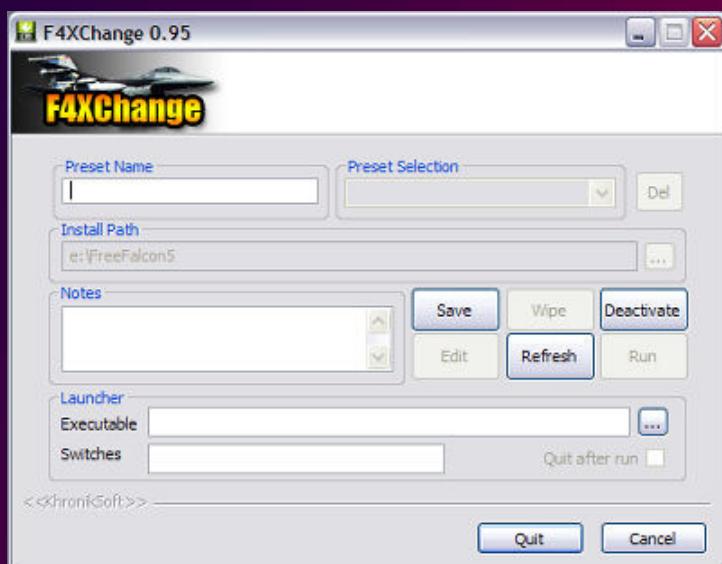
Crew Chief slacking off...? Lee's scratched and worn canopy is available via your Config Editor...!



TOOLS



Click the Picture for the Desired Tool Section...



DATABASE WARNING

The FreeFalcon DATABASE is LOCKED.

- * **TacEdit** - can no longer be used to modify your install.
- * **F4Browse** - can no longer be used to modify your install.
- * **LODEditor** - can no longer be used to modify your install.

Use of these tools will BREAK your installation.
Attempted changes will not take effect.

Use of these tools will necessitate a reinstallation of FreeFalcon.

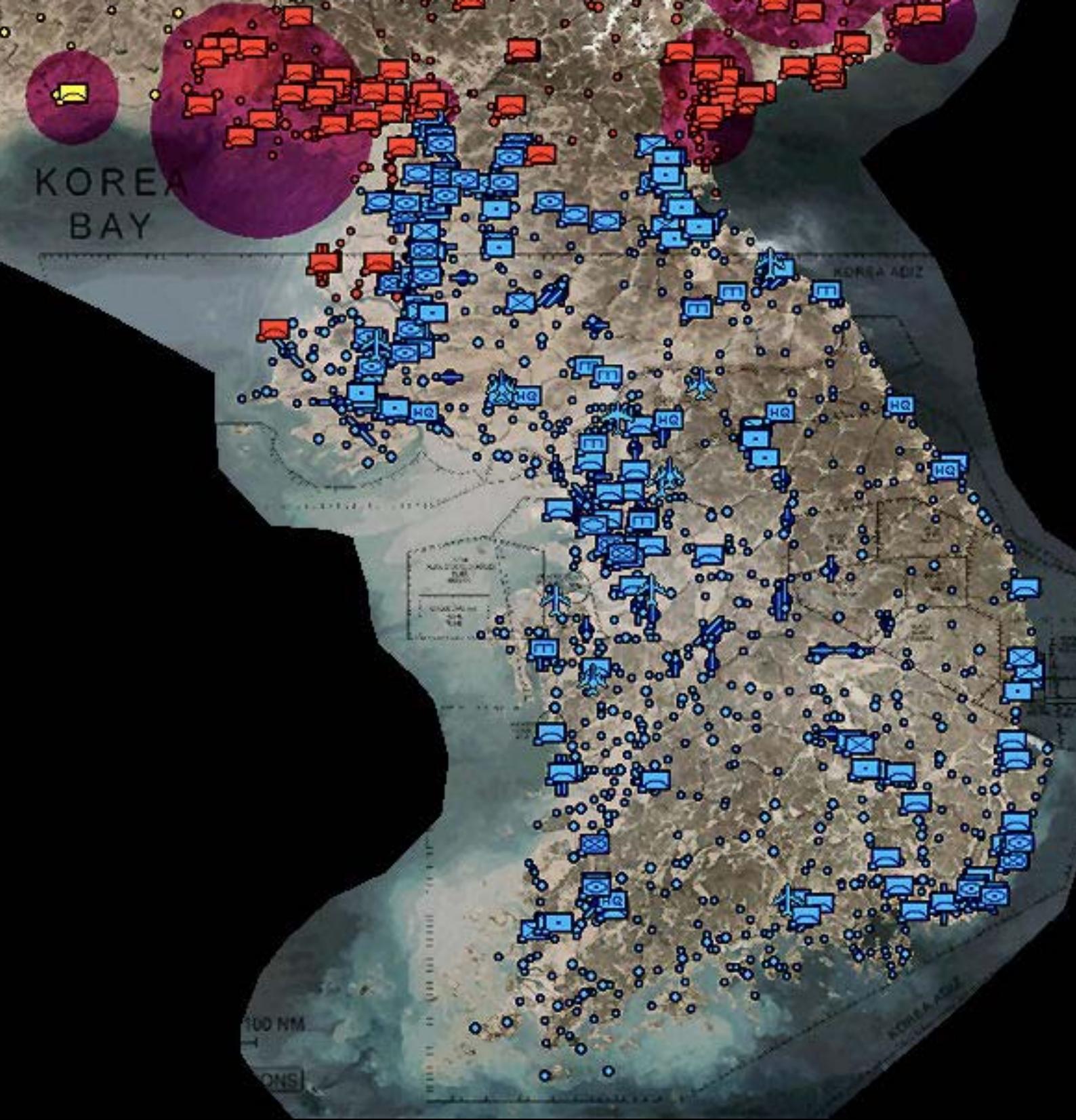
This lock has been undertaken in the interests of Stability.

For too long, these largely misunderstood tools, have had a plethora of unintended negative consequences. By locking the Database, we have ensured that the End-User will benefit; enjoying an install, which is free of negative, unintended effects. FreeFalcon has been optimized by the FF Development Team.

No tweaks are required (nor possible) with complex and undocumented tools.

This is our intent. This is the End-User's gain.





pWnd

By AZEMAN

3D Pit Emporium

...a parade of the 3D Pits which are available for flight in FreeFalcon5.0

For the Switchology and Functionality descriptions, please refer to the *Flight Manuals Companion*...



A Parade of 3D pits for FF5.0, and some accompanying info about the aircraft. FF5.0 is about choice; now enjoy even more...

A-4 SKYHAWK

A-10 THUNDERBOLT

A-6 INTRUDER

JAS-39 GRIPEN

THE VIGGEN

EF2000

AV8B HARRIER

B-52 STRATOFORTRESS

F-104 STARFIGHTER

F-4 PHANTOM

F-5E TIGER

F-117

F-14 TOMCAT

F-15 EAGLE

F-16 FALCON

F-18 HORNET

MIRAGE 2000-C

MIRAGE 2000-D

MIRAGE 2000-5F

F-22 RAPTOR

JASDF F-1

THE RAFALE

THE TORNADO

MIG-21MF FISHBED

MIG-23 FLOGGER

MIG-29 FULCRUM

AN-2 COLT

SR-71 BLACKBIRD



A-4 SKYHAWK



The Skyhawk was designed in response to a US Navy call for a jet-powered attack aircraft to replace the A-1 Skyraider. The result was an aircraft that weighed only half of the Navy's specification and had a wing so compact that it did not need to be folded for carrier stowage. The diminutive Skyhawk soon received the nicknames "Scooter," "Bantam Bomber," and - due to performance - "Heinemann's Hot-Rod." The aircraft sports a low-mounted delta wing, tricycle undercarriage, and a single turbojet engine in the rear fuselage, with intakes on the fuselage sides. The tail is of cruciform design, with the horizontal stabilizer mounted above the fuselage. Armament consists of two 20 mm Colt Mk 12 cannon, plus a large variety of bombs & rockets. The design of the A-4 is a good example of the virtues of simplicity. The delta wing combines speed and manoeuvrability with a large fuel capacity and small overall size. The leading edge slats are designed to drop automatically at the appropriate speed by gravity and air pressure, thereby requiring neither motors nor pilot input. The undercarriage does not penetrate the main wing spar, so when retracted only the wheel itself is inside the wing; the undercarriage struts housed in a fairing. The wings have automatic leading edge slats, operated by aerodynamic pressure alone - again simple & effective and a weight saving feature.

The A-4 pioneered the concept of "buddy" self air-to-air refueling. This allowed the aircraft to be used as a tanker for others of the same type, removing the need for different tanker aircraft - a particular advantage when operating in remote locations.

In the event of hydraulic failure, the A-4 was designed to make an emergency landing, on the two drop tanks nearly always carried by these planes..!! Such landings result in only minor damage to the nose of the aircraft which can be repaired in less than an hour.

During design of the A4, Ed Heinemann is said to have had a large "K.I.S.S." sign put up on the wall. The A-4 certainly is a shining example of the application of that principle to aircraft design.

A-6 INTRUDER



The Grumman A-6 Intruder was a twin jet-engine, mid-wing attack aircraft built in the United States by Grumman Aerospace. In service between 1963 and 1997, the Intruder was designed as an all-weather replacement for the piston-engined A-1 Skyraider medium attack aircraft. A specialized electronic warfare derivative, the EA-6B Prowler, remains in service as of 2009. The A-6 Intruder was featured in a 1986 novel by Stephen Coonts called *Flight of the Intruder*, about pilots flying into Hanoi restricted by dubious rules of engagement. In 1991, *Flight of the Intruder* was adapted as movie.

The definitive attack version of the Intruder was the A-6E, introduced in 1970. The first deployment was 9th December 1971. The A-6E featured vastly upgraded navigation and attack systems.

A-6E models totaled 445 aircraft, about 240 of which were converted from earlier A-6A/B/C models.

An electronic warfare/ECM version of the Intruder was developed early in the aircraft's life for the USMC. A much more highly specialized derivative of the Intruder was the EA-6B Prowler, a "stretched" airframe with two additional systems operators, and more comprehensive systems for the electronic warfare and SEAD roles.

In total, 170 Prowlers were produced.

A-10 THUNDERBOLT



The A-10 Thunderbolt is designed for close air support of ground forces. It can be used against all ground targets, including tanks and other armoured vehicles. The primary mission of the A-10 is to provide day and night close air combat support for friendly land forces and to act as forward air controller (FAC) to coordinate and direct friendly air forces in support of land forces. It also possesses a limited capability to perform certain types of interdiction. All of these missions may take place in a high or low threat environment. The Air Force requirements documents emphasized payload, low altitude flying capability, range and loiter capability, low speed manoeuvrability and weapons delivery accuracy. The A-10 is slow enough to be an observation plane. This greatly increases the A-10's effectiveness at protecting ground troops. The gun system consists of the 30mm Gatling gun mechanism, double-ended linkless ammunition feed, storage assembly and hydraulic drive system. The General Electric GAU-8/A 30mm seven barrel cannon, specifically designed for the A-10, provides unmatched tank killing capability. The gun fires armour-piercing projectiles capable of penetrating heavy armour. It also fires a high explosive incendiary round, which is extremely effective against soft skinned targets like trucks. The cannon fires at a rate of 4,200 rounds per minute. The A-10's manoeuvrability, teamed with the gun's accuracy, allows the pilot quick reaction with lethal effects. Other weapons include the AGM-65 Maverick and AIM-9 Sidewinder missiles. The A-10 have excellent manoeuvrability at low air speeds and altitude, and are highly accurate weapons-delivery platforms. The A-10's highly accurate weapons delivery system makes it effective against all ground targets including tanks and other armoured vehicles.

AJ-37/JA-37 VIGGEN



AJ 37 Viggen → This is the **strike variant**. Main armament for the anti-shipping role, a very important role, is the Saab 304 rocket-powered anti-ship missile. For ground attack, 135 mm Bofors M70 rockets in pods of six each, were together with the command controlled, smoke-less liquid fuel Saab 305 missile, the main weapons, with the 120 kg bombs and 30 mm podded guns used when appropriate. The Saab 305/Rb 05 missile is now an all round weapon, as it is rather effective against slow, large aircraft and helicopters too. A TV version was contemplated as the Rb 05B, but it was cheaper to buy Mavericks instead. It has always had a secondary fighter role, with Sidewinders and 30 mm cannon in pods. In service, it replaced the A 32A Lansen.

JA 37 Jaktviggen → This is the **Fighter variant**. By the time this version was in final design, it was clear that guns were definitely useful, so it was given the most powerful cannon a fighter has had, a 30 mm Oerlikon KCA with 150 rounds. A unique feature is the coupling of the radar gunsighting mode to the autopilot. When the pilot places a target in a capture window, the autopilot takes over pitch and yaw, and presents bank information on the HUD for the pilot to follow. Even if it's not followed, the pitch and yaw channels have enough authority to precision aim the cannon, reducing pilot workload letting him or her concentrate on tactics and situational awareness. The fighter version has an inertial navigation system instead of the earlier doppler navigation system.

The radar is able to track more targets now, than at service entry, for example. The latest software upgrade, EDIT 33, enables the JA 37 to use AMRAAM missiles. In spite of having a strengthened wing, an engine 100 kg heavier (2200 kg) and a fixed cannon, it only has an empty weight 400 kg more than earlier versions. In service it has replaced and supplemented the J 35 Draken.

Harrier Jump Jet



The AV-8B Harrier is a single-seat, light attack aircraft that provides offensive air support to the Marine Air-Ground Task Force (MAGTF). By virtue of its Vertical/Short Take-Off or Landing (V/STOL) capability, the AV-8B can operate from a variety of amphibious ships, rapidly constructed expeditionary airfields, forward sites (e.g., roads), and damaged conventional airfields. This makes the aircraft particularly well-suited for providing dedicated close air support.

- Conduct close air support using conventional and specific weapons.
- Conduct deep air support, to include armed reconnaissance and air interdiction, using conventional and specific weapons.
- Conduct offensive and defensive anti-air warfare. This includes combat air patrol, armed escort missions, and offensive missions against enemy ground-to-air defences.
- Be able to operate and deliver ordnance at night and to operate under instrument flight conditions.
- Be able to deploy for extended operations employing aerial refuelling.
- Be able to deploy to and operate from carriers and other suitable seagoing platforms, advanced bases, expeditionary airfields, and remote tactical landing sites.

The primary mission of the Harrier is a ground-attack fighter-bomber. In this role, a variety of external ordnance with maximum weight up to 5000 pounds may be carried, as well as two 30-mm cannons. The Royal Navy employs the aircraft in a fleet air-defense role; in this capacity, Sidewinder missiles are carried in addition to the cannon and various external stores. In naval use, the Harrier employs a short takeoff technique from a small carrier equipped with a ski-jump launching ramp; after its mission and at a much reduced weight, the aircraft makes a vertical landing on the carrier. This mode of operation is referred to as STOVL, short takeoff and vertical landing. The improved version of the Harrier, known as the AV-8B, was manufactured in the United States by McDonnell Douglas under an agreement with the British Aerospace Corporation

JAS-39 GRIPEN



The JAS 39 Gripen has the capability to switch roles mid-air between air-to-air combat, ground attack and reconnaissance missions. Since the aircraft was introduced in 1996, many important milestones have been passed. The Gripen systems are designed to be able to meet today's as well as future requirements; in terms of both combat performance and mission capability.

The systems build upon new and advanced technologies, which gives it a very long-term development potential. Those aircraft which are now supplied from Saab are adapted to co-operate internationally.

The JAS 39 Gripen belongs to fourth-generation aircraft systems. From an operational point of view, its air defence role is of the highest importance. As an integrated multi-role aircraft, Gripen can operate just as well against ground and sea targets, and undertake advanced reconnaissance missions. The balance in all roles is central to Gripen's operational and tactical capability. Despite its small size, the JAS 39 Gripen is a true multi-role aircraft, carrying all the electronics required for every mission. Thus a single aircraft will be able to replace the Viggen in ALL its versions.

The JAS 39 is one of the lightest of the new generation of fighters. Its configuration is that of a canarded delta, powered by a more powerful derivative of the G.E. F404 engine. Gripen offers high agility, advanced target acquisition systems - including a powerful multi-role radar, modern weapons, low environmental signatures and a comprehensive electronic warfare (EW) suite

EF2000



The Eurofighter is a single-seat, twin-engine, agile combat aircraft designed for air-to-air, air-to-ground and tactical reconnaissance roles. The design of Eurofighter Typhoon is optimised for air dominance performance with high instantaneous and sustained turn rates, and specific excess power. Special emphasis has been placed on low wing loading, high thrust to weight ratio, excellent all round vision and carefree handling.

The use of Stealth technology is incorporated throughout the aircraft's basic design. Eurofighter's high performance is matched by excellent all round vision and by sophisticated attack, identification and defence systems which include the ECR 90 long range radar and Infra Red Search and Track (IRST) system, advanced medium and short range air-to-air missiles and a comprehensive electronic warfare suite to enhance weapon system effectiveness and survivability. Eurofighter Typhoon is intentionally aerodynamically unstable to provide extremely high levels of agility, reduced drag and enhanced lift. The unstable design cannot be flown by conventional means and the pilot controls the aircraft via a computerised 'fly by wire' system.

The Eurojet EJ200 military turbofan was designed specifically to match Eurofighter Typhoon's mission requirements. The overall design ensures a small lightweight engine with the thrust and strength to match the typically on demand reheat temperatures generated during combat. The EJ200 engine combines high thrust with low fuel consumption.

Eurofighter's air dominance supremacy and versatility as a multi-role combat aircraft is marked by its highly potent and comprehensive air-to-surface attack capability.

F-117 NIGHTHAWK



The F-117 is a 'Stealth' attack aircraft. The F-117 uses flat, angled fuselage and wing panels to direct radar reflections in a few sharply defined directions. Despite the aerodynamic disadvantages of such design, and because of the computer controls, it is easy to fly. The F117 can execute precision attacks on point targets with impunity, but has a limited weapons load.

After 25 years of service the F-117 Nighthawk, the US Air Force's first stealth fighter, retired. The technology that once made it a unique weapon system caught up to it, and newer fighter aircraft are now joining the fleet. The F-117A Nighthawk is the world's first operational aircraft designed to exploit low-observable stealth technology. About the size of an F-15 Eagle, the twin-engine aircraft is powered by two General Electric F404 turbofan engines and has quadruple redundant fly-by-wire flight controls. Air refuelable, it supports worldwide commitments and adds to the deterrent strength of the U.S. military. The F-117A can employ a variety of weapons and is equipped with sophisticated navigation and attack systems integrated into a state-of-the-art digital avionics suite that increases mission effectiveness and reduces pilot workload. In order to lower development costs, the avionics, fly-by-wire systems, and other parts are derived from the F-16, F/A-18, and F-15E. (These parts could be described as "spares" on budgets to keep the project secret). Among the penalties for stealth are 30% lower engine power and a very low wing aspect ratio (*Due to the high sweep angle [67.5 °] needed to deflect incoming radar waves to the sides*). The radar cross-section of the F-117 has been estimated at between 10-100 cm² - meaning that a typical radar will not be able to detect an F-117 at a range any greater than 8-16 miles. It carries no radar, which lowers emissions and cross-section. It navigates primarily by GPS and high-accuracy inertial navigation. Missions are coordinated by an automated planning system that can automatically perform all aspects of a strike mission, including weapons release. Targets are acquired by a thermal imaging infrared system, slaved to a laser that finds the range and designates targets for laser-guided bombs. The F-117A's split internal bay can carry 5,000 lb (2,300 kg) of ordnance. Typical weapons are a pair of GBU-10, GBU-12, or GBU-27 laser-guided bombs, two BLU-109 penetration bombs, two Wind-Corrected Munitions Dispensers (WCMD), or two Joint Direct Attack Munitions (JDAMs), a GPS/INS-guided stand-off bomb. It can theoretically carry two examples of nearly any weapon in the USAF inventory, including the B61 nuclear bomb. There are a number of bombs that it cannot carry, either because they are too large to fit in its bomb bay, or are incompatible with the F-117's carry system

F-22A Raptor



The F-22A is destined to replace the F-15 and become the next-generation fighter of the USAF. It is one of the first fighter designs optimised for stealth. In addition, it was designed to "supercruise", i.e. fly at supersonic speeds without afterburner. The F-22 has a relatively conventional appearance, with twin tails and flat fuselage sides. The engines have two-dimensional thrust vectoring nozzles. To conserve a low radar cross-section, the armament is carried in internal weapons bays. F-22 made its debut in December 2005. A combination of improved sensor capability, improved situational awareness, and improved weapons provides good first-kill opportunity. The F-22 possesses a sophisticated sensor suite that allows the pilot to track, identify, and shoot the threat before it detects the F-22. Significant effort is being placed on cockpit design and avionics fusion to improve the pilot's situational awareness. Advanced avionic technologies allow the F-22 sensors to gather, integrate, and display essential information in the most useful format. Advances in low-observable technologies provide significant survivability and lethality against air-to-air and surface-to-air threats. The F-22's combination of reduced observability and supercruise accentuates the advantage of surprise in a tactical environment. The F-22 engines produce more thrust than any current fighter engine, especially at military (non-afterburner) power. This characteristic allows the F-22 to efficiently cruise at supersonic airspeeds without using afterburner (supercruise). This capability greatly expands the F-22's operating envelope in both speed and range over current fighters which must use afterburner to operate at supersonic speeds. The sophisticated F-22 aerodesign and high thrust-to-weight provides the capability to outmaneuver all current and projected threat aircraft. To ensure operational flexibility, the F-22 has better reliability and maintainability than any military fighter in history. Increased F-22 reliability and maintainability pays off in less manpower required to fix the aircraft and consequently less aircraft required to support a deployed squadron. Additionally, reduced maintenance support provides the benefit of reduced life cycle cost and the ability to operate more efficiently from prepared or dispersed operating locations. The F-22 exceeds current fighter sortie surge rates with a reduced support structure.

The combination of reduced observability and supercruise drastically shrinks surface-to-air engagement envelopes and minimizes threat capabilities to engage and shoot the F-22. The F-22 has a secondary role to attack surface targets. The aircraft will be capable of carrying 2 x 1,000 pound Joint Direct Attack Munitions (JDAMs) internally and will use on-board avionics for navigation and weapons delivery support.

B-52H STRATOFORTRESS



The B-52 was originally designed for high-altitude weapons delivery over the target. Like the B-47, however, the increasing effectiveness of enemy antiaircraft defences required the development of low-altitude high-speed penetration tactics for the B-52. Again like the B-47, the B-52 has suffered from its share of structural fatigue problems. To cure these problems, many modifications have been made to the aircraft during its long-lived career.

A total of 744 B-52s were built with the last, a B-52H, delivered in October 1962. Only the H model is still in the Air Force inventory and all are assigned to Air Combat Command. The first of 102 B-52H's was delivered to Strategic Air Command in May 1961. The H model can carry up to 20 air launched cruise missiles. In addition, it can carry the conventional cruise missile which was launched from B-52G models during Desert Storm.

Today, 94 B-52H's are all that remain of 744 Stratofortresses built in the '50s and '60s. As part of the 1991 Strategic Arms Reduction Treaty, signed by the United States and Russia, B-52 C/D/E/F/G crews flew their planes' final missions to the Aerospace Maintenance and Regeneration Centre at Davis-Monthan Air Force Base, Ariz. Commonly known as the "Boneyard," the centre became the last stop - but not a resting ground - for many of the old SAC warriors. The bombers, some still wearing faded "Peace is our Profession" emblems, were placed deep inside the sprawling complex, then stripped of all usable parts. The bombers were then ripped into five pieces by a 13,000-pound steel blade. The modern-day guillotine crashed down four times on each plane, severing the mammoth wings and leaving the fuselage in three pieces. There was nothing left but 90 tons of junk.

F-104 STARFIGHTER



Because of its physical appearance and performance, the F-104 has often been called the "missile with a man in it." Encounters with the MiG-15 in Korea caused a strong outcry among Air Force fighter pilots for a cheap, lightweight, manoeuvrable, high-performance fighter to confront future Soviet fighters. The result was the F-104, a fighter that overemphasized rate of climb and brute speed. Intended as a point defence interceptor, range was sacrificed for rate of climb. It used an exceptionally small wing span of only 21 feet, and provided low speed lift through air bled from the engine and vented over the wing. Designed as a supersonic superiority fighter, the F-104 was produced in two major versions. Armed with a six-barrel M-61 20mm Vulcan cannon it served as a tactical fighter and - additionally equipped with heat-seeking Sidewinder missiles - as a day-night interceptor.

In 1952, C.L. "Kelly" Johnson designed the F-104; the first XF-104 making its initial flight in 1954. It was the first aircraft to fly at twice the speed of sound and held numerous airspeed and altitude records. 1958 - a world speed record of 1,404 mph; 1959 - a world altitude record of 103,395 feet. The Starfighter was the first aircraft to hold simultaneous official world records for speed, altitude and time-to-climb. Using an accelerated loft technique, some F-104s have been flown to higher than 90,000 feet.

Like the F-16, the F-104 was selected for use by NATO allies. More than 1,700 F-104s were built in the U.S. and abroad under the military aid program for various nations including Canada, West Germany, Italy, Norway, the Netherlands, Belgium, Denmark, Greece, Turkey, Spain, Taiwan and Japan.

Some F-104s were modified to include a second cockpit for transition training and some weapons delivery. A reconnaissance version also exists although it never served with the USAF.

F-4 PHANTOM



The F-4 Phantom II is a two-seat, supersonic, long-range, all-weather fighter-bomber built by McDonnell Douglas Corporation (*originally McDonnell Aircraft Corporation*). It was operated by the US Navy, the USMC and later the USAF, from 1961 until 1995. It is still in service with other nations. In service, it earned the nickname "Rhino" (*a reference to both its prodigious nose and its rhinoceros-like toughness*). Its primary mission capabilities are: long range, high-altitude intercepts utilizing air-to-air missiles; long-range attack missions utilizing conventional or nuclear weapons; and, CAS missions utilizing a choice of bombs, rockets and missiles. First flown May 27, 1958, the Phantom II was originally developed for US Navy fleet defence. The initial F4H-1 (later F-4B) entered service in 1961. The USAF evaluated it (*with the F-110A Spectre*) for CAS, interdiction, and counter-air operations and - in 1962 - approved a USAF version, the F-4C. The F-4C made its first flight on May 27, 1963, and production deliveries began in November, 1963. The F4 went through many upgrades. These include the USAF's replacing the F-4D with the F-4E with an internal M61 Vulcan 20 mm cannon and the conversion of 116 F-4Es for the SEAD "Wild Weasel" role as the F-4G. Reconnaissance versions were also built, the RF-4C for the USAF, RF-4B for the USMC, and the export RF-4E. In 1965, the first USAF Phantom IIs were sent to Vietnam. Early versions lacked any gun armament. Coupled with the unreliability of the air-to-air missiles of the time, this major drawback resulted in aircraft loss after they ran out of missiles. During the course of the Vietnam War, its contemporaries, the MiG-19 and MiG-21, inflicted heavy losses on the F-4s when the American aircraft were ambushed after returning from bombing assignments. This prompted the USAF to introduce an M61 Vulcan 20 mm cannon in the nose of the aircraft, below the radome (although no Navy or Marine Phantoms ever had an integral gun). This later version was the mainstay of the USAF Phantom II forces. The last Phantoms in USAF service were retired in December 2004 with the deactivation of the 20th Fighter Squadron, the Silver Lobos. The last Phantoms in Marine Corps service were F-4S models of VMFA-112, retired in 1992 when VMFA-112 transitioned to the F/A-18A.

F-5 TIGER



The Tiger IIs are used in both air-to-air and air-to-ground roles. The F-5A was an agile, well-performing aircraft, but it had been built primarily with the air-to-ground role in mind, and was not well-equipped for air-to-air combat. In particular, it lacked any sort of modern radar equipment, and did not even have a lead computing gun-sight. Northrop thought that the basic design might make an effective air-to-air fighter by adapting it to more powerful engines, and by equipping it with radar and other avionics improvements. The F-5 placed emphasis on manoeuvrability rather than on high speed. It incorporated a system of manoeuvring flaps that was based on a similar system that had been used on the Netherlands Air Force's Canadair-built NF-5A/B. Full-span leading-edge flaps worked in conjunction with conventional trailing-edge flaps. The manoeuvre flaps had four possible settings. The first setting was the fully retracted one, giving a symmetrical aerofoil for supersonic flight. The second was the cruising flight setting, in which the trailing edge drooped 8 degrees. The third was the intermediate setting, which drooped the trailing edge 8 degrees and the leading edge 12 degrees and was used in combat at speeds of up to 600 mph. The last was the landing/takeoff setting, in which full flaps (24 degrees for the leading edge, 20 degrees for the trailing edge) were used. The combination of LEXes and manoeuvring flaps was intended to allow the new F-5 to achieve higher angles of attack and thus higher lift with the same amount of drag, or to achieve the same angle of attack with less drag. Unlike the F-5A, which could be equipped with wing-tip tanks, the wing of the F-5E was completely dry.

F-14 TOMCAT



The F-14 *Tomcat* is a supersonic, twin-engine, variable swing-wing, two-seat A/C designed to attack and destroy enemy aircraft at night and in all weather conditions. The F-14 can track up to 24 targets simultaneously with its advanced weapons control system; engaging six with Phoenix AIM-54A missiles whilst continuing to scan the airspace. The Tomcat is the only U.S. plane capable of carrying the long-range Phoenix missile, which can fire at targets from distances of 80 miles. Armament also includes a mix of other air intercept missiles, rockets and bombs. Manufactured by Grumman Aircraft Corporation, the F-14 employs variable geometry wings to optimize aircraft performance throughout the flight envelope. The F-14 swing-wing can be manually controlled by the pilot or adjusted automatically according to the plane's state. They swing forward to allow the plane to land on tiny aircraft carrier decks at relatively low speeds and backwards as the plane dashes for intercept roles. The multiple tasks of navigation, target acquisition, ECM, and weapons firing are divided between the pilot and the radar intercept officer (RIO). When the F-14 Tomcat thunders off the aircraft carrier's deck into the sky, its wings automatically sweep back to a 60-degree angle as the two afterburning turbofan engines each kick out 27,000 pounds of thrust, propelling the fighter at more than twice the speed of sound. Inside the wings and fuselage, five internal fuel tanks must securely hold up to 9,000 litres of highly volatile jet fuel under extremes of temperature, vibration, high G forces and other adverse conditions. Overall, the Navy's Grumman F-14 Tomcat is an outstanding aircraft. Six long-range AIM-54A Phoenix missiles can be guided simultaneously against six separate threat aircraft at long ranges by the F-14's AWG-9 weapons control system. For medium-range combat, Sparrow missiles are carried; Sidewinders and a 20mm cannon are available for dogfighting. In the latter role, the Tomcat's variable-sweep wings give the F-14 a combat manoeuvring capability that could not have been achieved with a "standard" fixed wing.

F-15 EAGLE



The F-15 is an all-weather, extremely manoeuvrable, tactical fighter designed to gain and maintain air superiority in aerial combat. The Eagle's air superiority is achieved through a mixture of manoeuvrability and acceleration, range, weapons and avionics. The F-15's superior manoeuvrability and acceleration are achieved through high engine thrust-to-weight ratio and low wing loading. It features a multi-mission avionics system, a tactical electronic-warfare system, "IFF" system, electronic countermeasures, and an onboard computer. The F-15's versatile pulse-Doppler radar system can look up at high-flying targets and down at low-flying targets without being confused by ground clutter. It can detect and track aircraft and small high-speed targets at distances beyond visual range down to close range, and at altitudes down to tree-top level. The radar feeds target information into the central computer for effective weapons delivery. For close-in dog fights, the radar automatically acquires enemy aircraft, and this information is projected on the head-up display. The Fiber Optic Towed Decoy (FOTD) provides aircraft protection against modern radar-guided missiles to supplement traditional radar jamming equipment. The device is towed at varying distances behind the aircraft while transmitting a signal like that of a threat radar. A variety of air-to-air weaponry can be carried by the F-15: AIM-7F/M, AIM-120, AIM-9L/M Sidewinder, and an internal 20mm Gatling gun (with 940 rounds of ammunition). AIM-9X puts the F-15 in the air superiority position in all arenas. The F-15/AIM-9X weapon system allows a high off-boresight targeting capability. Low-drag, conformal fuel tanks were especially developed for the F-15C and D models. These tanks reduce the need for in-flight refueling on global missions and increase time in the combat area. All external stations for munitions remain available with the tanks in use. The F-15 Eagle began its life in the mid 1960s as a dedicated air superiority fighter, as no such AC had existed since the F-86 Sabre.

An industry-wide competition ended on December 23, 1969 when McDonnell Douglas was awarded the contract for the F-15.

F-16 FIGHTING FALCON



The F-16 Fighting Falcon is a compact, multi-role fighter aircraft. It is highly manoeuvrable and has proven itself in air-to-air combat and air-to-surface attack. It provides a relatively low-cost, high-performance weapon system for the United States and allied nations. In an air combat role, the F-16's manoeuvrability and combat radius (distance it can fly to enter air combat, stay, fight and return) exceed that of all potential threat fighter aircraft. It can locate targets in all weather conditions and detect low flying aircraft in radar ground clutter. In an air-to-surface role, the F-16 can fly more than 500 miles (860 kilometres), deliver its weapons with superior accuracy, defend itself against enemy aircraft, and return to its starting point. An all-weather capability allows it to accurately deliver ordnance during non-visual bombing conditions. USAF F-16 multi-mission fighters were deployed to the Persian Gulf in 1991 in support of Operation Desert Storm, where more sorties were flown than with any other aircraft. These fighters were used to attack airfields, military production facilities, Scud missiles sites and a variety of other targets. The original F-16 was designed as a lightweight air-to-air day fighter. Air-to-ground responsibilities transformed the first production F-16s into multi-role fighters. The empty weight of the Block 10 F-16A is 15,600 pounds. The empty weight of the Block 50 is 19,200 pounds. The A in F-16A refers to a Block 1 through 20 single-seat aircraft. The B in F-16B refers to the two-seat version. The letters C and D were substituted for A and B, respectively, beginning with Block 25. Block is an important term in tracing the F-16's evolution. Basically, a block is a numerical milestone. The block number increases whenever a new production configuration for the F-16 is established. Not all F-16s within a given block are the same. They fall into a number of block subsets called mini-blocks. These sub-block sets are denoted by capital letters following the block number (Block 15S, for example). From Block 30/32 on, a major block designation ending in 0 signifies a General Electric engine; one ending in 2 signifies a Pratt & Whitney engine.

FA-18 HORNET



The F/A-18 "Hornet" is a supersonic, single seat (A and C models) or tandem seat (B and D models), twin engine, all weather, night, combined fighter and attack aircraft and can be refuelled in flight. The F/A-18 multi-mission aircraft can operate from either aircraft carriers or land bases. The F/A-18 fills a variety of roles: air superiority, fighter escort, suppression of enemy air defences, reconnaissance, forward air control, close and deep air support, and day and night strike missions. The F/A-18 Hornet replaced the F-4 Phantom II fighter and A-7 Corsair II light attack jet, and also replaced the A-6 Intruder as these aircraft were retired during the 1990s. The combat-proven F/A-18 Hornet is the first tactical aircraft designed from its inception to carry out both air-to-air and air-to-ground missions. The F/A-18, (models A, B, C and D), can deliver conventional air-to-air, air-to-ground decoy expendables, and can carry airborne control pods for various missions. The combination of excellent thrust-to-weight ratio, and manoeuvrability offers an unmatched combat capability. A key aspect of the Hornet's popularity with pilots is the ease with which the aircraft can be converted from fighter to strike mode and back again; it's as easy as flipping a switch. During Operation Desert Storm, F/A-18s routinely performed fighter and strike missions on the same sortie. Fulfilling a variety of roles-air superiority, fighter escort, suppression of enemy air defences, reconnaissance, forward air control, close air support, and day and night strike missions-the F/A-18 has proven to be the most versatile combat aircraft in service.

MIRAGE 2000-C



The first Mirage 2000 to go into service was the single-seat "Mirage 2000C" interceptor / air combat variant. There were four single-seat prototypes, including the initial Mirage 2000 prototype mentioned above. The first production Mirage 2000C flew in November 1982. Initial deliveries were in 1983. The first operational squadron was formed in 1984, the 50th anniversary of the French Armee de l'Air (AdA). Primary armaments of the Mirage 2000C in the interceptor role were the Matra Super 530 medium-range semi-active radar-guided air to air missile (AAM) on the inboard wing pylons, and the Matra Magic short-range infrared-seeking AAM on the outboard wing pylons. The Mirage 2000C could also carry air-to-ground stores, such as iron bombs, cluster bombs, or Matra 68-millimeter rocket pods, in its secondary strike role. It had no smart munitions capability, though it could carry laser-guided bombs (LGBs) if another aircraft or ground forces provide designation. Standard colours consisted of light gray on the bottom and a disruptive pattern of light gray and gray blue on top. Armament was substantially improved by the new Matra MICA AAM, which is now the AdA's standard AAM. MICA stands for "Missile d'Interception, de Combat et d'Autodéfense / Intercept, Combat, & Self-Defense Missile". It is a lightweight and highly agile weapon, with a thrust-vectoring nozzle. There are two versions, including the heat-seeking "MICA IR" and the radar guided "MICA EM". The infrared seeker on the MICA IR can in principle provide video to the cockpit to act as an infrared search and track sensor. The radar-guided MICA EM variant provides a "fire and forget" capability. However, the Mirage 2000C only carries the MICA IR, there being no support for the MICA EM in the aircraft's weapons control system.

MIRAGE 2000-D



The designation was changed to "Mirage 2000D" in 1990, with the "D" denoting Multirole. The "Mirage 2000D" aircraft can carry stores such as:

- All major dumb munitions, such as iron bombs, Belouga cluster bombs, Durandal runway breaker bombs, BAP 100 and BAP 120 clusters, Matra 68 millimetre rocket pods, and cannon pods.
- Laser-guided weapons such as the AS-30L ASM or French and US LGBs, with the munitions directed by a ATLIS II or improved optical-infrared PDLCT and high-resolution PDLCTS targeting pods, attached to a pylon under the right air intake. The navigator / WSO in the back seat handled laser targeting while the pilot in the front flew the aircraft. Carriage of the next-generation Damocles pod is now under consideration.
- The Armat antiradar missile (*though this is rarely carried*).

The Mirage 2000D remains in service, with various improvements such as the MICA IR. A general upgrade designated the "Mirage 2000D-R2" machine was delivered from 2001. It featured an enhanced countermeasures suite, noticeably featuring twin 24-shot flare dispensers on each side of the spine at the front of the tailfin. Further enhancements are being implemented for carriage of the APACHE and SCALP-EG cruise missiles, as well as carriage of the new low-cost AASM family of modular precision guided bombs. The AdA would also like to add a Link-16 Multifunction Information Distribution System (MIDS) datalink and a SATURN (Second-generation Anti-Jam Tactical UHF Radio for NATO) encrypted radio. There has been some talk of using Mirage 2000Ds as jamming platforms as well. AdA Mirage 2000Ds served in the intervention in Afghanistan in 2001:2002, operating in close conjunction with international forces and performing precision attacks with LGBs.

MIRAGE 2000-F



By the late 1980s, the Mirage 2000 was beginning to age relative to the competition, and export sales slumped. Dassault and Thomson-CSF began work on a privately-funded update of the Mirage 2000C to compete with the latest models of US F-16 fighters. The new "Mirage 2000-5" was to feature updated avionics and MICA missile armament. A two-seat Mirage 2000B prototype was extensively modified as the first Mirage 2000-5 prototype, first flying on 24 October 1990 with Patrick Experton at the controls. A Mirage 2000C prototype was then reworked to a similar standard, performing its initial flight on 27 April 1991. The Mirage 2000-5 could also carry the oversized drop tanks developed for the Mirage 2000N, greatly extending range. A Mirage 2000-5 could carry four MICA EMs and two MICA IRs. A two-seater version was developed as well. The back-seater had the HUD but not the associated head-level display, and as with first-generation two-seaters, there were no built-in cannon -- though cannon pods could be carried. Dassault needed an order from the AdA to help promote foreign sales, and after some lobbying, in 1993 the AdA decided to upgrade 37 of their existing Mirage 2000s to 2000-5 specification as a stopgap before the arrival of the Rafale. The upgraded aircraft were redesignated "Mirage 2000-5F", and became operational in 2000. They retained the old countermeasures system with the SERVAL / SABRE / Spirale units and did not receive the ICMS 2 system. The aircraft upgraded were later production Mirage 2000Cs and their RDI radars were passed on to early Mirage 2000Cs with the early RDM radar.

the RAFALE



The Dassault Rafale is a relatively small airplane (it does not need folding wings to fit on a carrier) that carries a very heavy load. The Rafale has an operating empty weight of around 22,000 pounds and was initially designed with a maximum take-off weight of 49,600 pounds. That figure has now been increased to 54,000 pounds, and Dassault is preparing a further jump to 60,000 pounds. Without fuel or weapons, a Rafale weighs some 3,000 pounds more than a F-16C, but it can take off 10,000 pounds heavier. This allows the Rafale to carry as much as 21,000 pounds of external stores in addition to 9,000 pounds of internal fuel. With twin conformal fuel tanks holding a total of 600 US gallons of fuel - designed and flight-tested by Dassault during its campaign to win Korea's fighter contest - the Rafale can perform a 1,000-nm-radius strike mission, carrying both heavy air-to-surface weapons and air-to-air missiles. Despite these capabilities, the Rafale has failed to win a single export order to date, although it entered hard-fought campaigns in the United Arab Emirates and Korea. Singapore is getting close to a decision on a future high-end fighter aircraft. The Lockheed Martin F-35 Joint Strike Fighter (JSF) has apparently scooped much of the available world market, at least for now, so Singapore, which wants airplanes before the JSF is ready, is a unique opportunity for European contenders, such as the Eurofighter Typhoon and its French rival, the Rafale. The carrier-based Rafale M has become the first Rafale variant to be delivered. The first Rafale squadron, Flotille 12F, was formed in May 2001 and is now working up aboard the Charles de Gaulle . Seven aircraft were deployed on the carrier in the Indian Ocean earlier this summer, and the squadron is expected to be declared fully operational shortly, with ten aircraft. According to French executives, some unofficial training engagements have already taken place between Rafales and US Navy F/A-18s. On June 9, 2002, Rafale Ms of the French Navy operating from the Charles de Gaulle participated in a joint patrol with American fighters. Although the assignment was for reconnaissance over the tense India-Pakistan border and no shots were fired, it marked the official combat debut of the aircraft .

the TORNADO



The Tornado IDS resulted from a 1968 feasibility study undertaken by the Belgian, British, Canadian, Dutch, Italian and West German governments for an advanced warplane to be designed, developed and built as collaborative venture with the object of providing the air forces of the partner nations with a STOL warplane able to undertake the close air support, battlefield interdiction, long-range interdiction, counter-air attack, air-superiority, interception and air defence, reconnaissance and naval strike roles. With the new warplane's roles finalized, the task of the design team was to create an airframe/power plant/electronic combination able to fulfil the resulting requirement. This demanded five core capabilities: the ability to take-off and land in very short distances, even if the main runways were damaged; the ability to fly at high speed at very low level over long ranges without significant degradation of crew performance; the ability to undertake low-level penetrations of hostile air space by day and/or night under all weather conditions; the ability to hit any target with complete accuracy in a first-pass attack; and, the ability to attain high supersonic speed at all altitudes. The aerodynamic core of the airframe demanded by these capabilities was a variable-geometry wing: in its minimum-sweep configuration of 25 degrees this would generate high lift at takeoff and landing, and in its maximum-sweep configuration of 68 degrees it would produce low wave drag for high supersonic speed as well as low gust response for a smooth low-level ride. Flight control was exercised via a fly-by-wire system operating in conjunction with a command stability augmentation system. The airframe was schemed in association with the power plant and electronics. The power plant was to comprise a pair of reheated turbofans of very low specific fuel consumption for long range, and high afterburning thrust for maximum acceleration at take-off, and fitted with thrust-reversers for maximum reduction of the landing run. The avionics were based on an extremely advanced nav/attack system with fully automatic terrain-following capability to ensure all-weather penetration capability. Structural design was completed in August 1972, and the first of nine prototypes flew in April 1974. The Tornado finally entered service in July 1980.

MITSUBISHI F-1



The Mitsubishi F1 attack aircraft - which is similar in configuration to the Jaguar - is the combat version of the T-2 trainer. The rear cockpit of the T-2 is faired over with the space used for additional fuel. Other modifications include the addition of two wing pylons and a fuselage pylon; the 20mm Vulcan cannon; and, combat avionics. The F-1 is a capable attack aircraft though with relatively short range, and can be used in interception missions carrying the AIM-9 missile.

With a crew of one, armament includes:

- Cannon: 1 20mm Vulcan
- Type 80 ASM
- Mk82 500lb bombs
- M117 750lb bombs
- LAU-69 rocket pods
- AAM-1
- AIM-9L

A total of 77 aircraft were built.

The F-1 is employed by the Japan Air Self Defence Force (JASDF)

MiG-21MF FISHBED



The MiG-21F is a short-range day fighter-interceptor and the first major production version of the popular MiG-21 series. It is one of many versions of this aircraft that have served in the air arms of many nations around the world. The E-5 prototype of the MiG-21 was first flown in 1955 and made its first public appearance during the Soviet Aviation Day display at Moscow's Tushino Airport in June 1956. During the Vietnam War, MiG-21s were often used against U.S. aircraft. Between April 26, 1965, and January 8, 1973, the USAF downed 68 MiG-21s. More than 30 countries of the world-including nations friendly to the U.S. -have flown the MiG-21. At least 15 versions of the MiG-21 have been produced, some outside the Soviet Union. Estimates place the number built at more than 8,000, a production total exceeding that of any other modern jet aircraft. The aircraft has mid-mounted delta wings with small square tips. There is one turbojet inside the body. There is a small round air intake in the nose. There is a single exhaust. The fuselage is a long, tubular body with a blunt nose and bubble canopy. There is one belly fin under the rear section. There is a large dorsal spine flush with the canopy. The tail fin is swept-back and tapered with a square tip. The flaps are mid-mounted on the body, swept-back, and tapered with square tips. The J-7FS modification adds a radar to a reconfigured air intake, while the "Super 7" upgrade would have completely reworked the front end of the aircraft, adding a much larger radar and ventral air inlets, along with various other less pronounced improvements.

MiG-23BN / MiG-27



This is a version of the MiG-23 optimized for the ground attack role, with a new nose, simpler engine intakes and nozzle, and other changes. These limit supersonic performance, but reduce cost, weight and fuel consumption. The MiG-27 Flogger D/J production was completed in the mid 1980'. They are flown by the former soviet tactical air force and naval aviation. The MiG-27 Flogger M, named Bahadur (Valiant) is built in India and is still being manufactured today. The wings are high-mounted, variable, swept-back, and tapered with blunt tips. There is one engine inside the body and rectangular box-like air intakes forward of the wing roots. There is a single exhaust. The fuselage is long and tubular, except where air intakes give a box-like appearance. The aircraft has a long, downward-sloping, sharply pointed nose and a stepped canopy. There is a large, swept-back, and tapered belly fin under the rear section. The tail is swept-back and tapered tail fin with curved dorsal in leading edge and angular tip. The swept-back and tapered flats high-mounted on the fuselage with angular tips. The Mikoyan-Gurevich MiG-27 (NATO reporting name 'Flogger') is a variable geometry, swept-wing ground attack aircraft, originally built by the Mikoyan-Gurevich Design Bureau in the Soviet Union and later licence-produced in India by Hindustan Aeronautics as the Bahadur ("Valiant"). It is based on the MiG-23 fighter aircraft, but optimized for the air-to-ground role. The MiG-27 shares the basic airframe of the MiG-23, but with the revised nose (referred to as "Utkonus," platypus, in Russian service) introduced on the MiG-23B that deletes radar in favour of a downward-sloping profile that improves pilot visibility and contains a laser rangefinder and marked-target seeker. Additional cockpit armour is installed, along with a totally new nav-attack system. Because the MiG-27 is intended to fly most of its missions at low altitude, the fighter's variable intake ramps and exhaust nozzles were deleted in favour of simpler, fixed configuration, reducing weight and maintenance requirement. The aircraft also has larger, heavy-duty landing gear to facilitate operation from poorer airfields.

MiG-29 FULCRUM



The MiG-29 is one of the first Russian aircraft that was considered by many to be equal to those in the west. It incorporated a number of innovative technologies, some of which had never been seen on any western fighter. It also reflected a change in the Russian air tactics. For example, previously there had been a very heavy reliance on command and guidance from the ground, therefore there was little need for a cockpit with an excellent view, and since it was easier to make them smaller for aerodynamic reasons as was the trend with the MiG-21, MiG-23 and MiG-25. But the MiG-29 was designed with a large bubble canopy similar to those on most western fighters suggesting a change in tactics. The MiG-29 Fulcrum is of a comparable size to the F/A-18 Hornet. It first became operational in early 1985 and since then has been exported to a number of countries. About 345 of these counter air fighters are in service with the Russian tactical air forces and 110 with the naval forces. The MiG-29 has a high level of manoeuvrability and the coherent pulse Doppler radar (which can track up to 10 targets simultaneously at 69km) combined with a laser range finder and infra-red search and track (IRST) linked to the Helmet Mounted Sight (HMS) make it an excellent close-in fighter. The two engines on the MiG-29 are the Klimov/Sarkisov RD-33 each providing 18,000 pounds of thrust. Even if one engine is damaged and providing no thrust the MiG-29 is able to accelerate and start on one engine. The engines have proven their ability to take rough handling with manoeuvres such as tail slides which were performed by Anatolij Kvocur at Farnborough in 1988.

AN-2 COLT



History: The An-2 Colt has been used as a paratroop transport, glider tug, navigation trainer, utility transport and light bomber. Despite being a versatile and adaptable machine, the large, fabric-covered An-2 biplane remains firmly rooted in much earlier days of aviation.

The **An-2** prototype was first flown on August 31, 1947, and the aircraft is still in production, although the Antonov Bureau has not produced any since 1960. The An-2's designer, Oleg Antonov, had been an aircraft designer during the Second World War. He then formed his own bureau with the intention of creating an aircraft capable of almost any task. He succeeded. Originally designed for the Ministry of Agriculture and Forestry in the former Soviet Union, the aircraft was soon adopted by the Soviet Air Force and built for its client states. It is ideally suited to less developed countries because it requires little maintenance and is easy to fly.

The An-2's design gives it extremely short take-off and landing (STOL) capabilities. This is partly achieved not only by the high-lift double wings, but by the use of the drooping ailerons which can be lowered 20 degrees to compliment the flaps. The wings are covered in fabric aft of the front spar and the tailplane is also covered with fabric, making field repairs easy. It has a crew of two in a heated crew compartment, and a single bay running the length of the aircraft.

The An-2 is still in service with over 30 air forces and has been used by Aeroflot and other eastern airlines. With the collapse of the communist regime over a decade ago, a small number of An-2s have begun to appear on the civilian rosters in Europe and the United States, although the type is difficult to register in the United States due to regulatory issues.

AKA: *Annushka* ("Little Annie"); *Big Ant*; *Colt* (NATO code name); *Kukuruznick* ("Corn-Eater")

SR-71 Blackbird



Developed for the USAF as reconnaissance aircraft more than 30 years ago, SR-71s are still the world's fastest and highest-flying production aircraft. The aircraft can fly more than 2200 mph (Mach 3+ or more than three times the speed of sound) and at altitudes of over 85,000 feet.

The SR-71 was designed by Lockheed's "Skunk Works." The first version, a CIA reconnaissance aircraft that first flew in April 1962 was called the A-11. Upon retrofitting with J-58 engine, it was designated the A-12. An interceptor version was developed in 1963 under the designation YF-12A. A USAF reconnaissance variant, called the SR-71, was first flown in 1964. The A-12 and SR-71 designs included leading and trailing edges made of high-temperature fiberglass-asbestos laminates which among other features contributed to their reduced radar signature. Its existence was publicly announced by President Lyndon Johnson on Feb. 29, 1964, when he announced that an SR-71 had flown at sustained speeds of over 2000 mph during tests at Edwards, Calif. The Air Force needed technical assistance from NASA to get the SR-71A, fully operational. The SR-71 is a delta-wing aircraft, powered by two Pratt and Whitney J-58 axial-flow turbojets with afterburners, each producing 32,500 pounds of thrust. Less than 20 percent of the total thrust used to fly at Mach 3 is produced by the basic engine itself. The balance of the total thrust is produced by the unique design of the engine inlet and "moveable spike" system at the front of the engine nacelles, and by the ejector nozzles at the exhaust which burn air compressed in the engine bypass system. The Blackbird weighs about 34 tons empty, and can carry another 20 tons of special JP-7 jet fuel (enough for about two hours of flight time) in its fuselage and wing tanks. In flight, the fuel is redistributed automatically to maintain the plane's center of gravity and load specifications. Because the Blackbird was designed to expand during flight, it has had a history of fuel tank leaks on the ground. The airframes are built almost entirely of titanium and titanium alloys to withstand heat generated by sustained Mach 3 flight. The aircraft's largely titanium structure is coated with a special radar-absorbing black paint that also helps dissipate the intense frictional heat resulting from flight through the atmosphere at faster than three times the speed of sound. It also gives the plane its distinctive "Blackbird" nickname. Aerodynamic control surfaces consist of all-moving vertical tail surfaces above each engine nacelle, ailerons on the outer wings, and elevators on the trailing edges between the engine exhaust nozzles.. The SR-71A accommodates two crew members in tandem cockpits. The pilot flies the aircraft from the forward cockpit, while a systems operator monitors sensors and experiments in the rear station. For high-speed, high altitude missions, both crew members must wear full-pressure suites that resemble those worn by the early astronauts.

An-2 Model by Qawa *Textures by → Aragorn*

A-4 Model by Qawa

A-6 Model by Qawa

AV-8 Model by Qawa *Textures by → Rufus Parson*

A-10 Model by Daws *(Thanks to Cockpits.nl)*
Improvements by Qawa

B-52 Model by Gnat; OFP Co-pilot model by Ikar
OFP → FF conversion by Qawa

F-1 Model by → Qawa *Textures by → Aragorn*

F-104 Model by → Qawa *Textures by → Rufus Parson*

F-117 Model by → Qawa

F-22 Model by → Radicaldude1234

F-4 Model by Qawa

F-5 Model by Footmunch
FF Conversion by Qawa *(Thanks to S.L. Tsai)*

F-18 Model by Daws *(Thanks to Cockpits.nl)*
Improvements by Qawa

F-14 Model by → Qawa

F-15 Model by → Qawa

GRIPIEN Model by → Qawa *Textures by → Rufus Parson*

MiG-23 Model by Qawa
Thanks to Earthling

MiG-29 Model by → Sea Demon
OFP → FF Conversion by Qawa

Mirage 5F: "C" Model by Jdaou
5F conversion by Qawa

Mirage 2000C Model by Jdaou

Mirage 2000D: "C" Model by Buzzz157
2000D conversion by Qawa

Rafale Model by Qawa

SR-71 Model by Qawa

Tornado by Pumpyhead

Viggen Model by Qawa



Flight Manuals

Flight Manuals for all aircraft can be found in the separate **Flight Manuals Companion**.
See your: *_the_Manual* Folder.

The Flight Manuals Companion includes layouts for both the 2D and 3D Cockpits.

It covers all of the aircraft, available to the Virtual Pilot in FreeFalcon 5.0

It's The 'Pits

No good having all these 'Pits, if you can't just climb straight into the aircraft and fly it...!

TE-Meister DewDog has come to the rescue. He has fashioned some epic Advanced Training missions. One is for Allied pits; the other for DPRK pits. They can be found in the TE/SAVED Section of your UI.

They offer the opportunity to sample many of the flyable 'Pits, in an immersive combat environment.

They are appropriately named: It's The Pits USA and It's The Pits DPRK.

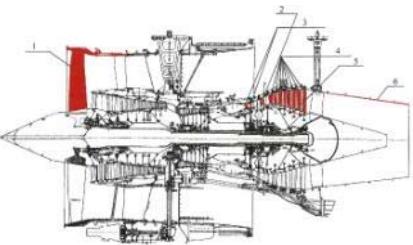
In order to enjoy them to their fullest, DewDog offers some advice →

- ☞ You may have issues in some flights, if using Combat Autopilot. This TE is designed to be FLOWN by the pilot. No “passive” roles here. Get in and FLY it...!

Joining the 17:43:00 Mission - You may get a Mission Cancelled message. It simply means that the carrier was hit prior to departure. Solution: Restart TE and try again. Joining the 17:45:00 Mission, requires the same consideration.

- ☞ If you take other flights after the above missions and try to cycle the “8” view to find that one, it may be missing. Same reason as above.
- ☞ IF the instructions of a particular Flight say to *Start at “Taxi”*, then you MUST start at “Taxi”; NOT “Takeoff”. If you do not follow the instructions, you may miss the excitement, fireworks, and hidden surprises...
- ☞ Flights departing up to 18:00 – try and stay within 24 miles of the An-72. You’ll be rewarded with some great “ground action”...! Not so difficult – just stick to your Flight Plan.
- ☞ There are no Victory Conditions assigned. The objective here is to fly the variety of 'Pits and enjoy the action....
- ☞ At times, you may notice the odd, mysterious F-22 flying about. Sometimes, certain aircraft will “loiter” from one mission to the next. This can interfere with the next mission. The Raptor is an excellent platform to “persuade” those aircraft to depart. The F-22 can be rather persuasive...
- ☞ Be aware – as you traverse the skies in these missions, there are a lot of aircraft that are 'friendly' but not listed. It is strongly suggested the player use AWACS to “Declare”. Wisely, and often.

Reverse Thrust



A REMINDER from the F.A.Q. Section of the FF4.0 Manual...

Tap '**k**' twice. (You'll see a confirmation in the upper right of the screen.)



Tapping '**k**' once more will disengage the Thrust Reverser.

Remember - Like sex: The more thrust you apply, the MORE you'll slow down...



WHERE are my 'Pits...?

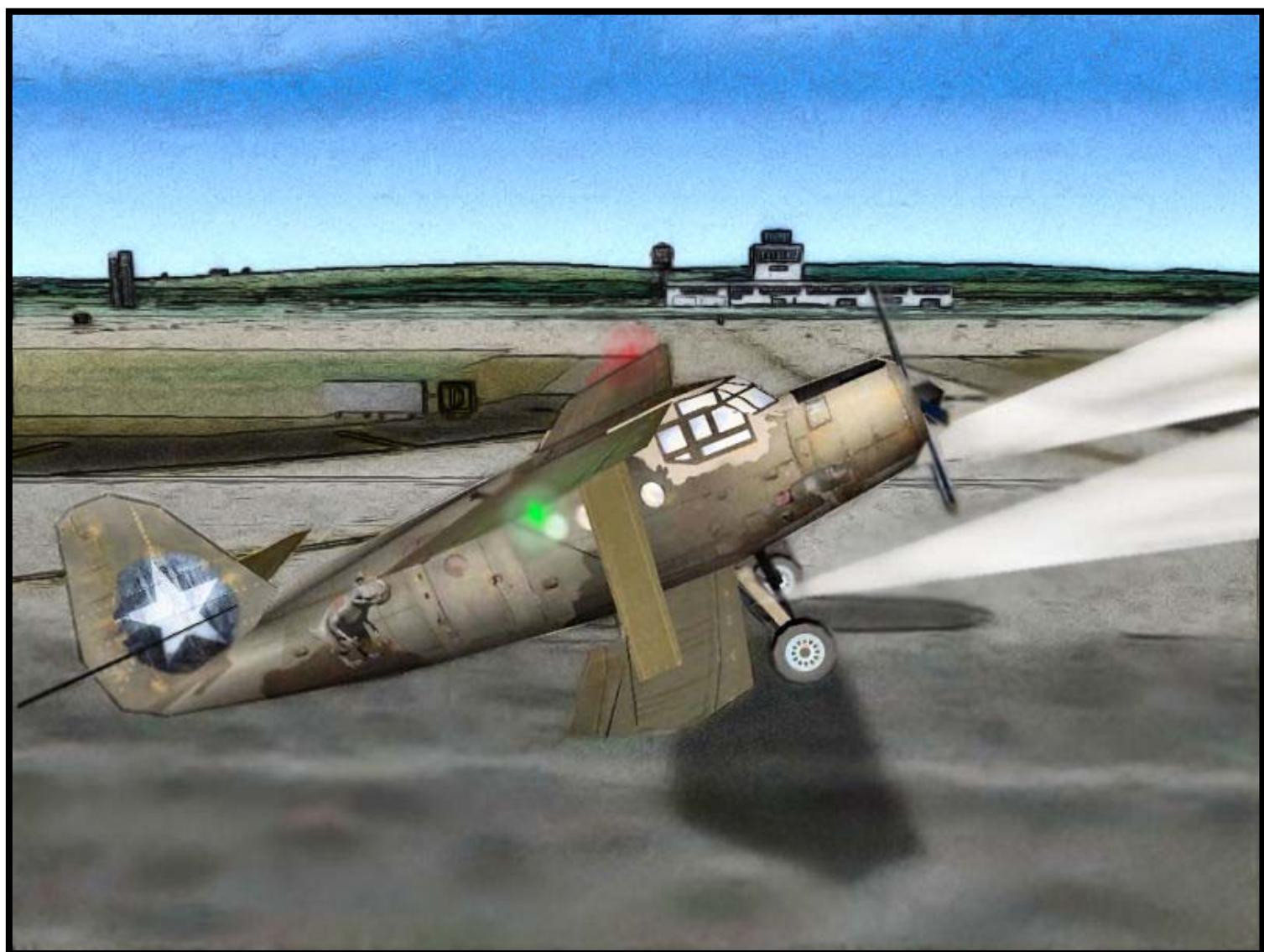
Now with so many to offer, FreeFalcon Cockpits are available as a SEPARATE download.

The 'Pit Package will fully integrate into your FreeFalcon Install.

Simply download your 'Pit Package from the FreeFalcon website, and install.

Don't forget to use the **Flight Companion**, to learn the layout of your chosen 'Pit.

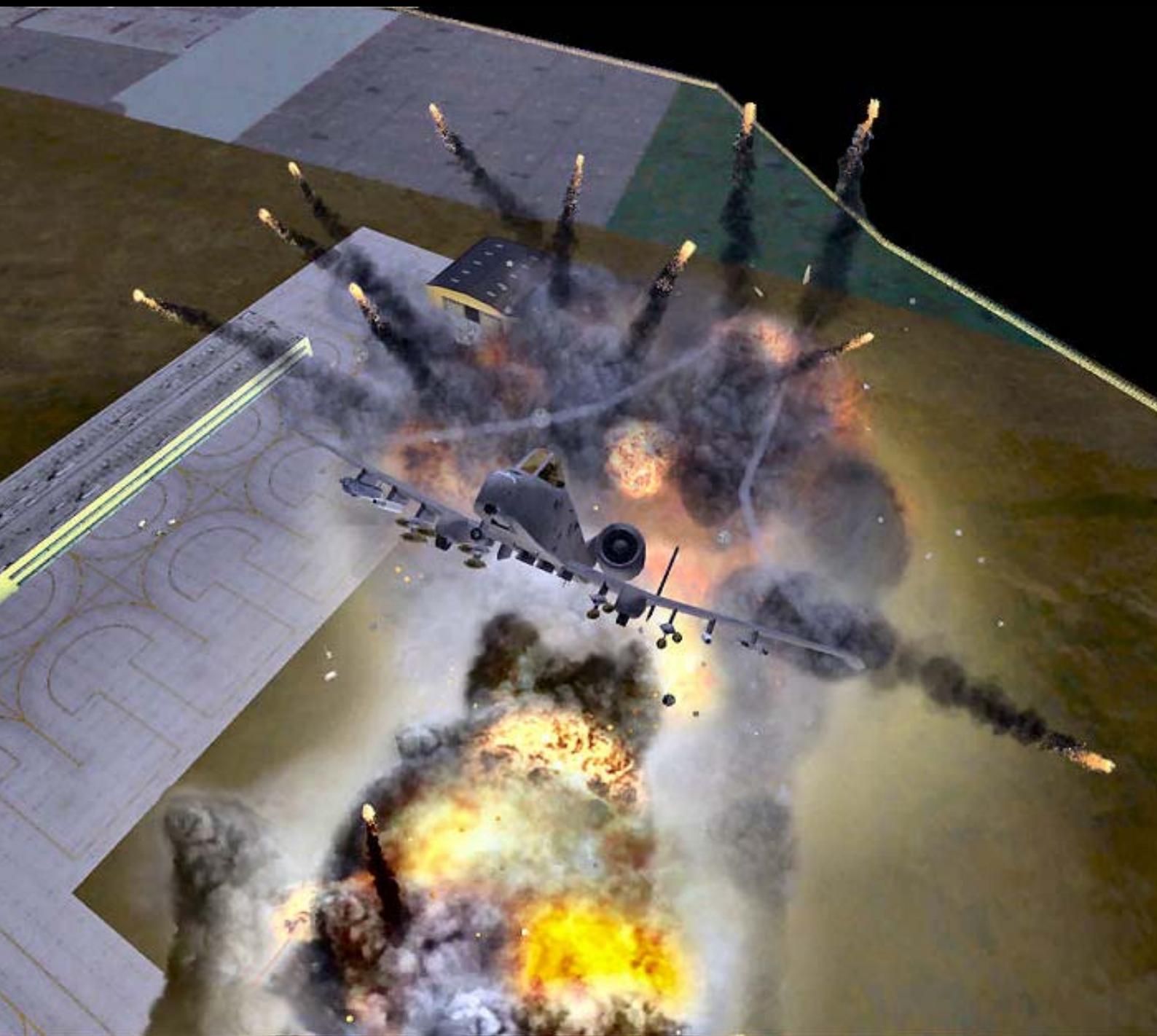
The **Flight Companion** can be found in _the_MANUAL folder.



<http://www.freefalcon.com/forum/index.php>

FF5.0

I t ' s a b l a s t



An airman in a bar leans over to the guy next to him and says, "Wanna hear a MARINE joke?"

The guy next to him replies, "Well, before you tell that joke, you should know something. I'm 6' tall, 200 lbs, and I'm a MARINE."

The guy sitting next to me is 6'2" tall, weighs 225, and he's a MARINE.
The fella next to him is 6'5" tall, weighs 250, and he's also a MARINE.

Now, you still wanna tell that joke?"

The Airman says, "Nah, I don't want to have to explain it three times."



Falklands

Despite some terrific missions, three British Harrier Pilots returned from the Falkland Islands without being decorated. The Group Captain called them into his office to explain.

"Bit of a cock-up in the medals department, chaps," he said, "so the RAF has decided to give you ten pounds sterling for each inch of measurement between any two parts of your bodies. Flight Lieutenant, which measurement for you?"

"Tip of me toes to the top of me head, sah!"

"That's £720. Well done, Lieutenant. Squadron Leader?"

"Tip of one hand to the tip of the other; me arms outstretched, sah!"

The Group Captain took the measurement. "Six feet, two inches.... £740. Very good, old boy. Wing Commander, how about you?"

"Tip of me prick to me balls, sah!"

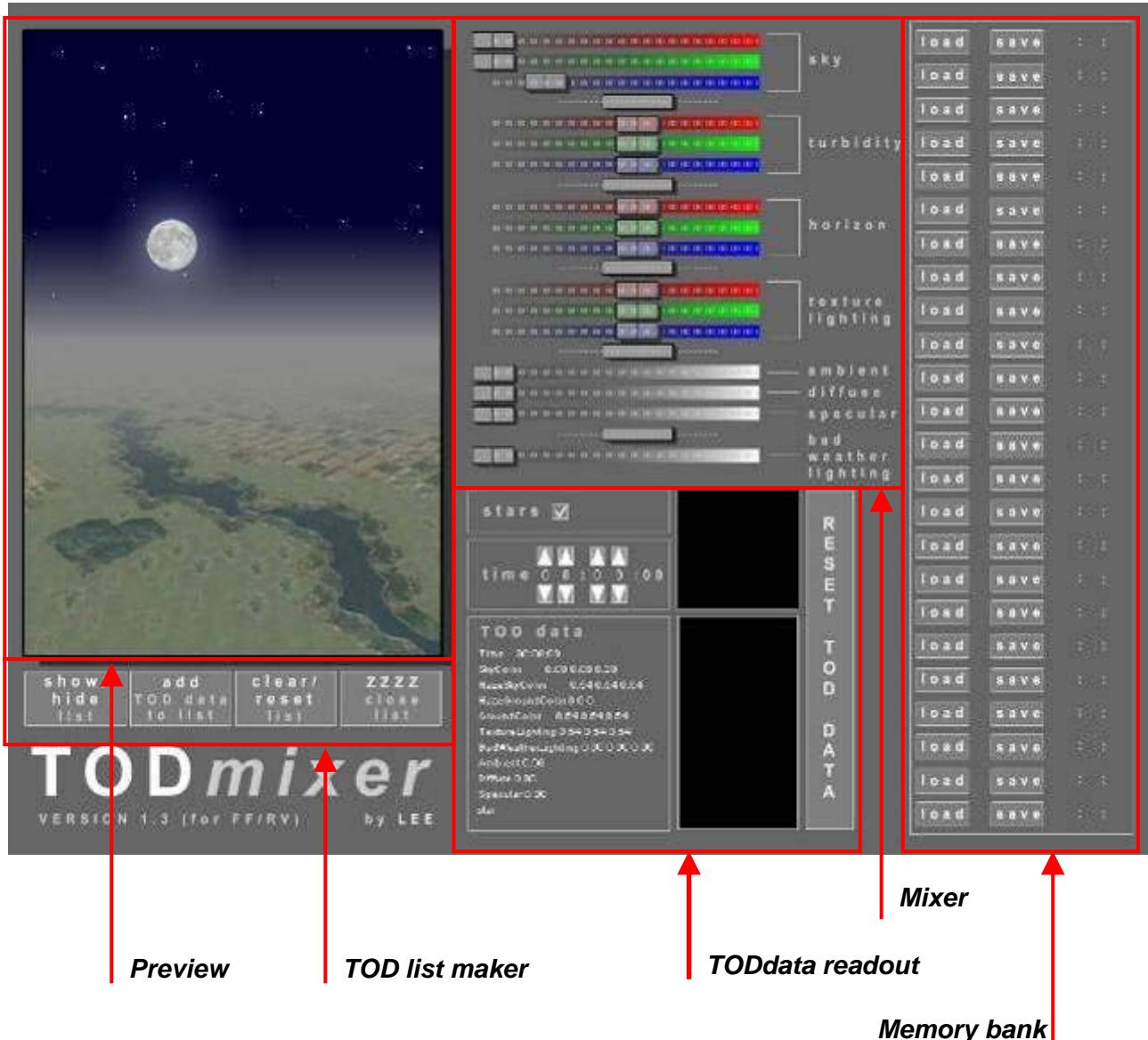
"Very well. Drop your trousers, then."

The Group Captain put his tape measure at one end of the man's penis, then looked up and asked: "Where are your balls, Wing Commander?"

"Goose Green, Falklands, sah!"

Lee's TODmixer

INTERFACE →



Mixer

These are the main sliders for controlling the colour values of the various elements that make up the visual environment in Falcon.

TODdata output

This is a readout of the current mixer settings in a format which Falcon reads. Here you'll also be able to turn stars on or off and set the time of day. A reset button resets the mixer sliders to their default setting.

Preview

This is a simple preview window displaying the current mixer values.

Memory bank

This is where to store each “time-of-day” setting.

There are twenty-four (24) slots which you can save, and load into the mixer.

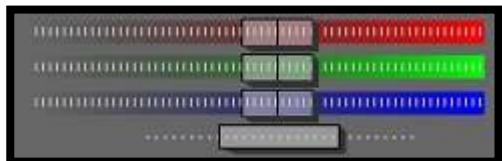
TOD list maker

A few buttons enables you to compile a complete usable TOD file for Falcon.

It is done by a simple copy paste function to an empty notepad document

MIXER →

The SLIDERS



colour.

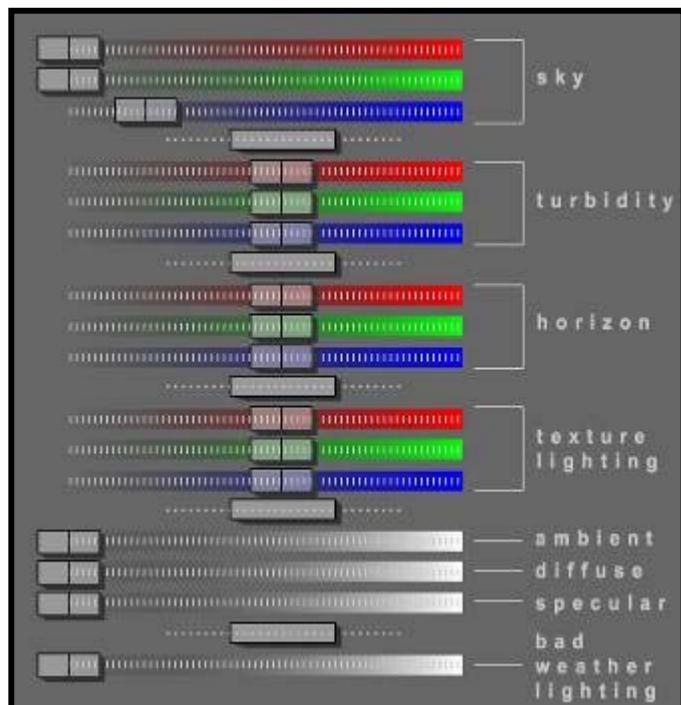
All sliders moved to the far left creates a 100% black colour (no colours used).

All sliders to the far right produces a 100% white colour.

Each element in the mixer has three separate sliders controlling the **Red** **Green** and **Blue** value. A slider to the far left indicates 0% of that colour is used. A slider at the far right indicates 100% usages of that colour.

The small slider below moves all three sliders at the same time preserving the selected tint but adding only more white or black to the colour. This is useful when you want to use a colour for a different time of day, but want to make it lighter or darker.

The ELEMENTS



The visual environment in Falcon are made up of these eight (8) settings; each representing a different facet. Experiment with different settings and observe them in the preview window.

Sky

These sliders determine the colour of the sky and affects none of the others.

Turbidity

These sliders control the amount of particles in the air creating a graduation of the sky towards the horizon. This is often seen near large cities where pollution creates yellow like haze in the horizon creating spectacular sunsets. This setting also affects none of the others.

Horizon

These sliders determine the colour of the horizon and the haze on the ground. The turbidity and horizon colour meet in the distance so if you want a distinct separation between the sky and earth you make them individual colours. If you want them to merge, make them the same colour and you'll get a diffuse and hazy effect.

The horizon colour not only affects the ground it also affects the cloud and particle system.

I will demonstrate below →



TODmixer preview



In-game screenshot

For illustration purposes, I've created an environment with extreme colours.

The **horizon** colour is made **purple** and the **texture lighting** is made **yellow**.¹

In the In-Game screenshot (*right*), you will see how the **horizon** colour gradually takes over and colours the clouds, textures and particles (**purple**).

Textures which are close to the aircraft are colored by the **texture lighting** setting. In the example above, this setting is **yellow**.

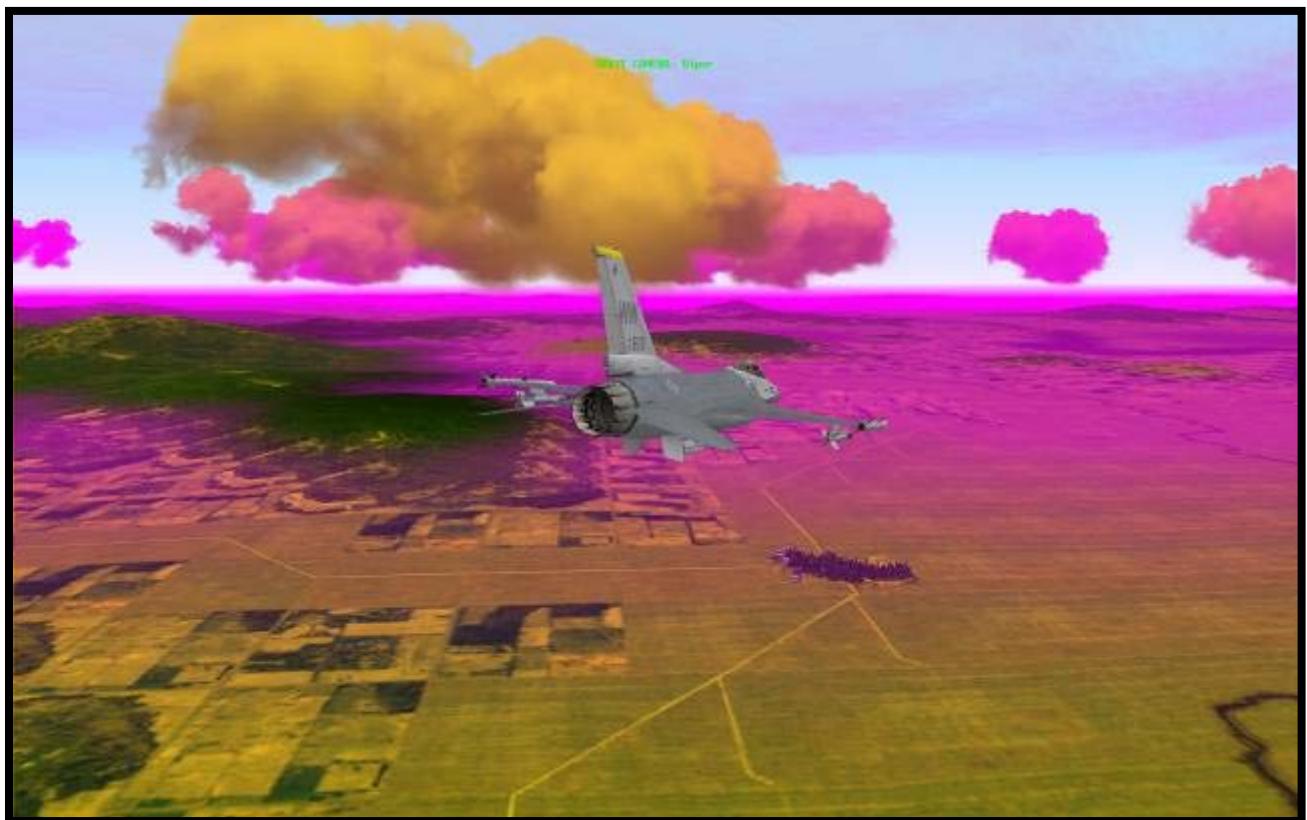
This creates a nice transition for particles towards the horizon.

This is an important point to remember when one is attempting to get the cloud and particle colour just right.

Horizon and **texture lighting** work very closely together.

¹ The Texture Lighting determines the Tint/Colour of the texture in Falcon. We'll return to this point.

Here's another screenshot showing how **horizon** and **texture lighting** work together:



Please note how much of the landscape is coloured by the **horizon** setting (**purple**), and how it gradually changes to the **texture lighting** setting (**yellow**). The **texture lighting** is like a “big yellow bubble” of colour around the camera; colouring everything close to it.

Also notice how the aircraft is separated from these settings. It has its own settings.

Texture lighting

As explained above, these sliders control the tint/colour of the textures in the environment.

Then - as textures move farther away from the camera - it tints into the **horizon** colour.

The “Preview” does not display the **texture lighting** effect very well, so some testing is needed to get the colour right...!

On the following page, there are three (3) screenshots showing examples to help illustrate how the **texture lighting** works.



All sliders to the far left 0%.

Textures close to the camera are all black. Landscape is also black

Notice where it peeks through the horizon colour haze.



All sliders in the middle position 50%.

Textures close to the camera are mid-grey. Grey landscape.

Notice again how the elevated landscape peeks through the horizon colour haze.



All sliders in the far right position 100%.

Textures close to the camera 100% white.

This is the setting you want, for all-white clouds. You can then move one or two sliders to slightly tint the textures.

Ambient and diffuse - These settings control the lighting of the aircraft.

Ambient light is the light coming from all around the aircraft.
It is not directional, thus creates a uniform lighting on the aircraft.



Ambient at 100% diffuse at 0%.

Notice how the aircraft appears flat because it is lit from every angle.

Diffuse light is the light coming from the sun or other point light source.
It is directional; therefore only lighting the aircraft from one direction.



Diffuse at 100% ambient at 0%.

Notice how the aircraft is lit only from one direction; in this example – the sun.

There is no ambient light, so the aircraft is not lit from any other direction, thus making the surfaces facing away from the light source black.

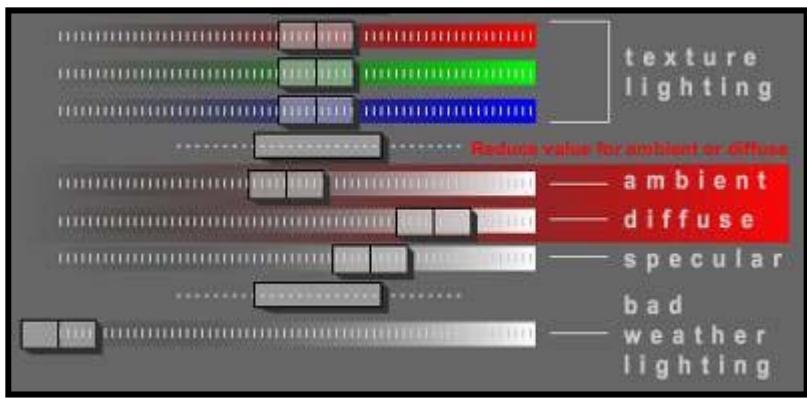
(In this case, the underside.)

Below is a mix between “ambient” and “diffuse”.



Diffuse at 50% ambient at 50%.

The settings are also used to make the aircraft dark at night.



Note: the two values **ambient** and **diffuse** must not be more than 1.0 when combined.

If they are, one will notice anomalies in the cockpit textures. If this occurs, a warning appears. If this red warning label appears, adjust either one of the two sliders until the warning disappears.

Specular

This setting is fairly simple. It controls how “glossy” the aircraft appears to be.

Bad weather lighting

This slider controls the colour of the sky at the current time of day if the weather is bad. The colour can only be in the gray scale.

TOD data →

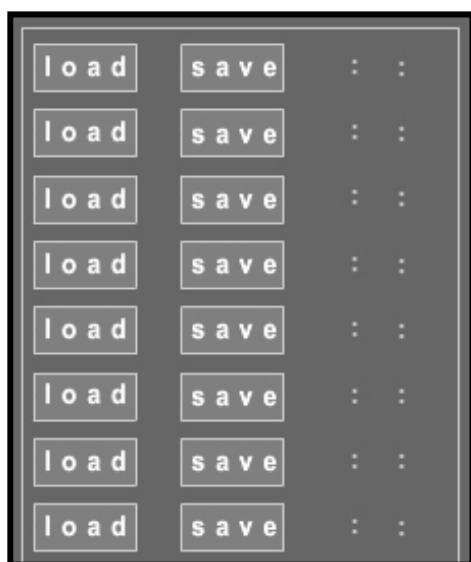


This is the readout of all the settings made in the mixer. Here you may also determine whether to have stars ‘on’ or ‘off’, and what time of day you are currently editing.

There is a small preview which shows the setting of the **ambient**, **diffuse**, and **specular** sliders; and also a preview of the selected **bad weather lighting**.

A ‘reset button’ resets the mixer and TOD data to its default setting.

Memory bank → This is where the different “times of day” settings are stored.



Press ‘save’ to save the current mixer and TODdata into the memory bank; press ‘load’ to load it into the mixer and TOD data.

You can use this to copy and paste a setting to a different memory slot. Just load it to the mixer and save it in a different slot.

You can preview a full day by rapidly pressing the ‘load button’ for each slot, thereby creating a small animation of the entire day.

When a slot is in use, a time indicator is shown to the right.

TOD list maker → These buttons are used to paste in a complete Falcon-ready TOD file.



Show hide/list → shows the list over the preview windows.

Add → adds the data currently in the TODdata output.

Clear/reset → clears the list.

ZZZZ → closes the list in the end to let Falcon know it is the end of the list.

Used, when you have finished and saved all the data in the memory bank.

Load them individually into the TODdata, and add them one-by-one to the list finishing; with the “ZZZZ”.

Select, and copy paste the entire list to an empty notepad document (*including the text at the top: sun.gif etc.*) and name it TOD.lst.

Backup the default TOD.lst. There can only be one TOD.lst in the weather folder...!

Note - it is not necessary to use the TOD list maker.

You can also copy paste directly from the TODdata readout and into a TOD.lst file.

Tips & Tricks →

Graduation

FreeFalcon creates a gradual transformation between each TOD setting. This prevents sudden jumps from one setting to the other.

TOD ----- slow change ----- TOD



If you want sudden changes to the light environment (like at sunset) - and not slow and gradual changes - you can create an extra TOD setting in between with the same setting.

TOD ----- no change (same TOD setting) ----- TOD --- fast change --- TOD



Testing

When testing it is easier to just test one setting at a time.

Create a TE in Falcon at around midday and create a simple TOD.file like so:



```
tod.list - Notepad
File Edit Format View Help
SunBitmap sun.gif
MoonBitmap moon.gif
SunColor 1.0 1.0 1.0
Time 00:00:00
SkyColor 0.40 0.51 0.78
HazeSkyColor 0.69 0.81 0.95
HazeGroundColor 0 0 0
GroundColor 0.89 0.81 0.95
TextureLighting 1 1 1
BadWeatherLighting 0.9 0.9 0.9
Ambient 0.3
Diffuse 0.6
Specular 0.95
Time 23:00:00
SkyColor 0.40 0.51 0.78
HazeSkyColor 0.69 0.81 0.95
HazeGroundColor 0 0 0
GroundColor 0.89 0.81 0.95
TextureLighting 1 1 1
BadWeatherLighting 0.9 0.9 0.9
Ambient 0.3
Diffuse 0.6
Specular 0.95
zzzz
```

Notice how I created the TOD setting I want to test at 00:00:00. This means the day will start with this setting, and run through the entire day. As explained above, I will also need the exact same TOD setting at the end of the day (*in this example, at 23:00:00*), to make sure the TOD setting stays the same for the entire day.

Now just ALT-TAB your way to and from ‘Falcon’, the ‘TODmixer’, and ‘Notepad’, until you have the right setting.

Save it to the memory bank and move on to the next setting.

Make sure you exit the 3D world in Falcon before you change the TOD.lst file and then reenter the 3D world afterwards otherwise it will not notice the changes made.

Note: You can just copy paste the setting from the TODdata readout to the notepad no need to use the TOD list maker until the end.

The Default TOD file

Pay close attention to the Default TOD.lst file in Falcon. There are some funky things going on around sunset and sundown and you want to hit the exact time and light values when this happens. The default TOD has been tweaked to match these moments so get your inspiration from it; but use your own tint and colour levels.

Or you could just experiment and maybe stumble upon something entirely new and better!

Happy mixing

LEE

TODMixer can be found in your /Utilities/TOOLS/TODmixer folder.



T * MANAGER

with Khronik

T-Manager allows the end user to install 3rd party freeware and payware terrain tiles for use with FF5 without causing compatibility issues introduced with other installers.

The currently available terrain installer for Thomas D. Wälti's "HiTiles" (*HiTiles2Falcon4+.exe*) replaces the Korean L2 terrain mesh, and has been known to cause issues with FF5. Simply put – it poeks your install. T-Manager avoids this.

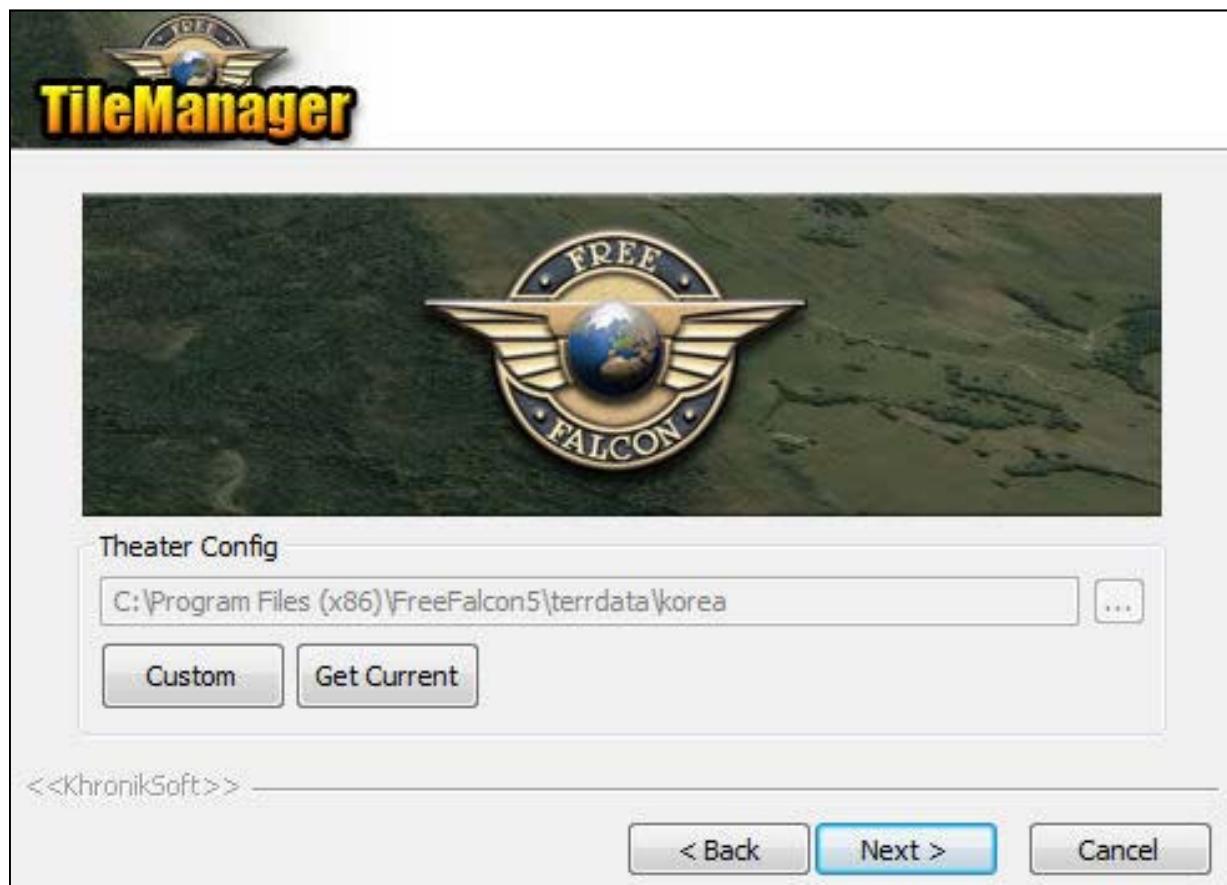
Some T-Manager Features:

- Compatible with *FreeTilesFF5 / Payware HiTiles / Payware HiTilesAF*.
- Selectable seasons.
- Archives generated tilesets for quick season switching.
- Compatible with USER defined theatres. (Based off the Korean tileset)
- Stock L2 / O2 / MAP / MEA are used to re-generate the theatre
- No "path" / "road" / "elevation" issues are expected.

Instructions:

T-Manager can be found in the *Utilities* folder located in the falcon root install path. At least one compatible 3rd party tileset must be installed before the application will launch.

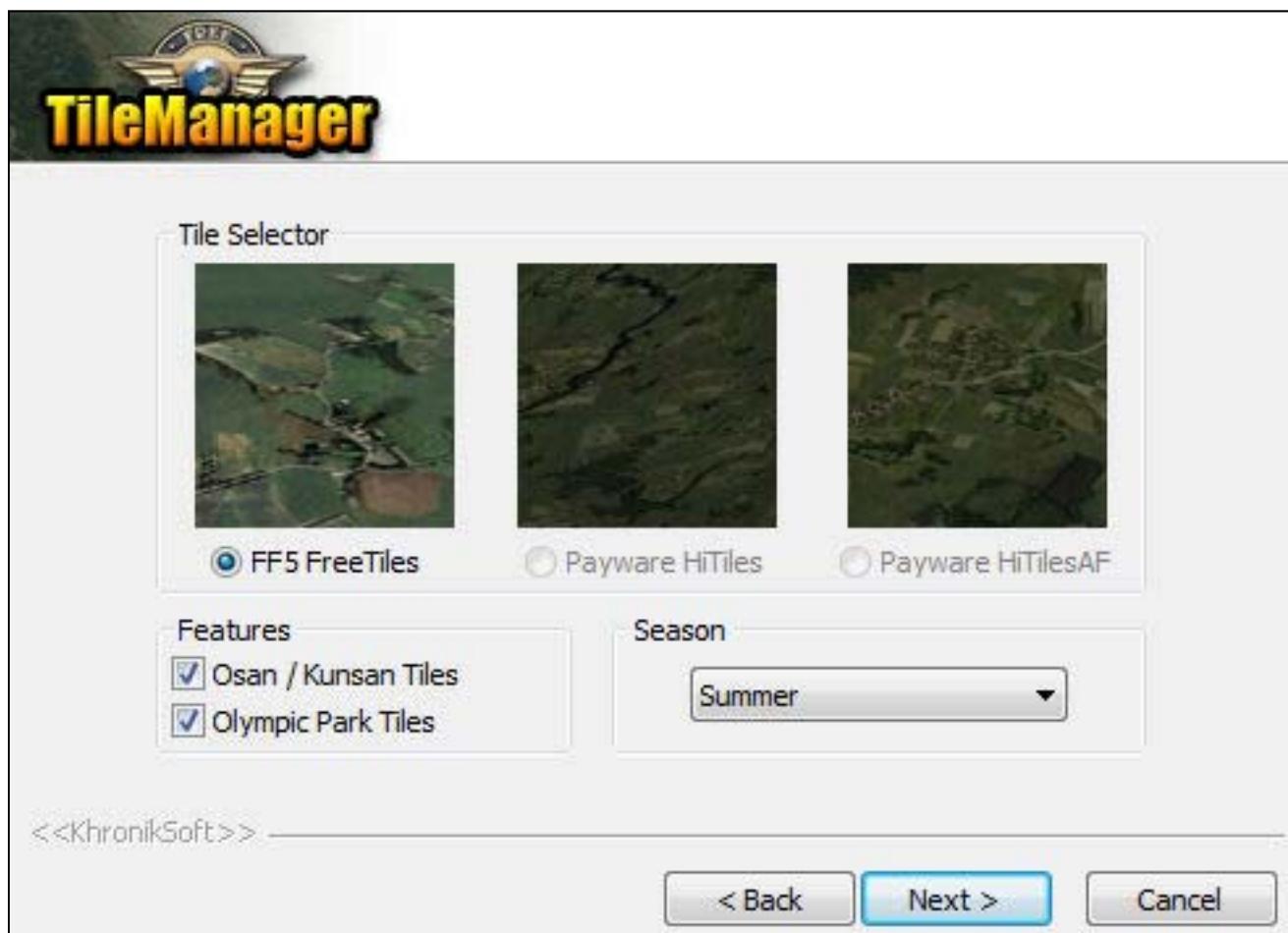
When launching the application for the first time this is what you should see →



The "Custom" button will allow you to select a custom theatre path. Only use with theatres which use the Korean tileset. Operation will fail on theatre which uses a different tileset. (Select the folder of the theatres which contains the "texture/terrain/weather" folders.)

The "Get Current" button reads the currently active theatre from the registry and defines the path as the working directory. FFViper.exe version 2.3.1.8 does not support this feature, so ATM this button has no functionality. Define a custom theatre using the "Custom" button mentioned above.

By default T-Manager is set up to use stock Korea, so if you're in a hurry to re-tile, just hit "Next".

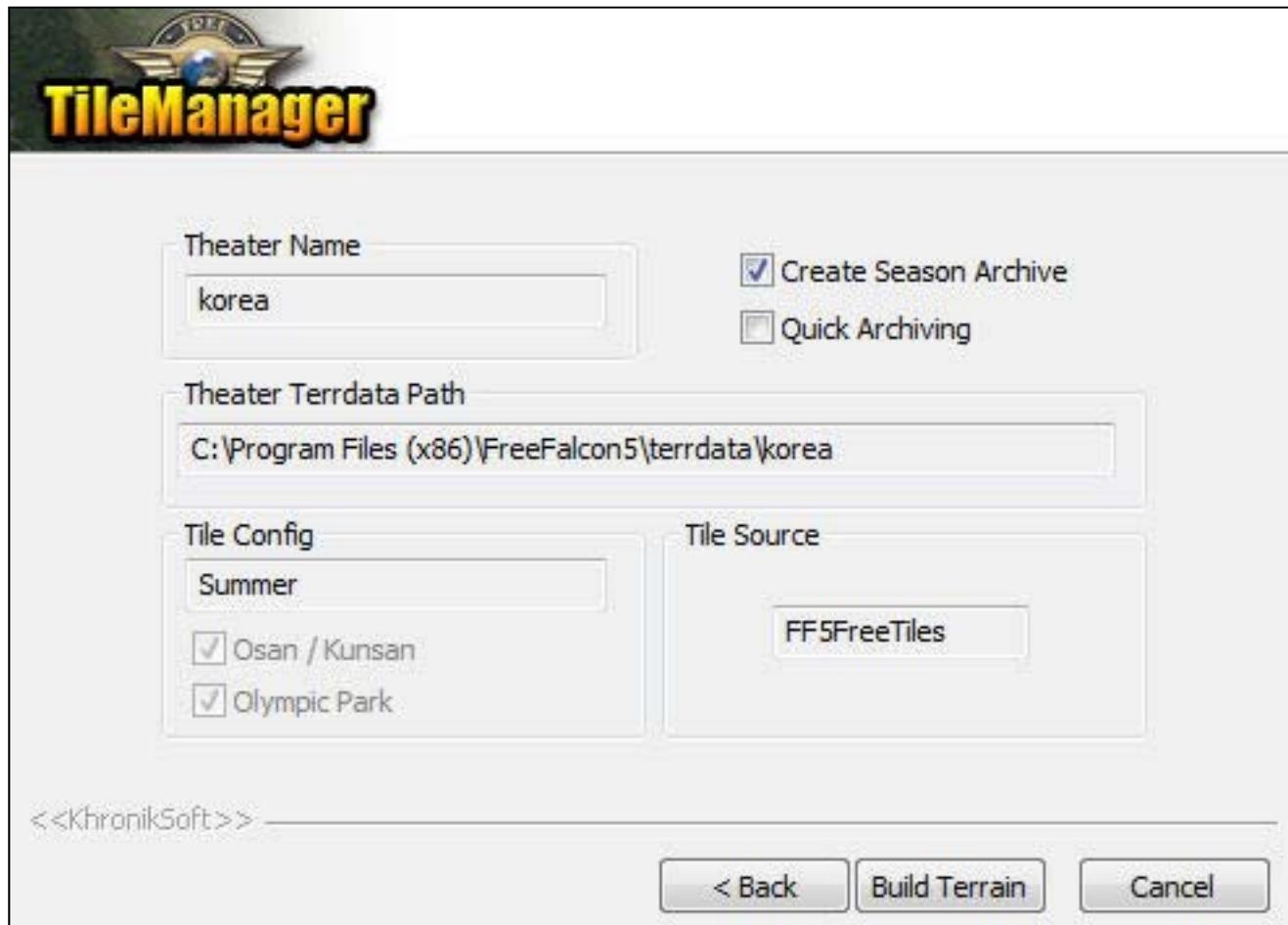


The Tile selector dialog box shows you all detected compatible tilesets installed. Select the tileset of your choice.

The "Features" section allows you to import some tiles included with FF5 for Osan / Kunsan AB and Olympic Park. These are only available when generating a summer terrain due to surrounding tiles not matching other seasons.

The "Season" selector allows you to choose one out of four seasons to be generated. (Summer-Fall-Winter-Spring).

Select "Next" once you are happy with your selections.



This last page shows a summary of your defined choices.

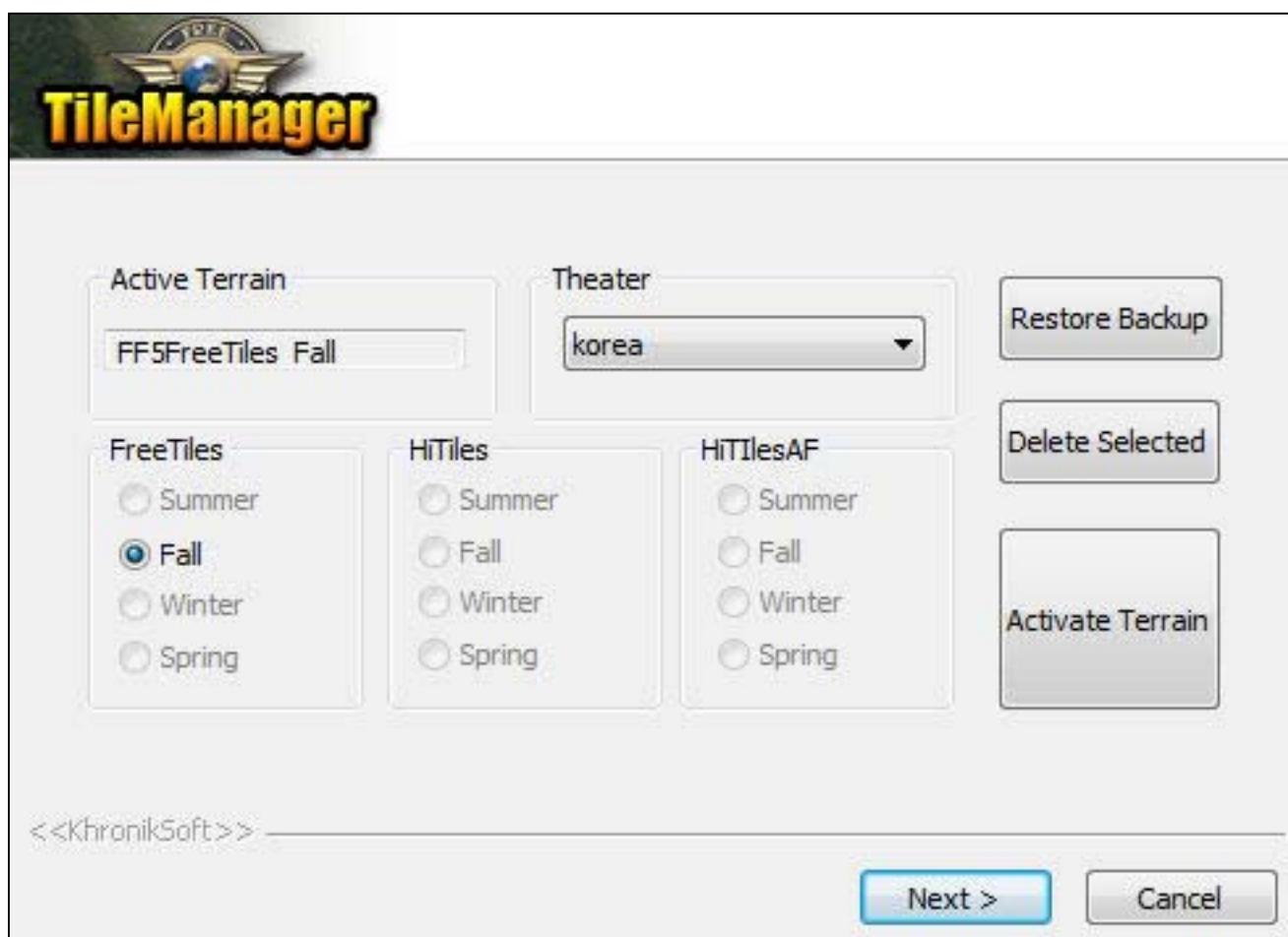
"Create Season Archive" toggles whether you want T-Manager to archive your generated tileset for quick switching between different sets. If you do not archive your tileset, it will have to be re-generated if another season/tileset is created. Recommended value is "checked".

Selecting "Quick Archiving" sets the archive compression ratio to 100%, effectively disabling any compression which will cause much larger archive packages, but will take less time and resources to generate on slower computers. Recommended value is "unchecked".

Select "Build terrain" to begin the tileset generation. This can take quite some time on slower systems. Be patient and wait until all operations are completed.

*** A backup will be created before the stock tileset and corresponding files are deleted, so you can always revert back to the "stock" tileset. This only occurs the first time you install a tileset. ***

Once a new tileset has been generated, launching T-Manager will start with the following dialog window →



Here you can quickly switch between archive tilesets by selecting an available choice and selecting "Activate Terrain".

"Delete Selected" allows you to delete the selected tileset from the archive. This operation is permanent, but you can always go back and regenerate if need be.

"Restore Backup" restores the stock terrain archived from the first install, effectively restoring the factory stock FreeFalcon5 terrain.

Known Issues:

Due to the fact that the L2 remains untouched, some tiling will appear random and can have less than ideal transitions. These issues are limited to a small number of areas, and should not subtract from the overall experience.

TileManager script and ui written by Kchronik.



F4XCHANGE

with *Khronik*

- Allows for an infinite number of archived installs.
- Compatible with any Falcon 4.0 variant. (SP/BMS/OF/FFx)
- x64 registry compatible (Vista x64 / Windows 7 x64)
- Archives ALL relevant registry keys/strings. Leaves nothing out.
- Ability to migrate the install to another HD / OS without re-installing.
- Ability to run the install directly from the UI with independently saved command line switches.
- Easy to use UI with visual feedback and end-user safeguards.
- Does not require 3rd party libraries to execute (VB/.NET). Simply install F4XChange and start switching.

UI Definitions →



- 1 - User defined "Preset Name". Give your install a label.
- 2 - "Preset Selection" dropdown. Once your install has been saved selecting it here will automatically switch to the install chosen.
- 3 - Deletes a saved preset from the dropdown.
- 4 - Detected install path. Can be edited with the locate button on the right of the field.
- 5 - Notes to be saved with the install.
- 6 - Install functionality pushbuttons.
- 7 - Define your exe and set your command line switches here.
- 8 - Reads out the version of the executable defined in #7.
- 9 - Toggle whether F4XChange should quit or remain idle after running the selected exe.

Instructions

IMPORTANT!

Each separate install of falcon must reside in its own specific path. These do not have to be in the same subfolder or HD.

They can be anywhere on the system HD. (ie. C:\Falcon4\FF5 - C:\Falcon4\OF - D:\Games\F4SP4 - etc)

F4XChange will automatically detect the current install on launch. In this state the "Preset Name" and "Install Path" will show "NEW INSTALL".

X - Download and install F4XChange to any location on your HD.

Step 1 - Install a Falcon 4.0 variant. (ie OF/FF/SPx)

(if you already have a variant of Falcon 4.0 installed you can skip this step.)

Step 2 - Start F4XChange. You should see "NEW INSTALL" as the "Preset Name".

Step 3 - Name your install, and fill out any other fields at your discretion.

Step 4 - Save the install using the "Save" button.

Step 5 - Your install has now been archived.

*** IMPORTANT / REQUIRED *** *To add another install simply hit the "Deactivate" button to clear the current install from the registry. Then install the new variant (either through the "dance" or an exported reg key), and hit the "Refresh" button. You can simply repeat back from Step2 at this point. The "Refresh" button is not required as you can close and restart F4XChange at any time after the new variant has been installed instead.*

Additional Notes

"Edit" Function : Allows the USER to edit the fields of the selected preset.

"Wipe" Function : Completely erases the install defined in the "Install Path" including relevant registry entries tied to that install. This is 1:1 with un-installing the install and completely removes it from the system.

"Refresh" Function : Refreshes F4XChange in order to detect a new install.

"Deactivate" Function : Disables the currently selected install from the system (registry) so that a new variant can be installed.

"Run" Function : Executes the executable defined in the "Launcher" section along with the USER defined command line switches.

"Del" Function : Erases the currently selected preset from the F4XChange archive.

"Quit after run" Function : If checked off, will quit F4XChange after launching the F4 executable.



FreeFalcon5.0 – Home of the RAPTOR



User Interface



In addition to being the most beautiful to ever grace our screens, FreeFalcon's stunning new UI also integrates a few subtle changes in functionality.

This section will introduce you to NightFalcon's work of art...

I can't find the "task bar" with the menu functions for TE Editing...!



It no longer exists. For adding flights, or objectives or battalions, etc - the functions will appear when you right click on the map.

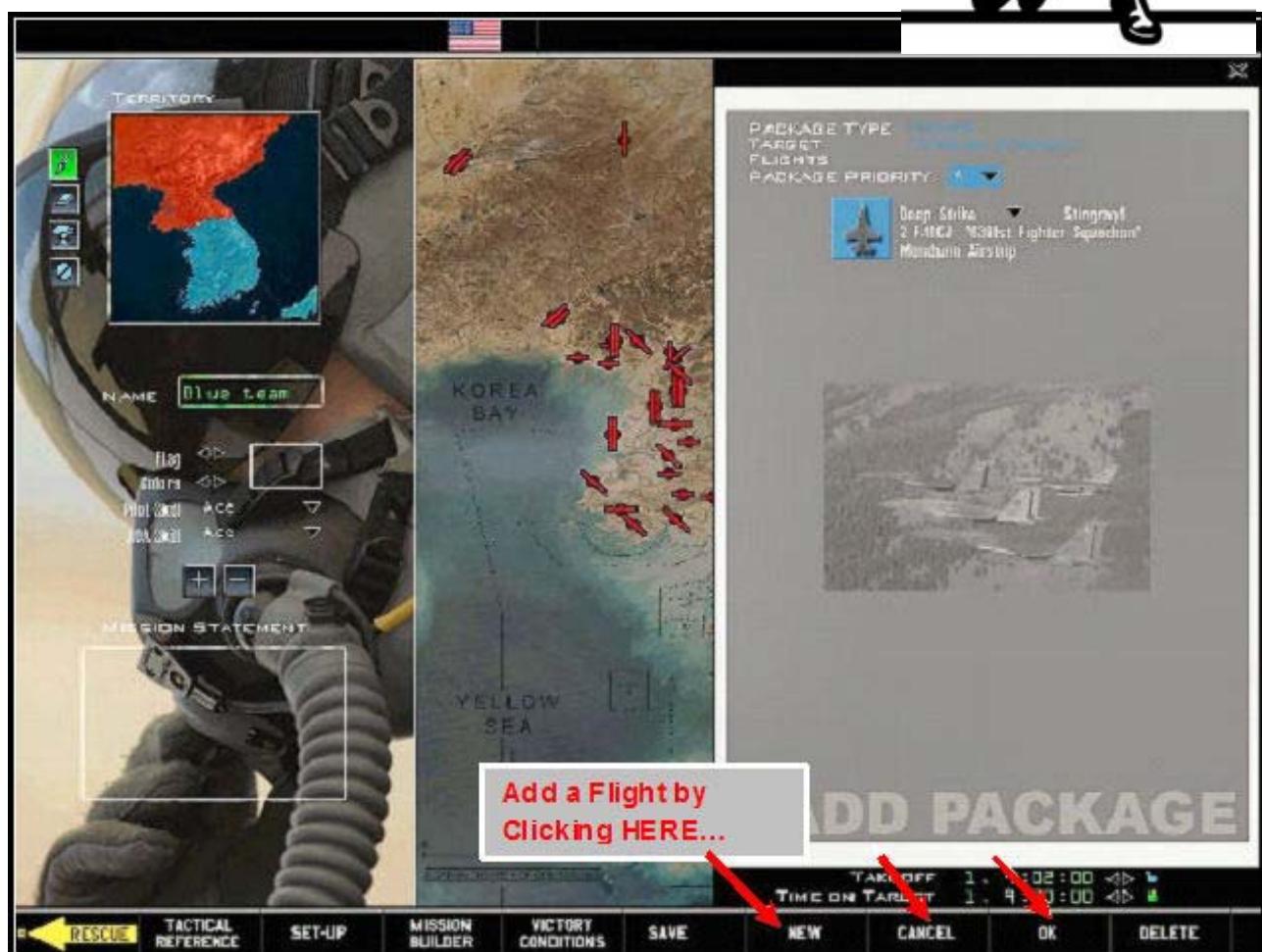
Editing a TE → I add my flight to the package...

Now – HOW do I add a NEW flight to the Package ? If I click on the Map and Right Click "New Flight", the created flight seems to replace the previous one...!

Is the "Add Flight" button in the Package window missing...?

If you make a package, and then start making a new one without clicking "OK", it will not be saved.

If you are making a package and want to add flights to the package, you again click on "New", at the bottom.



When making or tweaking a TE, I can't assign other A2G targets than the default.
Not in the recon screen, nor in the flight plan screen (strike waypoint)....!

Open flight plan of the flight and go to the TGT STPT.
In the lower right will be an Assign box → click that.
Now, the Target List will open, and you can select whatever you want.
The Assign button on target list is at the top bar.

With the new UI, **stop** looking for buttons in the windows, and **start** looking at the bars at the top and bottom of the screens.

I can't find my "Bubble" Slider...!

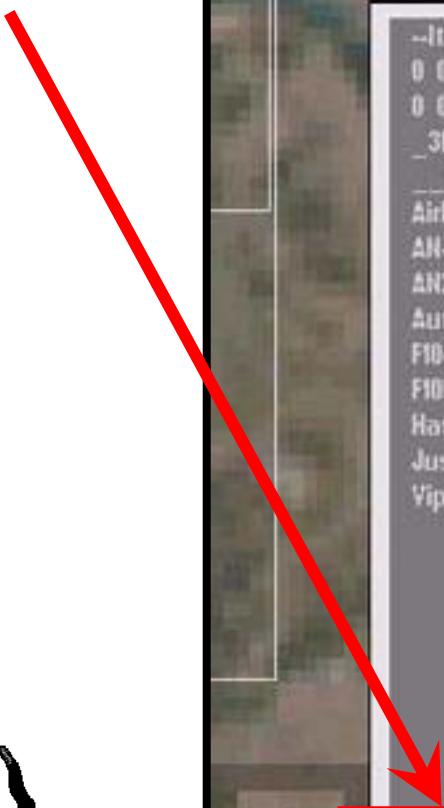
Correct. We've removed the option of parking your 3D world.

I have a fast rig. I want MORE "detail" than "7". Can I increase it...?

See the "HOW TO" Section for details.

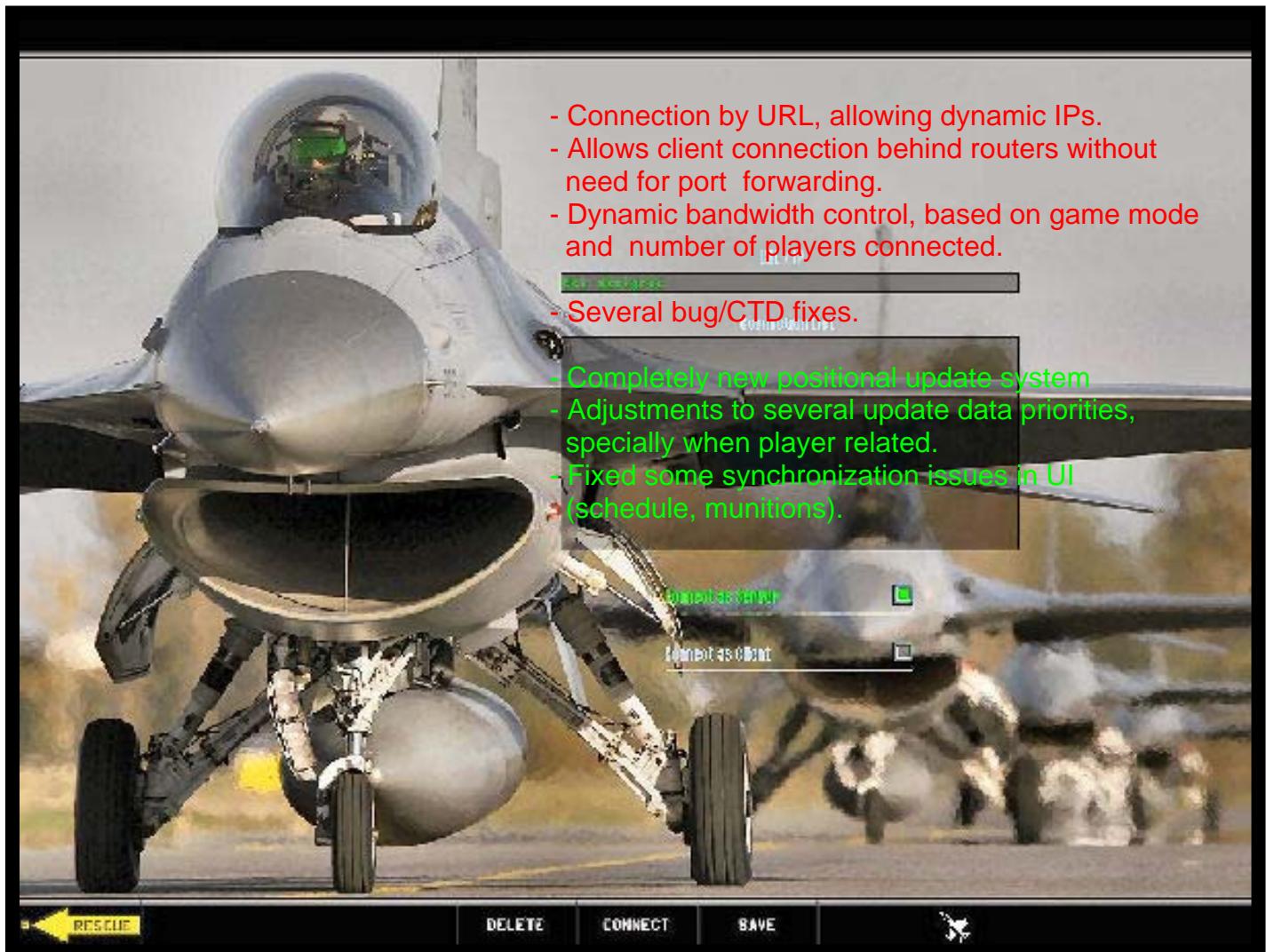
SAVING

Type your Save-
Name in this box





Multi-Player



FreeFalcon 5.0 features some significant enhancements to our Multiplayer approach.

This section will assist in getting you connected to the On-Line Falcon Experience.

On-Line MP Help → <http://www.freefalcon.com/forum/forumdisplay.php?f=9>

derStef's - 'How to Join a Game'

1. Organize your flights in the "MP scheduling thread":
<http://www.freefalcon.com/forum/showthread.php?t=14532>
2. Get onto '**Teamspeak**' (see [Teamspeak Section in this Companion for details](#))
3. Talk to the guys and get the server IP. Write it down on a paper. If you are using a vpn prog like '*Hamachi*', you have to join the right network, so - ask the guys for the address.
4. Make sure that you are using the right Config file (*FFviper.cfg*)
You can find it on the first page of the "MP scheduling thread".
5. Start FF5; make sure that you are in the correct theater; check your settings.
6. When the server is up, go to **COMMS**, enter the IP, select "connect a client" & hit SAVE. Then hit "**connect**". Click on the small "*connection established*" window.
7. Hit **COMMS** again to get into the "*chat/comms lobby*". Once you are in the lobby, you should NOT jump out anymore, it can bring the whole game down.
8. Write down the TOTAL number of guys, that you can actually see in the lobby, (Including "server").
9. Wait until EVERYBODY is in the lobby, then the "Server" goes and starts the TE, DF or campaign. Wait until he calls: "TE/DF/Campaign is up and the clock is stopped."
10. Connect in the same order as you are listed in the "chat/comms lobby". Wait until you are the first listed in the lobby, then go to TE/DF/Campaign, **ONLINE** and select the server's game.
11. Check the sim settings. **If there is nothing red** - hit "**OK/Commit**".



12. Once you see the 2D map, immediately STOP the clock and move your pilot out of the first slot where you have been put in. (*It doesn't matter where you go; just go away from the first slot. This will free the slot for the next guy who joins.*)

13. Call out your "callsign", and "clock is stopped". Then - the next guy can join in. (REPEAT Steps 10 ~ 13, as necessary).

14. Join the flight/slot that you want to fly.

IMPORTANT: Do **NOT** hit: "BRIEFING", "WEAPONS SCREEN" , or "RECON button". At the moment, this is **CRITICAL** in Multi-Player. **DO NOT CHANGE STEERPOINTS OR WEAPONS IN A MP GAME.**

If you must make changes: Do it in single-player, save it, then load it up in MP.

15. Listen carefully to the briefing by the Lead Pilot. Don't ask 'dumb' questions. ☺

16. When you are ready to go, call out: "Callsign - Ready".

17. Finally you'll "**Commit**" in the SAME order as you connected into the game.

You can hit "COMMS" to see the "chat/comms lobby" again.

18. Hit "**Commit**" and choose "**TAXI**" and call out: "Callsign, Takeoff/commit TAXI".

19. Once you are in the 3D world, call out: "Callsign, IN THE PIT".



Have a nice flight...!

derStef's MP Tips'n'Hints:

- **Do not use external views too extensively.** It often leads to CTDs. In campaign it is often a good idea to DISABLE external views in the settings. This also injects more realism into the flight.
- **Do not join flights-in-progress.** Once the pilots are in the 3D World, do not attempt to join that flight.
- **If you have a CTD, remain “out” of that flight.** Do not rejoin. Rejoining can easily bring the whole game crumbling down. It can cause MASSIVE sync problems.
- **Attempt to always fill a flight.** The synchronization in that flight will be better optimized. For example, let's assume there are four (4) Pilots. It is far better to join the SAME flight, as a 4-ship of Human Pilots, than for each person to join a separate flight, and take on three AI wingmen. The latter option offers far less “synchronization” in the 3D world.
- **Edits should be done by the Server Pilot.** If adjustments (such as adjusting steerpoints or weapons) are necessary, it is best that the “server pilot” do that in Single player mode; then save the game; then start the server.

Following the Tips outlined above will lead to the ultimate MP experience...!

DOG FIGHT:

- Always use “Team Furball”
- ONLY the server is allowed to change planes or the weapons/range/score settings. (should be done before the other guys join in)
- The “commit/take off” sequence is a bit different here:
The first guy in the order of the chat/comms lobby will hit commit,
Others wait until they see written in the lobby: “Callsign, entered arena”
- THEN the others can join as usual.

General DF Rule → First pass cold, then the fight's on...!!



Skratch's Random Tips'n'Hints:

Configuring Falcon 4.0

Make sure that EVERYONE has consistent Falcon4 configurations & FF Config Editor settings. It is especially useful to ensure that everyone has built-in voice comms either ON or OFF. Likewise, all users should have JetNet Uplink either ON or OFF.

Lots of other options are also significant, and need to be kept **consistent**

Voice COMMS

FF uses DirectX 8 Directplay Voice. Therefore, DirectX 8 or later must be installed on your system (see: www.microsoft.com/directx). In addition, you must initialize your microphone by running Voicesetup.exe (in the "UTILITIES" folder).

Real-time voice communication between players greatly enhances online game play.
You can now use "real" radio to communicate with other players!
If you want to use voice comms, enable it in the FF Config Editor

(If editing manually → Go to "// use voicecom" and "set g_bvoicecom "1")

Communicating in the User Interface

In the User Interface, use the keys "F1" and "F2" to activate radio comms on two different channels (hold the appropriate key while talking - it acts like a transmit button on a radio):

- Channel 1: Guard (Other team members in the UI or the 3D world)
- Channel 2: Everybody who is in UI

Communicating in the 3D World

Once flying in the 3D world, the keys used to transmit are the ones defined in the keystrokes.key file and will radio on whatever channel COM1 or COM2 is set to on the UFC. The audio volume of each channel can be adjusted by using the knobs on the audio panel in the cockpit. The available frequencies in the 3D world are similar to those in the original Falcon 4.0:

- **Flight:** Other flight members who have at least one radio set to flight
- **Package:** Other package members who have at least one channel set to package
- **Guard:** Other team members will hear (even though there is no radio set on guard)
- **Broadcast:** Everybody connected to the server (doesn't matter if in 3D or User Interface)
- **Tower:** Others who have the same takeoff base and at least one radio set to tower.

To change frequency, select COM1 or COM2 from the ICP. Then use [Alt-z] to switch channels.

Fly-Any-Plane In MP Dogfight

The Dogfight module now allows for every online player to fly whatever aircraft is available. For example: If four online players want to fly 2 F-15s vs. 2 MIG-29s (*or any other combination*), this is now possible...! For this to work correctly, the following procedure must be followed.

Note: *The host alone must make all the changes listed below. If any client does this, it will not work and the client or host may CTD. The host is the person who started the Dogfight module from the COMMS lobby.*

To fly any aircraft in Dogfight, the host must:

1. Follow the normal procedures for connection setup and entering Dogfight module.
2. When in the Dogfight lobby with each player on the proper team, right click on a player's aircraft. This displays this player's dogfight menu.
3. On the player's dogfight menu, navigate down Change Aircraft to the desired aircraft.
4. When the cursor is over the desired aircraft, left click the aircraft. The dogfight menu will close and the aircraft icon will change to the selected aircraft.
5. Repeat this for each aircraft as necessary.
6. After all changes are made and each player is ready to fly, the host must be the first one to select "Fly." The other players are to follow only after the host has clicked Fly.

* **Note 1:** *Changes do not always appear immediately for the clients.*

Though the host sees the changes properly on his computer screen, the clients may take several minutes to update. Everything will still work correctly though the clients do not see their aircraft icon change to the new aircraft selected.

* **Note 2:** *The following step is mandatory to avoid CTDs for clients...!*

Setting Up A Campaign:

When a host starts a new campaign, the clock stops and the priorities setup screen appears. This allows the host to configure the campaign as desired from the beginning.

The important thing is that clients must wait for joining until the host has set the campaign priorities!

Dedicated Server mode:

- Using the option "**MP Server mode**" in the FF Config Editor, you can put FF into a dedicated Multiplayer Server mode.
Clicking the box in the editor next to "MP Server Mode" enables this.
- Using the sub-option "**MP Host all units**", the server will have the full CPU load of all aggregated and deaggregated units and the network traffic they afford. This option is designed to be useful for a fast CPU server with a high bandwidth hosting many players with low bandwidth connections.

Dedicated Voice Server

If you want to host large multiplayer games with more than a few players, it is a good idea to setup a separate voice server (Use the voiceserver.exe to setup a dedicated voice host). No matter how many players, this host will use mixing techniques to reduce bandwidth load to the clients to max 3.2 kb.

To use a voiceserver, the clients need to point to the host's IP address by setting the `g_stvoicestip` variable in the config file (i.e. `set g_stvoicestip "130.123.33.23"`)
A mixing server requires some CPU power so it's not recommended to run the voiceserver.exe while playing Falcon on the same computer. In this case, just run Falcon normally - the Falcon built-in host will act as a forwarding server which doesn't require that much CPU power.

Choosing the server

Now decide amongst your online MP buddies who has the best online MP connection to be the server and then calculate how many clients will be possible.

- For the server, you need both high bandwidth and stability/consistency.
- To determine how many clients a server can support, do a rule of thumb calculation and figure **33 kb for each client**. Therefore, divide the Server bandwidth by 33 to get approximately how many clients can be supported by that server. Do not try to support more clients than the bandwidth can sustain: Major warping and players getting dropped are usually indications that you need to try again with fewer clients, smaller "-bandwidth" settings or both.

Note that the Server host is the person who *HOSTS* the Dogfight or TE or Campaign mission. The Server is *NOT* the person who puts their IP address (or the popular 0.0.0.0 IP) in the UI and has others connect to him. So, the person with the fastest online connection that you want to be the Server must also host the mission. It doesn't really matter much who hosts the connection, since the person hosting the mission will automatically be the Server and all others will be Clients.

About voice-comms

If you use the built-in voice comms in FF, note that - due to MS DirectX features - the voice server host is the connection host person who puts in their own IP address (in the UI) and **NOT** the person hosting the mission (This does not apply if you use Roger Wilco or other voicecomms and have disabled the built-in comms).

Also note that the voice comm server does NOT work from behind routers and NAT. This is a limitation of MS DirectX DirectVoice, so the voice comm. server must be directly on the Internet and cannot be a client behind a router.

Starting a flight

When committing from the UI to the flight to start the mission, one player at a time should enter instead of everyone at once. Note, this can still create chaos on taxiways.

When a player clicks his "Fly" button, the other players will automatically receive the message "is committing now", from him.

Be prepared to stop your aircraft from rolling and be alert for other moving aircraft.
If possible, it's a good idea to stagger flight times so they won't occur too close together.

Router / Firewall Issues

If you have an external router or firewall, you most likely need to open up UDP protocol on some ports to allow Falcon to work through it (*See your router or firewall documentation on how to open up or forward ports*).

- For Online Multiplayer: UDP on ports 2935 and 2934
- For internal Voice Comms: UDP on 2936 and 2937

Doesn't work...? Perhaps try **Teamspeak** (see next section) or Roger Wilco.

* **To fly MP - DISABLE WINDOWS FIREWALL** *



Khronik's Chronic MP for Dummies

Having the opportunity to fly with another human in FreeFalcon has always been considered a luxury and a privilege. A sim as complex as this already offers much depth to the virtual pilot seeking a total fighter-simulation experience. Multiplayer can take this to the next level. With - of course - a little work, sweat, and (hopefully) without a hammer



Basics of Falcon Data Communication...

Firstly, it's important to understand how Falcon communicates in multiplayer. Falcon uses a UDP traffic protocol to transmit and receive data through the internet. *The reasons for the choice of this communication protocol are beyond the scope of this article.*

Unfortunately, UDP traffic is rarely used these days in modern applications, and - as such – is not automatically "open" by default on most routers and firewalls. Actually, most DOS (Denial Of Service) attacks are UDP based. So it's not so surprising that your router is paranoid about UDP traffic.

UDP from Wikipedia →.

User Datagram Protocol (UDP) is one of the core protocols of the Internet protocol suite. Using UDP, programs on networked computers can send short messages sometimes known as datagrams (using Datagram Sockets) to one another. UDP is sometimes called the Universal Datagram Protocol. It was designed by David P. Reed in 1980.

UDP does not guarantee reliability or ordering in the way that TCP does. Datagrams may arrive out of order, appear duplicated, or go missing without notice. Avoiding the overhead of checking whether every packet actually arrived makes UDP faster and more efficient, at least for applications that do not need guaranteed delivery. Time-sensitive applications often use UDP because dropped packets are preferable to delayed packets. UDP's stateless nature is also useful for servers that answer small queries from huge numbers of clients. Unlike TCP, UDP is compatible with packet broadcast (sending to all on local network) and multicasting (send to all subscribers).

Routers & Firewalls

If you do not have both a firewall and a router you can disregard this Section, and skip directly to the **Game Configuration Section** (pg. 115). Keep in mind - most DSL receivers (*modems for the old people*) usually have a built in firewall that will prevent falcon from connecting and/or will cause connection issues.

Preparing For Router Configuration...

Though there are too many router models and makes to be able to give a detailed tutorial for all, there is a common procedure for most.

First we must identify your local IP. One method is mentioned on pg.108

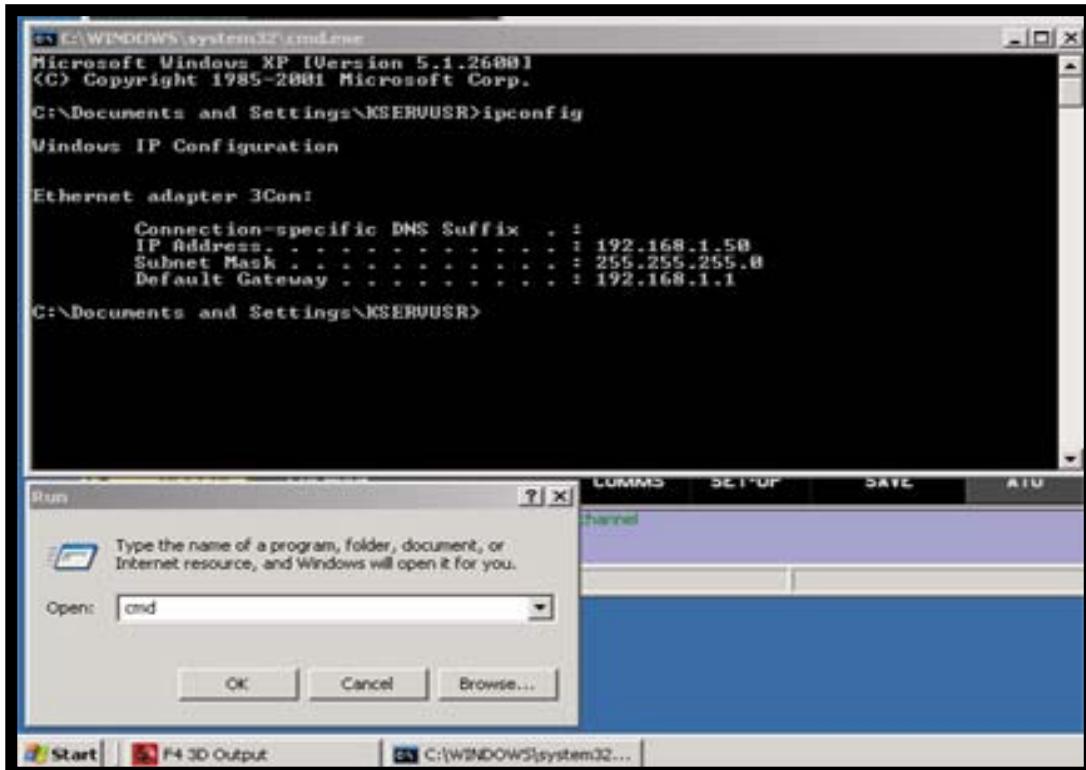
Another easy way to check this is to use the IPCONFIG command in a DOS box.

- i. Call up the DOS box by hitting → TASKBAR / START
- ii. Then → RUN
- iii. Type in → cmd *(A DOS box should appear with a command prompt.)*
- iv. Enter → ipconfig
- v. Then → Hit ENTER.

Details concerning all network connections will scroll.

What's important is the IP address (*above the subnet mask*) for the device your system uses to connect to the internet (*usually a LAN card*).

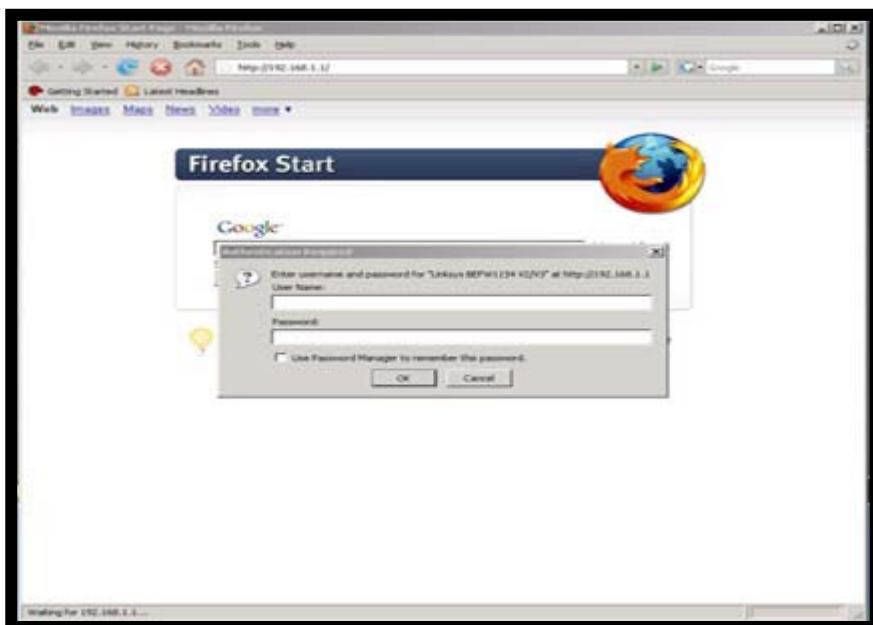
This should begin with 192.168 with 2 other octets. This is your "local IP".



There might be more than one network device connected so be sure to identify the one that connects to the router / internet connection.

Connecting To Your Router...

Armed with our "Local IP", we now need to port forward (or allow access) from your router to your computers local IP. To do so we need to enter the routers admin interface. Open your web browser and enter your routers address.



Ninety-nine percent of the time this will be : 192.168.1.1 or 192.168.0.1. (if your local IP had a 1 for its 3rd octet then the router's address will be 192.168.1.1 for example) . It should then ask for your login / pass. ¹



At this point Id suggest taking a look at portforward.com for more information on how to setup your particular router model for port forwarding falcon.

Find your routers port forwarding menu...!

¹ If you have never changed this, there is often a default manufacturer's login/pass documented in your routers manual

Ports To Forward... Port Forwarding is required only if you want to act as a Host/Server. For flying as a Client, Port Forwarding isn't required...!

UDP 2934 – 2935

UDP 2936 - 2937 (*for in game voice comms, optional*)

What we're looking to do is to allow your router to forward UDP traffic on ports 2934 and 2935 (2936/2937 for comms) to your "Local IP", which we found earlier with IPCONFIG. Some routers can do this with only one entry. Other need more.

The picture on the previous page shows an example from a linksys router.

Setting-Up a Static Local IP:

This is an optional step, but is handy for those who have multiple computers connected to their routers. In our last step we defined our "Local IP" and port forwarded UDP Falcon ports to that particular address. Unfortunately most routers assign their IP dynamically as devices are detected/connected, so in the future your "Local IP" might change. Setting a static IP will keep a predefined IP entered by us so that it is not randomly assigned by your router.

To set a static IP on your system –

- ☞ Browse to control panel / network devices.
- ☞ Double click the network device that connects you to the internet and/or router.
- ☞ Under the GENERAL tab double click on Internet Protocol (TCP/IP).

This will bring up the foreground window in the screen shot below.

- Chose an address starting with the same 3 octets as your local.
- Choose a value between 10 and 255.
- Keep the 255.255.255.0 as default subnet mask.
- Your gateway and DNS are the same as your router's address.



Game Configuration Section

*Due to improvements in the MP code, FreeFalcon / RV no longer needs a bandwidth setting in game. Any basic DSL or Cable connection should suffice to join an MP mission. **Hosting** an MP server, however, has a much higher bandwidth requirement, and would need enough to simultaneously cover the combined clients*

IMPORTANT →

Before attempting to connect to a multiplayer session, be sure to have matched your client's FF Config settings with the server's.

Any changes to the Server's FF Config **must** be mirrored by **all** clients.

Connecting to a Falcon Host:

To begin hit the COMMS section from the main menu screen.



Enter the host's IP into the IP entry box. Be sure to select connect as a client.



FF5.0 now allows for DNS based host addresses. i.e. "falconserver.com" types.²

Once connected you will receive a visual confirmation from the UI.



² A falcon host is anyone that has connected as server and has begun either a DF / TE / CAM.

To discover the host's session, select its game type (*DF/TE/CAM*) then browse to the **ONLINE** tab. Within seconds the host's session(s) should be listed.

Clicking on the **multiplayer session** will bring up the airbase / squadron map. *This is where you can select which airbase you would like to fly from.*

If you would like to fly together, it's important to select the **same airbase / squadron** as the person you wish to connect with.

It is not possible to join a flight outside your squadron. To do so, you must:

- i. Exit the session
- ii. Reconnect
- iii. Select the new squadron.

With your airbase and squadron selected, you can now click on the commit button.



The "commit" button will now enable you to proceed to the ROE menu...



During this stage, it is important to match the "server authorized" settings on the left side.

Any setting enforced by the server must be matched. Once done hit "OK".

Welcome to the campaign planning / FRAG order.



You should be able to simply chose a flight; selecting one of the seats from the flight.

Chat with clients is possible through the comms button.

When flying with other human pilots in any mission type it is good practice to not commit before the lead. See Point #17 on the following page

Snail's Guide to Multiplayer

The multiplayer sexion*

(* Multiplayer can be the most sexy part of Falcon4)

So, you have friends who like to fly FreeFalcon online with you. That is both scary (your faults can be easily noticed) and BIG fun at the same time.

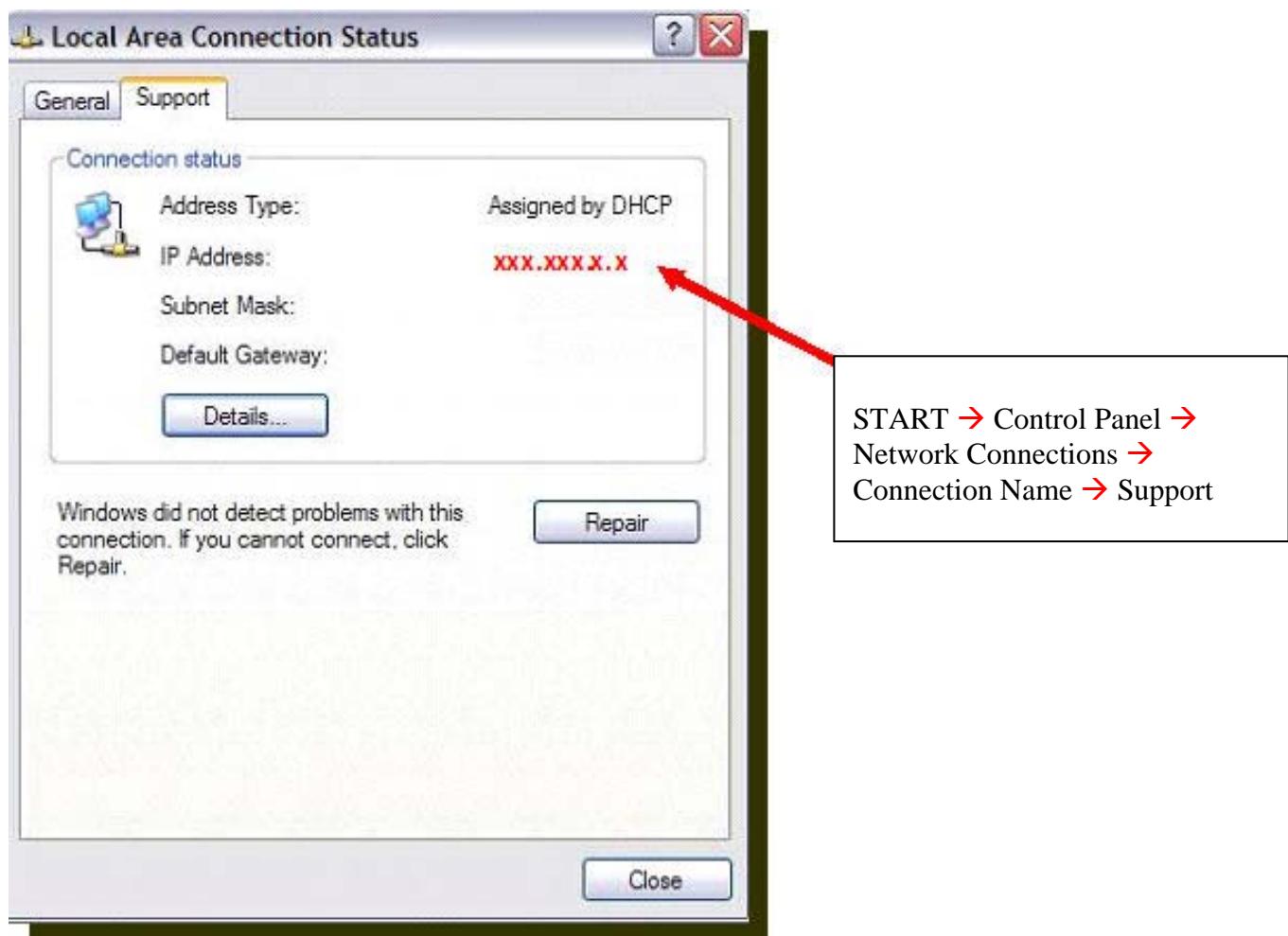
How do you setup a multiplayer mission (TE, Dogfight or Campaign)?



When you fly online, there is one computer which acts as the "Server". The rest of the computers are "Clients".

The first one to take action is the "Server". Who should act as the "Server"...? Usually the person with the fastest and most stable internet connection. This pilot should discover, and make a note of his IP number. The clients will need that information to join.

HOW TO FIND YOUR IP



Suggestion: use a program like TeamSpeak to have voice communication with each other. This is not only useful for flying, but it can help during the setup process...!³

Snail's Slow Step x Step:

The server chooses 'Comms' from the main menu. There he can 'connect as server'. The server does NOT have to fill in an IP number. Then he connects.

After the server has connected to itself, the clients can join. They have to fill in the server's IP and 'join as client'.

Suggestion: if you plan to fly often with the same server, you can save the IP number in this screen.

After committing you get a message from the 'commlink'. You can click that one. (Note: Bandwidth settings are no longer needed).

Now the server can choose 'Comms' again. He steps into a chat window that's often referred to as: 'the first chat'. Here he can see who has joined the game, and - by typing - he can do a primary check that – connection-wise - all is well, so far.

If it hasn't yet been done, this is ALSO the moment to check if all pilots are in the same theatre...! No need to explain why this is crucial.

Clients wait here until called.

Next step for the server is the choice of the 'game': TE, Campaign or just a fun Dogfight.

The Server chooses the game as he normally would in Single Player. After committing, he gets a new screen. Here the restrictions for the game can be set. (e.g. if he doesn't check 'labels', no other pilot will be able to choose labels...)

After an "OK" on the desired MP settings, the Server enters a familiar screen. At this point, he can inform the other pilots "Game is up...!"⁴

Now the Clients can join the game, and take a seat in a flight.

It is advisable to stop the clock in the UI. If not, the take off time could be passed while everybody is discussing interesting matters.

At this stage, both waypoints and munitions can still be altered. It is advisable to let the Server do all the necessary ordnance changes. They'll show up in the clients screen (The Client may have to exit the loadout screen and enter again).

There is also a chat window here. The "Second chat".

When all is satisfactory, it is standard practice for all pilots to "commit" in order of flights and position within flights.

³ See the TEAMSPK Section (following this) for Details.

⁴ Meaning – "the game is up for clients to join." This is a traditional Falcon expression.

After all pilots have joined, the clock should start running fast.

In the early days of Falcon, THIS was the most exciting part of MP... 😊

If the clock isn't running quickly, there can be two reasons →

1. The first flight is within 2 minutes of taking off (no problem).
2. There is something wrong...!

The problem could be any number of things. Perhaps a lazy pilot has forgotten to join; maybe something else....? In any case, EVERYBODY must return to the "First chat".

Same procedure again. Usually this works.

When entering the 3D cockpit, every pilot confirms it verbally. "MeatLoaf in cockpit".⁵

Now you are ready to fly the mission.

Have fun!!!



⁵ Editor's Note → If your name ISN'T "Meatloaf", you shouldn't say "Meatloaf". Try your own name instead. - Ara

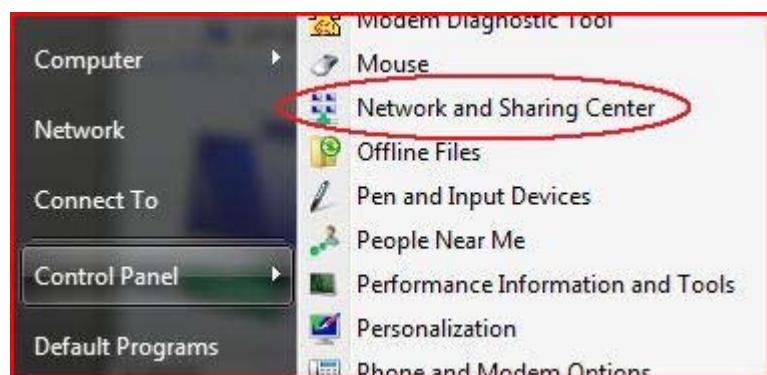
Configuring a Static IP in VISTA

Configuring a Static IP is important if you have multiple computers connected to a single router. For proper working of Port Forwarding from the Router, a Static IP on the Computer with FF5 is desired.

This guide, by **-=[ASG]=-** will take you step-by-step on how to configure a STATIC IP on your Windows VISTA Computer.

Go to:

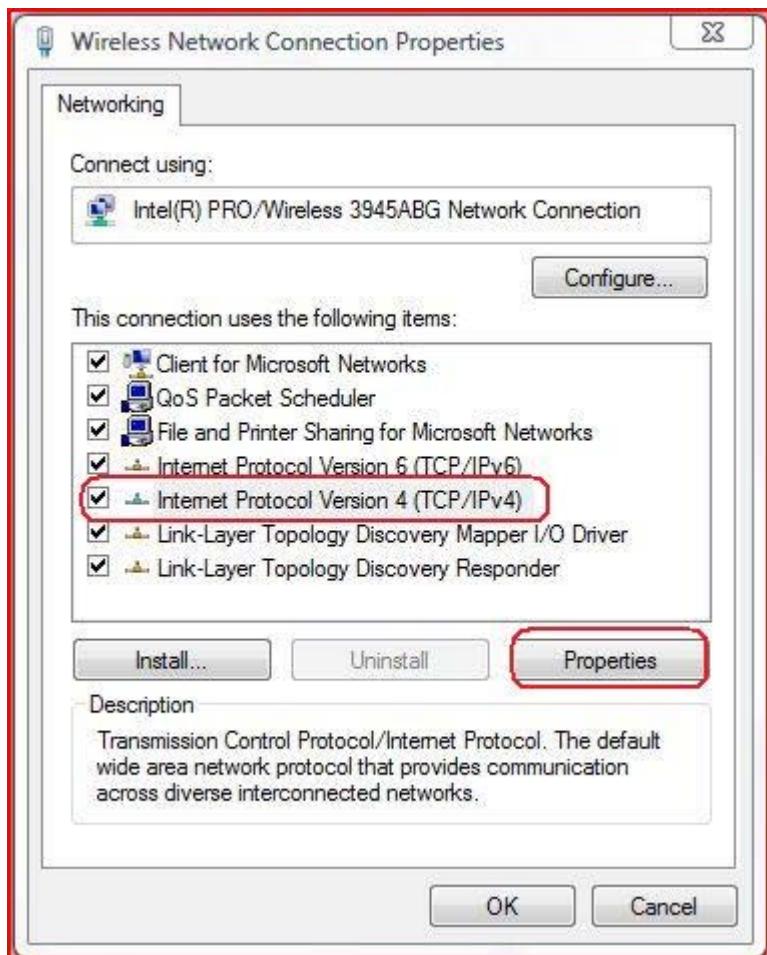
- Start Menu
- Control Panel
- Network and Sharing Centre



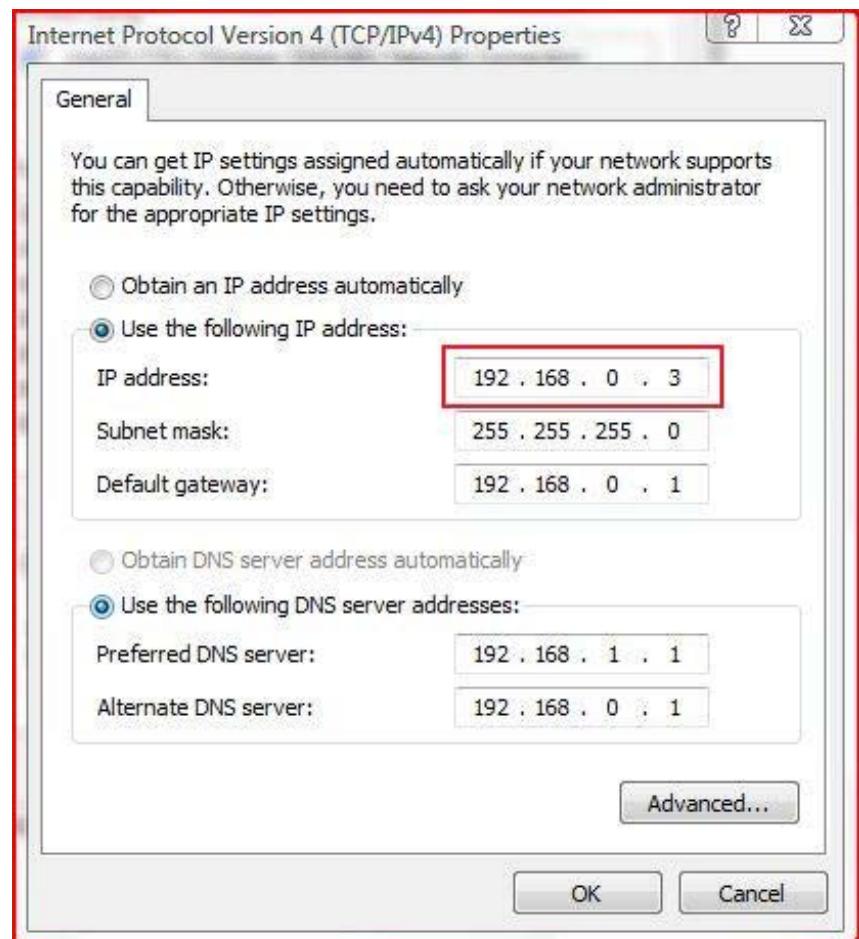
In the window, click on “Manage Network Connections” in the left Panel.

This would give you list of Network Connections currently configured on your system.
Right-Click on the Network Connection you are using and Click Properties.





A pop-up will appear, Single-click on “Internet Protocol Version 4(TCP/IPv4)” and Click Properties.



In front of IP address type your desired IP address.

This would be your STATIC IP.

In front of Subnet Mask type:

255.255.255.0

Default Gateway & DNS should be the IP address of your Router.

Anupam

TeamSpeak

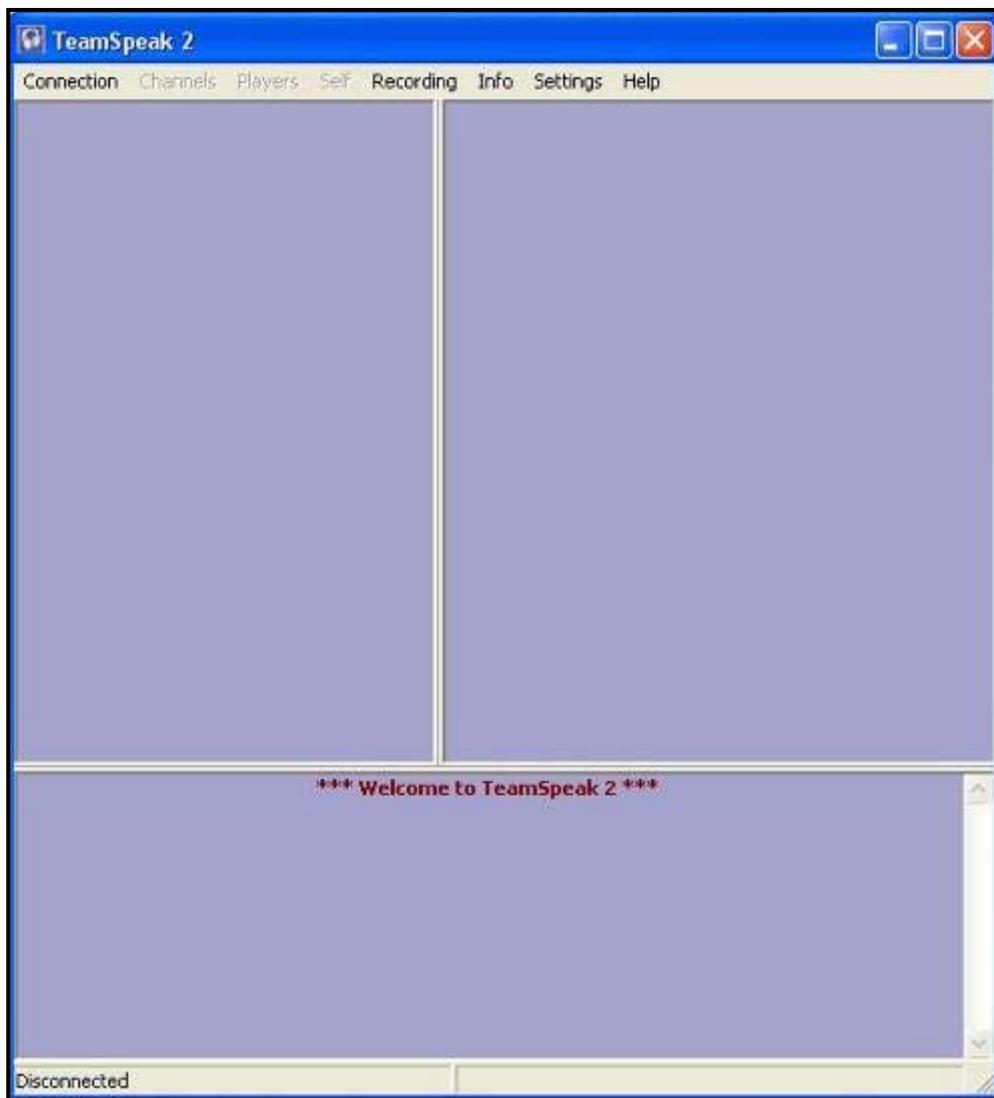
TeamSpeak is an application which enables people to speak with one another over the Internet. It is therefore able to be used by Virtual Pilots to communicate with their squadron during MP flight. TeamSpeak is FREE of charge for non-commercial use...!

RifleFighter offers up a simple guide for TeamSpeak.

Firstly, download the program from the TeamSpeak site →

<http://www.goteamspeak.com/>

Now – go ahead and install it.



If the program asks you to install codecs, allow it.

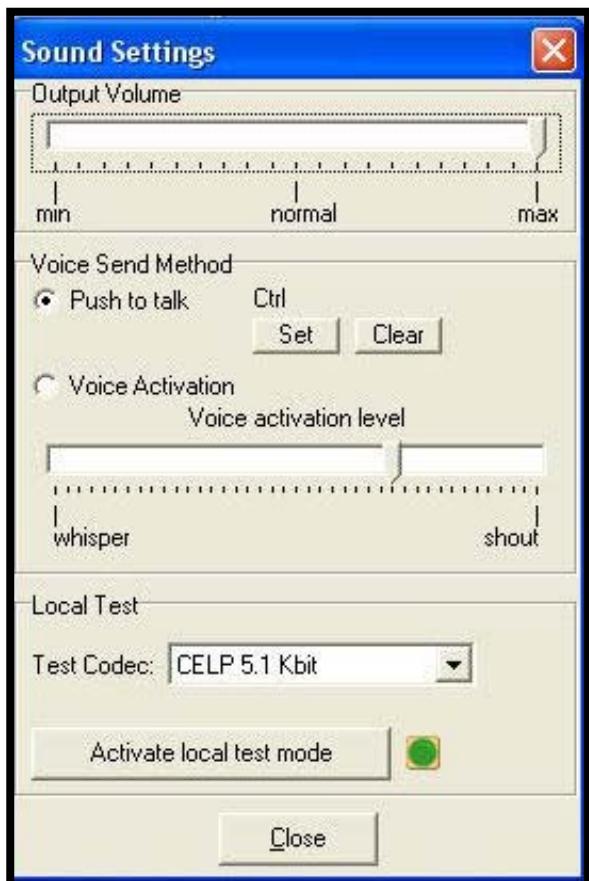
After installation, run the Teamspeak program.

You should see something like the picture to the left.

Next, we configure the program to PTT (Push To Talk), and set the output volume.

From the top menu → Settings → Sound Input/Output settings.

You should see something like this:



- Choose *Push to talk*.
- Press the "Set" button
- Press the desired PTT button (*the button you will depress in order to communicate with your radio. e.g. Scroll Lock is a good option*)
- Press "Active Local test mode"
- Now - press the talking button and talk...!

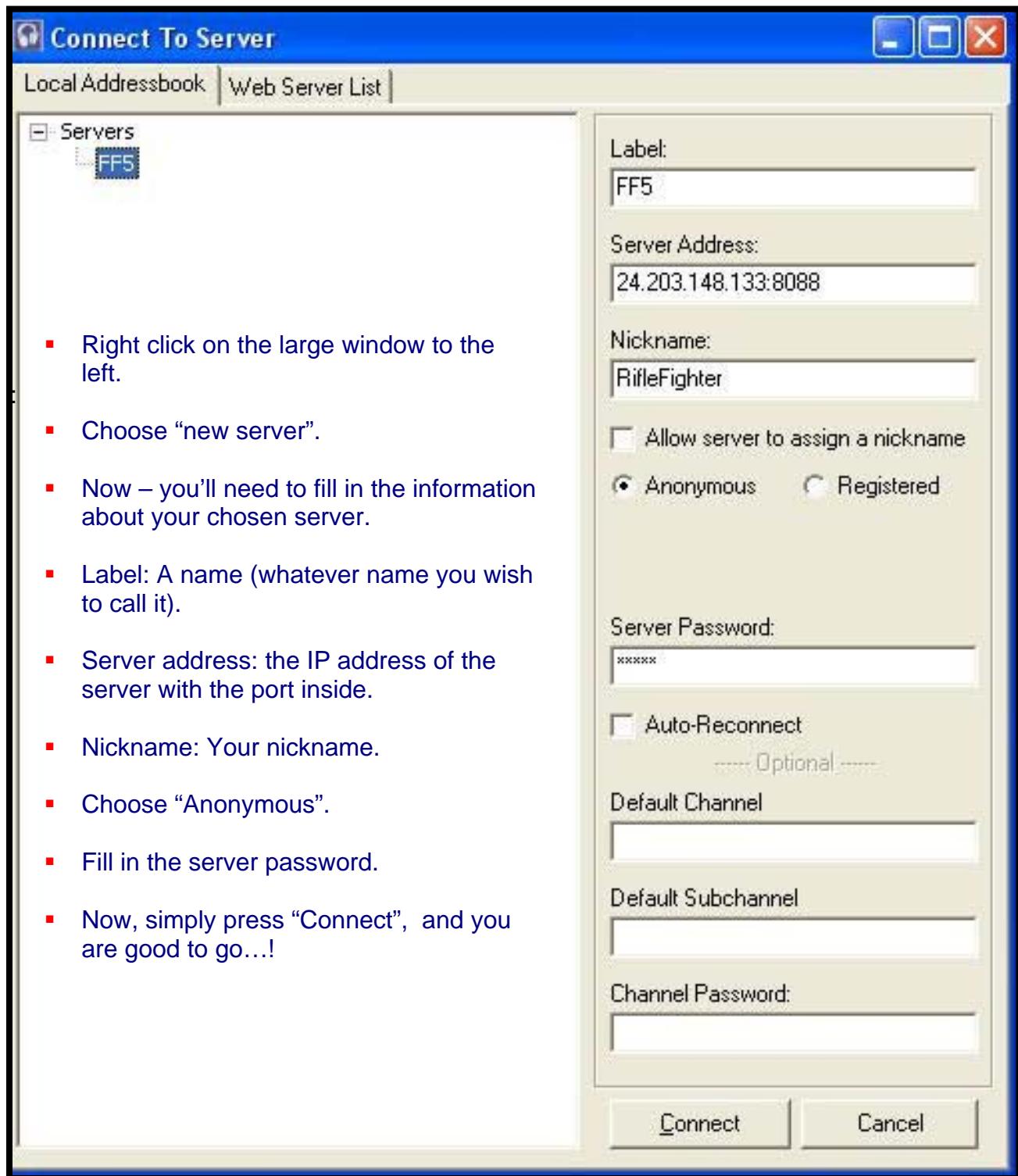
If you hear yourself, you have been successful.

If your voice is too soft, or too loud - adjust the "Output Volume" slider (upper window) until it sounds acceptable.



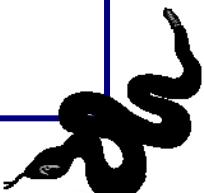
Now we are configured and good to go, let's try to enter a server...

Find **Connection** on the drop down menu, and select **Connect →**



Khronik says → Once connected, you won't be able to change channels until registered with the TS server. Any SA (server admin) can grant an unreg'd user Registered or SA rights. SA's can right click on a user and select "Allow registration".

At this point the "Register with server" will become active under SELF, in the TS top menu bar. Choose a name and pass. Next time you connect instead of choosing anonymous with the server pass, pick registered with your chosen log/pass.



JEWEL CASES



Available in your *FreeFalcon5/Extras/JewelCases* Folder

NATO Brevity Codes

Now that you have Team Speak up and running, and are ready to communicate in the Virtual FreeFalcon Skies, it is important that all Virtual Pilots are on the same Virtual page.

To this end, -=[ASG]=- has provided a list of NATO Brevity Codes for use in your Virtual Engagements.

DEFINITION (as per US DoD):

A Brevity code is a code which provides no security but which has as its sole purpose the shortening of messages rather than the concealment of their content.

The usage of these codes is imperative in a Battlefield environment, since it saves valuable seconds while communicating, resulting in quicker response to any situation.

The intent of publishing these codes is to save you valuable seconds while communicating in the Virtual Battlefield.

The following list of Brevity Codes is by no means exhaustive. The List has been modified to exclude some terms which you as a pilot might never use in FF5.0. The list has also been modified to include some additional codes/keywords, which are used regularly by any Pilot in the real world.

CONTENTS

List of Brevity Codes

List of NATO Code Names for Soviet Fighters and Missiles



A

ABORT(ING)(ED) - Directive/informative call to cease action/attack/event/mission.
ACTION - Directive to initiate a briefed attack sequence or maneuver.
ACTIVE - An emitter is radiating.
ADD() - Directive call to add a specific (system) or (electronic order of battle (EOB)category) to search responsibility.
ALARM - Directive/informative call indicating the termination of emission control (EMCON) procedures.
ALPHA CHECK - Request for/confirmation of bearing and range to described point.
ANCHOR(ED) - # Orbit about a specific point/refueling track flown by tanker.
-# Informative call to indicate a turning engagement about a specific location.
ANGELS -Altitude in "Thousands of Feet". Angels 10 equals 10,000 Feet.
ARIZONA - No anti-radiation missile (ARM) ordnance remaining.
ARMSTRONG- Weapons are Armed.
AS FRAGGED - Unit or element will be performing exactly as stated by the air tasking order(ATO).
AUTHENTICATE - To request or provide a response for a coded challenge.
AZIMUTH - Two or more groups primarily separated in bearing.

B

BANDIT - An aircraft positively identified as enemy, in accordance with theater ID criteria. The term does not necessarily imply direction or authority to engage.
BDA - Bomb Damage Assessment. A post-strike report on the damage caused to a particular target.
BEAM (ING) - An aircraft crossing your path perpendicularly is said to be BEAMING.
BENT - System indicated is inoperative.
BINGO - # Fuel state needed for recovery.
Proceed/am proceeding to specified base (field) or carrier or positioning.
BITTERSWEET - Notification of possible BLUE ON BLUE (friendly fire) situation relative to a designated track or friendly aircraft.
BLANK - A suppression of enemy air defenses (SEAD) aircraft does not detect any emitters of interest.
BLIND - No visual contact with friendly aircraft/ground position opposite of VISUAL.
BLOW THROUGH - Directive/informative call that indicates aircraft will continue straight ahead at the merge and not turn with target/targets.
BLUE ON BLUE - Friendly fire, inadvertent hostile engagement between allies.
BOGEY - A radar or visual air contact whose identity is unknown.
BOGEY DOPE - Request for target information as briefed/available.
BOX - Groups/contacts/formations in a square or offset square.
BRAA - Tactical control format providing target bearing, range, altitude, and aspect, relative to a friendly aircraft.
BRACKET - Indicates geometry where friendly aircraft will maneuver to a position on opposing sides, either laterally or vertically from the target.
BREAK (Direction) - Directive to perform an immediate maximum performance turn in the direction indicated assumes a defensive situation.
BREAKAWAY - Tanker or receiver directive call indicating immediate vertical and nose/tail separation between tanker and receiver is required.
BROKE LOCK - Loss of radar/infrared (IR) lock-on (advisory).
BUDDY LOCK - Locked to a known friendly aircraft; normally a response to a SPIKE or BUDDY SPIKE call and accompanied with position/heading/altitude.
BUDDY SPIKE - Friendly aircraft(s) air-to-air indication on radar warning receiver (RWR)to be followed by position/heading/altitude.
BUGOUT - Separation from that particular engagement/attack/operation intent to (Direction) re-engage/return.
BULLSEYE - An established point from which the position of an object can be referenced made by cardinal/range or digital format.
BUSTER - Directive call to fly at maximum continuous speed i.e. to use the afterburner.
BUZZER - Electronic communications jamming.

C

CAP/CAPPING # Directive call to establish an orbit at a specified location. (Location)

An orbit at a specified location.

CHAMPAGNE - An attack of three distinct groups with two in front and one behind.

CHEAPSHOT - ARH Missile not supported to Active Range.

CLEAN - # No radar contacts on aircraft of interest.

No visible battle damage

Aircraft not carrying external stores.

CLEARED - Requested action is authorized (no engaged/support roles are assumed).

CLEARED HOT - Ordnance release is authorized.

COLD - # On a leg of the combat air patrol (CAP) pointed away from the anticipated threats.

Group(s) heading away from friendly aircraft.

COMMIT(TED) - Fighter intent to engage/intercept, controller continues to provide information.

CONFETTI - Chaff lane or corridor.

CONS/CONNING - THREAT/BOGEY aircraft leaving contrails.

CONTACT - # Sensor contact at the stated position.

Acknowledges sighting of a specified reference point/object/aircraft. Usually followed by the name of point/object/aircraft.

COVER(ING) - Directive/informative call to take Surface/Air action or establish an air-to-air (A/A) posture that will allow engagement of a specified target or threat.

CRANK - F-pole maneuver; implies illuminating target at radar gimbal limits.

D

DASH(#) - Aircraft position within a flight. Use if specific call sign is unknown.

DECLARE - Inquiry as to the identification of a specified track(s), target(s), or correlated group.

DEFENSIVE - Aircraft is in a defensive position and maneuvering with reference to the (SPIKE/Missile/stated condition. SAM/MUD/AAA

DE-LOUSE - Directive to detect and identify unknown aircraft trailing friendly aircraft.

DEPLOY - Directive to maneuver to briefed positioning.

DIVERT - Proceed to alternate mission or base.

DEAD-RECKONING-To navigate without the assistance of instruments

E

ECHELON - Groups/contacts/formation with wingman displaced approximately 45 degrees behind leader's 3/9 (o'clock) line.

ESTIMATE - Provides estimate of the size, range, height, or other parameter of a specified contactimplies degradation.

EXTEND - Short-term maneuver to gain energy, distance, or separationnormally with the (Direction) intent of re-engaging.

F

FADED - Radar contact is lost.

FAST - Target speed is estimated to be 600 knots ground speed/Mach 1 or greater.

FATHER - Tactical air navigation (TACAN) station.

FEET WET / DRY - Flying over water / land.

FENCE (IN / OUT) - Set cockpit switches as appropriate prior to entering/exiting the combat area.

FOX (Number) - Simulated/actual launch of air-to-air weapons.

"ONE" - Semi-active radar homing / semi-active radar-guided missile.

"TWO" - Infrared-guided missile.

"THREE" - active radar-guided missile.

"FOUR" - simulated fire by a bombardier.

FRIENDLY - A positively identified friendly contact.

FURBALL - A turning fight involving multiple aircraft with known BANDITS and FRIENDLIES mixed.

FULL GRUNT- Full Military Power; throttle setting of 100% thrust.

FULL MILITARY POWER- 100% thrust

G

GIMBAL (Direction)- Radar target is approaching azimuth or elevation limits. Followed by Direction of the target aircraft.

GLOWWORM - Flare dropping aircraft

GRANDSLAM - All HOSTILE aircraft of a designated track (or against which a mission was tasked) are shot down.

GREEN (Direction) - Direction determined to be clearest of enemy air-to-air activity.

GROUP - Radar targets within approximately 3 nautical miles (NMs) of each other.

H

HARD (Direction) - High-G, energy-sustaining turn.

HEAVY - A group or package known to contain three or more entities.

HIGH - Between 25,000 and 40,000 feet mean sea level (MSL).

HIT(S) -# Air-to-air (A/A) Momentary radar returns search. (Indicates approximate altitude information from fighter.)

-# Air-to-ground (A/G) Weapons impact within lethal distance.

HOLDING HANDS - Aircraft in visual formation.

HOLD FIRE - An emergency fire control order used to stop firing on a designated target, to include destruction of any missiles in flight.

HOOK (Left/Right) - Directive to perform an in-place 180-degree turn.

HOSTILE - A contact identified as enemy upon which clearance to fire is authorized in accordance with theater rules of engagement.

HOT -# Attack geometry will result in rollout in front of the target.

-# On a leg of the CAP pointing toward the anticipated threats.

-# Group heading towards friendly aircraft opposite of COLD.

-# Ordnance employment intended or completed.

HOTDOG - Informative/directive call that an aircraft is approaching or at a specified standoff distance from the sovereign airspace of a nation (as defined by national boundaries or territorial sea and airspace). Follow briefed procedures.

I

ID - # Directive to identify the target.
-# Identification accomplished, followed by type.

INTERROGATE - Interrogate the designated contact of the IFF mode indicated.

J

JOKER - Fuel state above BINGO at which separation/bugout/event termination should begin.
JUDY - Aircrew has radar/visual contact on the correct target, has taken control of the intercept, and only requires situation awareness information. Controller will minimize radio transmissions.
JINKING- A series of erratic maneuvers designed to throw off an enemy gun attack.

K

KILL - Clearance to fire.
KNOCK IT OFF - Directive to cease air combat maneuvers/attacks/activities.

L

LEAD-TRAIL - Tactical formation of two contacts within a group separated in range or following one another.
LEAKER(S) - Airborne threat has passed through a defensive layer. Call should include amplifying information.
LINE ABREAST - Two contacts within a group side by side.
LIGHTS ON/OFF - Directive to turn on/off exterior lights.
LOCKED - Final radar lock-on; sort is not assumed. (BRAA/Direction)
LOCK ON- To acquire a target with radar with the intent to fire a weapon.
LOST CONTACT - Radar contact lost.
LOST LOCK - Loss of radar/IR lock-on (advisory).
LOW - Target altitude below 10,000 feet above ground level (AGL).

M

MAGNUM - Launch of friendly antiradiation missile.
MAPPING - Multifunction radar in an A/G mode.
MARKING - Friendly aircraft leaving contrails.
MARSHAL(ING) - Establish(ed) at a specific point.
MEDIUM - Target altitude between 10,000 feet AGL and 25,000 feet MSL.
MERGE(D) -# Information that friendlies and targets have arrived in the same visual arena.
-# Call indicating radar returns have come together.
MIDNIGHT - Informative call advising that C3 functions are no longer available; opposite of SUNRISE.
MSA- Minimum Safe Altitude. Altitude below which you are asking for trouble.
MUD - Indicates RWR ground threat displayed followed by clock position and type. (Type/Direction)
MUSIC - Electronic radar jamming. (On air interdiction (AI) radar, electronic deceptive jamming.)

N

NAILS - Radar warning receiver (RWR) indication of a radar in search. Add clock position/azimuth, if known.
NAKED - No radar warning receiver (RWR) indications.

NEW PICTURE - Used by controller or aircrew when tactical picture has changed. Supersedes all previous calls and re-establishes picture for all players.

NO FACTOR - Not a threat.

NO JOY - Aircrew does not have visual contact with the TARGET/BANDIT/landmark; opposite of TALLY.

NOTCH - All aspect missile defensive maneuver to place threat radar/missile on the beam. (Direction)

O

OFF (Direction) - Informative call indicating attack is terminated and maneuvering to the indicated direction.

ON STATION - Informative call unit/aircraft has reached assigned station.

OPENING - Increasing in range.

OUT (Direction) - Informative call indicating a turn to a cold aspect relative to the threat; opposite of IN.

OUTLAW - Informative call that a bogey has meet point of origin criteria.

P

PACKAGE - Geographically isolated collection of groups/contacts/formations.

PADLOCKED - Informative call indicating aircrew cannot take eyes off an aircraft or a surface position without risk of losing TALLY/VISUAL.

PAINT(S) - Interrogated group/radar contact that is responding with any of the specified IFF modes and correct codes established for the ID criteria.

PARROT - IFF transponder.

PICTURE - Provide tactical situation status pertinent to mission.

PINCE/PINCER - Threat maneuvering for a bracket attack.

PITBULL - # Informative call AIM-120 is at active range.

-# AIM-54 at active range.

PLAYMATE - Cooperating aircraft.

PLAYTIME - Amount of time aircraft can remain on station.

POP - Starting climb for air-to-surface attack.

POPEYE - Flying in clouds or area of reduced visibility.

POPUP - Informative call of a contact that has suddenly appeared inside of briefed range.

POST HOLE - Rapid descending spiral.

PRESS - Directive to continue the attack; mutual support will be maintained. Supportive role will be assumed.

PURE - Informative call indicating pure pursuit is being used or directive to go pure pursuit.

PUSH (Channel) - Go to designated frequency. No acknowledgment required.

PUSHING - Departing designated point.

R

RANGE - Two or more groups separated primarily in distance along the same bearing.

RAYGUN - Indicates a radar lock-on to unknown aircraft; a request for a BUDDY SPIKE (Position/Heading/Altitude) reply from friendly aircraft meeting these parameters (to prevent fratricide/[[friendly fire]]).

RETROGRADE - Directive to withdraw from present position or area of operation in response to a threat.

RIFLE - Air-to-ground missile (AGM)-65 Maverick launch.

RIPPLE - Two or more munitions released or fired in close succession.

S

SADDLED - Informative call from wingman/element indicating the return to briefed formation position.
SAM (Direction) - Visual acquisition of a SAM (surface-air missile) or SAM launch; should include position.
SANDWICHEDE - A situation where an aircraft/element is positioned between opposing aircraft/elements.
SCRAM - Emergency directive to egress for defensive or survival reasons. (Direction)
SCRAMBLE - Takeoff as quickly as possible.
SCUD - Any threat tactical/theater ballistic missile (TBM).
SEPARATE - Leave a specific engagement; may or may not reenter.
SHOOTER - Aircraft/unit designated to employ ordnance.
SHOTGUN - Pre-briefed weapons state at which SEPARATION/BUGOUT should begin.
SKATE - Informative call/directive to execute launch and leave tactics.
SKIP IT - Veto of fighter COMMIT, usually followed with further directions.
SKOSH - Aircraft is out of or unable to employ active radar missiles.
SKUNK - A radar or visual [[maritime]] surface contact whose identity is unknown.
SLOW - Target with a ground speed of 300 knots or less.
SNAP (Direction) - An immediate vector to the group described.
SNIPER - Directive for an aircraft to employ a range-known HARM against a specified threat at the specified location.
SORT - Directive to assign responsibility within a group; criteria can be met visually, electronically (radar), or both.
SORTED - Sort responsibility has been met.
SPIKE - RWR indication of an AI threat in track, launch, or unknown mode; include bearing, clock position, and threat type, if known.
SPLASH - # (A/A) Target destroyed.
-# (A/G) Weapons impact.
STACK - Two or more groups/contacts/formations with a high/low altitude separation in relation to each other.
STATUS - Request for tactical situation.
STROBE - Radar indications of noise jamming.
SUNRISE - Informative call that C3 functions are available. (opposite of MIDNIGHT).

T

TALLY - Sighting of a TARGET, BANDIT, BOGEY, or enemy position.
TALLY-HO - Confirmed target sighted. Opposite of "no joy".
THROTTLES - Reduction in power to decrease IR signature.
TIGER - Enough fuel and ordnance to accept a COMMIT.
TRACKING - # Stabilized gun solution.
-# Continuous illumination of a target.
-# Contact heading.
TRAILER - The last aircraft within a group(s).
TRASHED - Informative call that missile has been defeated.
TRESPASS - The addressed flight is entering a Surface/Air threat ring of a specific system at the stated (Position) location.
TUMBLEWEED - Indicates limited situational awareness; NO JOY, BLIND; a request for information.

V

VAMPIRE - Hostile antiship missile (ASM).
VERY HIGH - Above 40,000 feet MSL.
VIC - Three groups, contacts, or formations with the single closest in range and two contacts, azimuth split, in trail.
VISUAL - Sighting of a friendly aircraft/ground position; opposite of BLIND.

W

WALL - Three or more groups or contacts primarily split in azimuth.

WARNING (colour) - Hostile attack is

- "RED" imminent or in progress.
- "YELLOW" probable.
- "WHITE" improbable (all clear).

WEAPONS () - Fire only

- "FREE" at targets not identified as friendly in accordance with current rules of engagement (ROE).
- "TIGHT" at targets positively identified as hostile in accordance with current ROE.
- "HOLD" (USA, USMC) in self-defense or in response to a formal order.
- "SAFE" (USN) NOTE: USN and NATO use WEAPONS SAFE to avoid confusion with the phrase HOLD FIRE.

WEEDS - Indicates that fixed-wing aircraft are operating below 2,000 feet above ground level.

WHAT LUCK - Request for results of missions or tasks.

WHAT STATE - Report amount of fuel and missiles remaining. Ammunition and oxygen are reported only when specifically requested or critical.

- () Active = number of active radar missiles remaining.
- () Radar = number of semi-active radar missiles remaining.
- () Heat = number of IR missiles remaining.
- () Fuel = pounds of fuel or time remaining.

WINCHESTER - No ordnance remaining.

Y

YARDSTICK - Directive to use A/A TACAN for ranging.



NATO Code Names for Soviet Fighters and Missiles

Fighter/Attack Aircraft

Mikoyan-Gurevich MiG-15	Fagot
Nanchang Q-5 Nanchang Q-5/A-5	Fantan
Mikoyan-Gurevich MiG-9	Fargo
Mikoyan-Gurevich MiG-19 and Shenyang J-6	Farmer
Sukhoi Su-24	Fencer
Tupolev Tu-28 Tupolev Tu-28P/Tu-128	Fiddler
Shenyang J-8	Finback
Sukhoi Su-47	Firkin
Mikoyan-Gurevich MiG-21 and Chengdu J-7	Fishbed
Sukhoi Su-9 and Sukhoi Su-11 Su-11	Fishpot
Sukhoi Su-7 and Sukhoi Su-17 Su-17/Su-20/Su-22	Fitter
Sukhoi Su-15	Flagon
Sukhoi Su-27 Sukhoi Su-27/Su-30/Su-33/Su-35/Su-37	Flanker
Mikoyan-Gurevich MiG-23 and Mikoyan-Gurevich MiG-27	Flogger
Mikoyan-Gurevich MiG-25	Foxbat
Mikoyan-Gurevich MiG-31	Foxhound
Mikoyan-Gurevich MiG-17 and Shenyang J-5	Fresco
Sukhoi Su-25	Frogfoot
Mikoyan-Gurevich MiG-29 Mikoyan MiG-33 Mig-33/Mikoyan MiG-35 Mig-35	Fulcrum
Sukhoi Su-34 Sukhoi Su-32/Su-34	Fullback

Bomber Aircraft

Tupolev Tu-2	Bat
Tupolev Tu-4	Bull
Tupolev Tu-14	Bosun
Tupolev Tu-16	Badger
Tupolev Tu-22	Blinder
Tupolev Tu-22M	Backfire
Tupolev Tu-82	Beagle
Tupolev Tu-85	Barge
Tupolev Tu-91	Boot
Tupolev Tu-95	Bear A/B/C/D
Tupolev Tu-98	Backfin
Tupolev Tu-160	Blackjack
A-50 Shmel	Mainstay

Missiles

Kaliningrad R-5
Vympel R-13
Kaliningrad R-8
Raduga R-9
Bisnovat R-4
Bisnovat R-40
Vympel R-23
Molniya R-60
Vympel R-33
Vympel R-27
Vympel R-73
Vympel R-77
Vympel R-37



AA-1 Alkali
AA-2 Atoll
AA-3 Anab
AA-4 Awl
AA-5 Ash
AA-6 Acrid
AA-7 Apex
AA-8 Aphid
AA-9 Amos
AA-10 Alamo
AA-11 Archer
AA-12 Adder
AA-X-13 Arrow

<http://www.freefalcon.com/forum/index.php>



"HUSTLER"

Do the Hustle...!

The FreeFalcon Group has now enjoyed greater longevity than any other Dev'ing Group in Falcon's history. As well as being an award-winning development group, FreeFalcon has enjoyed unrivalled success in the development of Falcon.

The group was founded in 2003, by Hustler.

His mission statement was simple. Keep Falcon development active, and ensure the community would always have access to a free product, unpolluted by the constraints of profiteers.

The release of FreeFalcon5 demonstrates the continued success and commitment to that initial mission.

What was the main motivation which driving you to form the FreeFalcon Group?

Ron Nair and I were working on and providing skins to the SP series, we submitted our work to the Dev Team and were waiting on SP4 to be released. The wait seemed never ending and I contacted Froggy, the head of F4UT, regarding my concerns, and after some personal phone calls and discussion, Ron and I were invited into an underground group called ViperOps. During our tenure at VO, it became clear to Ron and I that this group was formed to release a payware version of Falcon and no freeware release was imminent in the foreseeable future.

I was not interested in hanging around for a few years watching and waiting for the VO Team to possibly obtain a legal means to release their work. I had in the past dealt with Dr. Fred 'BaldEagle' Balding and I spoke with him regarding the possibility of forming a small group that could release his 3D models, along with Ron and my skins.

It's probably safe to assume that you are the ONLY Community Developer to EVER have a legal contract from the Falcon IP Holder.

The legal IP holder during this time was G2i and its founder Claude Cavanaugh. Claude registered on the FF web site one day and I sent him a PM welcoming him. He wrote me back and soon a friendship started to build. During the course of this friendship I offered business advice and personal support to Claude. G2i's version of Falcon4 was titled Operation Infinite Resolve and while G2i had made some improvements over the years the game in its current state lacked polish. Through some community contacts I was able to offer G2i some code assistance and graphics improvements. In exchange for providing this assistance I obtained a never-ending legal right to the G2i/Falcon code.

*Has the fact that you have a **LEGAL** right to develop your code, had any benefits for other development groups...?*

As I stated above, my acquisition of the code led to the formation of Bench Mark Sims (BMS). Bench Mark Sims was given the code, and had a contract to provide certain specific improvements, for a finite length of time. The agreement between G2i and BMS for these code improvements expired on November 15, 2003. After this date I allowed members of BMS to continue to work under my agreement, but it became apparent that my development goals were not aligned with those who were coding for BMS. The two members of FreeFalcon that were working alongside the BMS developers left and at that time I terminated that group's right to continue editing the source code. The remaining BMS developers ignored my termination, expanded their group and continued to work on my code. An unfortunate leak of their work led to Open Falcon.

There are many community members who have had their “posting rights” rescinded on your Forum. How do you justify this...?

The FreeFalcon forums were formed to discuss Falcon and our modification, FreeFalcon. The founding members have been members of every group and forum associated with this game over the years. Our membership in these other forums allowed us to witness all types of behavior and internet personas. We have also witnessed varying degrees of moderation in these different forums, and it is our belief that moderation, rules and a code of conduct are required. Posting on our forums is a privilege that we extend to our members. When an individual disrupts our forums, they are removed.

Why this new focus on “CAMPAIGNS”...?

Over the years the FF Team has made a huge contribution to every area of this game - except Campaigns. We currently have some very talented individuals on our Team, whom have recently been working on Theaters and Campaigns. It became apparent that they were on the verge of some meaningful breakthroughs. This new talent provided the spark to really dig in and discover what makes these dynamic campaigns work. To truly understand how the VU2 engine functions and have the knowledge to use the tools that have existed for many years, you must possess the source code. We are using this talent, the code and tools to rework, repair and upgrade all three original Korean Campaigns. Our goal is to not only return the functionality and game-play of these Campaigns to our users, but to obtain the knowledge that will allow us to assist other development groups to build additional Theaters and Campaigns.

What first drew you to Falcon...?

Being a real-life Helo-pilot, I had flown almost every flight game released over the years, and when I read that Microprose would be releasing a new version of Falcon, I couldn't wait to get my hands on it. I bought it within a few days of its release and purchased a new high end Micron computer to run it. It was - and still is today - the best and most advanced flight simulator game ever offered to the public.

What drew you from FLYING Falcon to Developing Falcon...?

I have always been an artist, built plastics, RC aircraft and model rockets. My father was a professional artist and was often commissioned by restored War Bird owners or Military pilots to paint murals or canvas's depicting their aircraft. I saw a thread first posted on the Delphi boards by JimG of a skin and some instructions on where this art was located and how to replace existing art within Falcon. Shortly thereafter I saw some art work I thought was amazing created by Ron Nair. I contacted Ron, we soon became friends and he started to teach me how to create quality art using Photoshop. Ron took me on as his understudy and we soon formed our own little group called ViperWear. Ron and I skinned dozens of models for all of the various versions of Falcon. My association with Ron and ViperWear is still one of the proudest achievements of my Falcon career.

The formation of FreeFalcon shifted my focus from skinning to directing and assembling a total package of modifications to enhance or improve the Falcon game. The downside - if there is one - is that you only have so much free time to devote to your hobby. You can either play golf, or make golf clubs. I still enjoy flying Falcon, but my time is spent communicating with the Teams and coordinating everyone's efforts.

You've worked with MANY of the Developers during the Falcon Community history. Any developers you really enjoyed working with...?

For the most part I have enjoyed working with almost everyone. If a developer has had an interest in improving the Falcon experience, then he and I are both on the same path. I have enjoyed a special relationship with several of the founders of FreeFalcon (and some such as Ron Nair and Fred Balding have already been mentioned). The current members of the FF Team are extremely dedicated and that makes the experience very enjoyable. I do of course have an 'A' list but the list is long and frankly grows constantly.

What do YOU feel is YOUR greatest contribution to Falcon Development....?

That without a doubt is very simple to answer. Obtaining the rights to the source code.

In Falcon, what is your favourite Aircraft to fly...?

Whatever aircraft I happen to be spending time developing a skin for. I don't do much of that now, I simply don't have the time. When I do make the time there can be several hours of work doing research on the actual aircraft, color schemes, line drawings, markings and then the 3D model itself. If you love aircraft, and all Falcon players do, the process requires you to become intimate with this type and you can't help but develop an attachment to that particular plane.

I am at times disappointed that with the large number of available aircraft, the community tends to focus on just the F-16's. We are constantly asked to develop and include many new types, and as a group we spend hundreds of hours on these various planes. The majority of these additional types are complete with excellent 3D models, skins, 2D and 3D cockpits, accurate flight models, weapons and load outs. However, after all of this work, it appears that few if any of these are actually flown by members of the community. I think that many are missing out on some great experiences flying these other aircraft in a simulated combat experience.

What is the one thing you would REALLY like to see added to FreeFalcon...?

Stability. This one item has been very elusive and has certainly become harder to attain over the years. There are different operating systems, graphics cards, sound cards, drivers and user defined settings all designed it seems to make this quest the hardest of all to achieve. The add-ons that we as a community have created, has certainly added to the complexity of the game and thus has increased this difficulty. The source code is extremely complex and at times it appears we finally get something to work, but in the process, something else now fails. This simple goal is difficult for any software development company, with many qualified, competent, and salaried employees, obtaining this stability with just a small group of free internet developers is extremely difficult.

Why the "Hustler" nick....?

Call signs are 'awarded' based upon many things. They are a nickname given to you by others and are often not complimentary. My call sign was given for my ability to earn various sums of money from TAC Officers willing to engage me in a friendly game of pool.

Would you recommend Dev'ing to a Community Member, or do you think - ultimately - it is more fun to simply FLY the Sim...?

If you enjoy flying Falcon, then you should fly Falcon. You will quickly discover that as a developer, your flying time will rapidly decrease. There is a great deal of enjoyment to be had by doing both, but I'm not sure that one can do both at the same time. Developing Falcon requires a great deal of time and effort and I have seen hundreds of individuals come and go. Many want to develop but soon come to the realization that in reality it is not fun, but work. The work can be fun, but as a part of a Team, you have responsibilities, standards, and deadlines. You may have to master software tools, learn new skills, and bulldoze your way through a project to its completion. Often your work depends on others to help or aide you. Sometimes you get part way through and then discover you can go no farther until someone else completes his part, or does something special for you. None of these issues come into play when you set down and decide to fly a mission or two.

Where does FreeFalcon go from here? What is the future vision?

Being a loose knit team of free developers, this question is difficult to answer, your direction and plan is tied directly to the skill set and interest of those on the team. I would like to see us utilize the knowledge we have acquired reworking the Campaigns and either assist other groups with their work, or create the work ourselves. We will continue to seek out data base issues, improve our code and work towards increased stability. With the release of WIN7 we want to ensure that our installers and code are working well with this new OS, that work is progressing and we should see some improvements with the release of FF6.



A STUDY PROGRAMME:

This Companion includes a helpful collection of Tutorials in The Learning Centre.

But – your life in the Virtual skies can't START here...!

Therefore - in addition to this Guide - I would suggest the following:

Required Reading:

Falcon4.0™ Manual

(Included with your Original Falcon4.0™ Product)

- Covers EVERY ESSENTIAL.
- **Absolutely required** reading.
- Training Missions by Pete "Boomer" Bonanni.
- BFM Tactics
- Includes ALL facets of the Sim.
- Glossary and Index included.

Available for **download** here → <http://www.mediafire.com/?gmouemvzjyk>

FreeFalcon4.0/RV1 Manual

(Available in your "FreeFalcon5/_the Manual" Folder. Includes two books. Book #1 contains the most comprehensive set of Tutorials and Tactics ever released. Book #2 – Skratch's Guide – combines several existing Manuals into ONE convenient document. Both books combine to comprise the FreeFalcon 4.0 Manual.)

- ESSENTIAL Updates.
- Most comprehensive collection of Tactics & Tutorials ever released.
- UPDATED avionics and weapons delivery.
- UPDATED Systems & Weapons
- WVR + BVR Tactics
- Ramp start
- TOTAL Navigation
- Much, MUCH more

FF5.0 Companion Guide + Flight Manual Companion

(Congratulations. You are currently reading it. Learning Centre → Pg 164.)

Recommended:

RP5 Manual ***Download here*** → <http://www.mediafire.com/?mtyj0w05gzj>

Falcon4.0™ Checklists (*Produced for the community by Olivier “Red Dog” Beaumont*)

Art Of The Kill (*Spectrum Holobyte. Pete “Boomer” Bonanni*)

Supplemental:

Hughes/Raytheon AIM-120 AMRAAM Operations Guide

(*Written for eFalcon v1.10 by Stephen “HotDogOne” French*)

Download here → <http://www.mediafire.com/?t4m23ywhv3>

LANTIRN AN/AAQ-13 Navigation Pod AN/AAQ -14 Targeting Pod Operations Guide (F-16C/D Block 50/52)

(*Written for the Superpak 3 Series of Falcon 4.0 by Wayne “Black Cat” Timmins*)

Download here → <http://www.mediafire.com/?mu4jnitmwy0>

AN/APG – 68 (V5) Operations Guide

(*written for eFalcon 109 by Stephen “HotDogOne” French*)

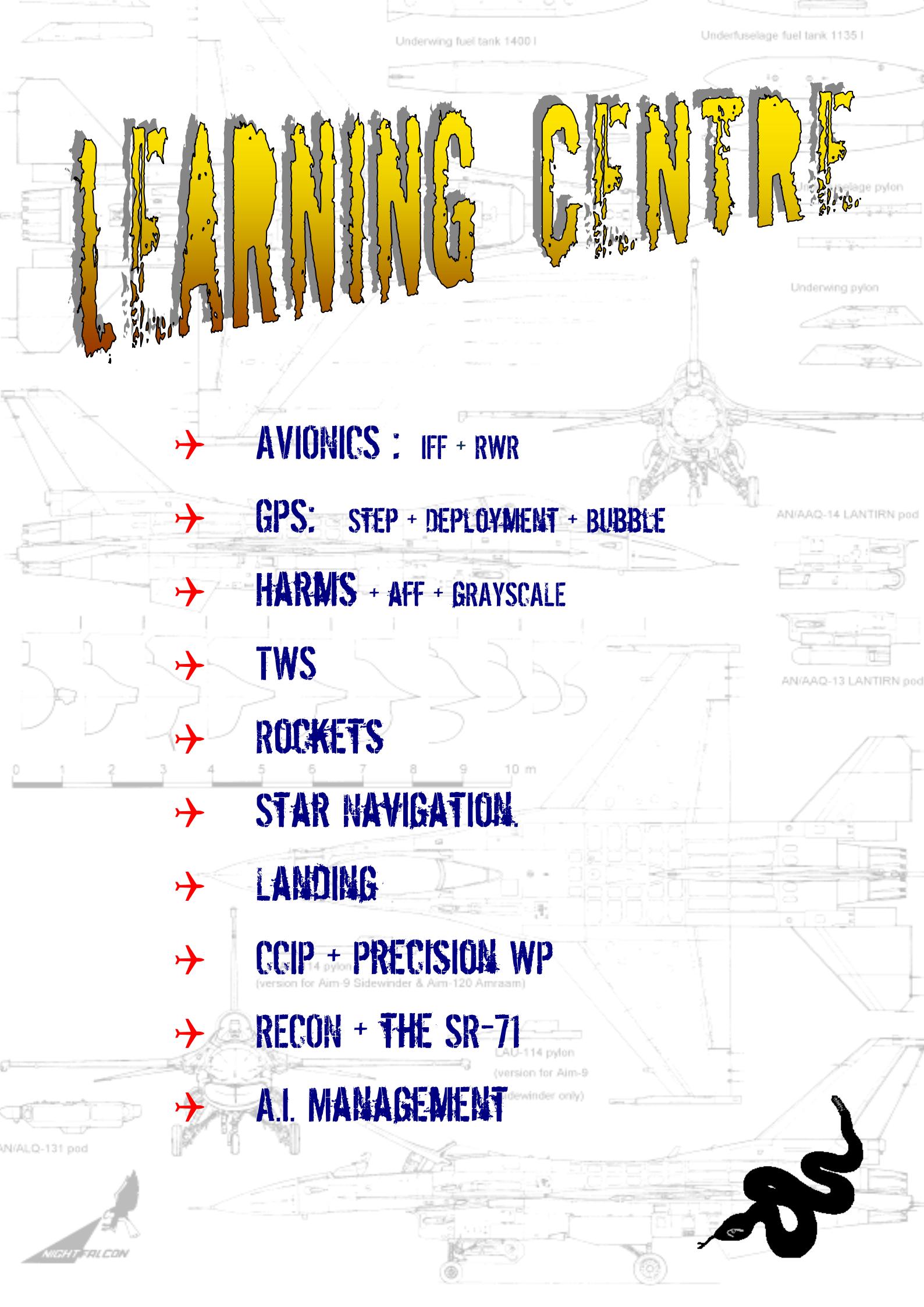
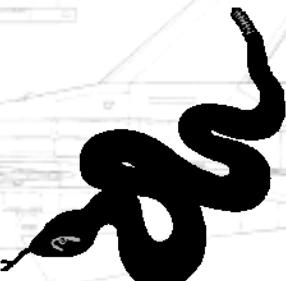
Download here → <http://www.mediafire.com/?jywcidyh2zm>

“Fighter Combat: Tactics and Maneuvering” by Shaw



LEARNING CENTRE

- ✈ AVIONICS : IFF + RWR
- ✈ GPS: STEP + DEPLOYMENT + BUBBLE
- ✈ HARMS + AFF + GRayscale
- ✈ TWS
- ✈ ROCKETS
- ✈ STAR NAVIGATION
- ✈ LANDING
- ✈ CCIP + PRECISION WP
(version for Aim-9 Sidewinder & AIM-120 Amraam)
- ✈ RECON + THE SR-71
(version for AIM-9 Sidewinder only)
- ✈ A.I. MANAGEMENT



AVIONICS + GPS ORDNANCE

The AVIONICS SECTION combines information from the FF4.0 Manual, with newer information from FF5.0

Both IFF Operations, & the use of GPS Ordnance were covered in the FF4.0 Manual.

However – there have been some significant upgrades to the GPS deployment procedures, and some additional avionics upgrades.

The tutorials are presented here in FULL.

It is advisable to read them in FULL.

These Features are only available in FreeFalcon, and thus a full working-knowledge is required for both the success of your missions, and for the full potential of this simulation to be enjoyed.

Ara'

IFF IN FREEFALCON

IFF in FreeFalcon is powered On by default.

To turn power Off/On you can use Ctrl-I to cycle On and Off.

You can also use the switch located on the left side of your cockpit to turn IFF MAIN POWER on and off. (*Note: Some 'Pits do not feature this animated switch*).

With IFF on and FCR selected on the L-MFD, you can scan Radar targets for friendly Vs. unknown by selecting Ctrl-Left_ARROW on your keyboard. You will see a green 4-second countdown on the FCR screen as the IFF scans the radar contacts (*see Figure 1*).

When finished, all targets it interrogates as friendly will be shown as small green circles and contacts it interrogates as unknown will remain as yellow squares (*See Figure 2*).

While green circles are friendly aircraft and yellow squares are generally enemy aircraft, pilots need to use AWACS to verify the IFF interrogation authenticity since some of the contacts may have missed the IFF scan.



Figure 1. IFF in scan Mode 4



Figure 2. IFF showing friendly & unknown returns

It is necessary to refresh this from time to time as radar conditions change.

To reflect realism, Scan Mode IFF is not fool-proof, and if your FCR drops radar track of any contact, then you will have to re-send the IFF signal for re-interrogation.

Also, if a new target appears after you perform IFF, you'll have to re-interrogate.

On your FCR screen there is a CPL and DCPL mode which you access by pressing CNTL (OSB 5) and then OSB 10. CPL interrogates what's showing on the FCR screen.

DCPL interrogates the whole 60x60 area in front of the plane and gives the pilot a snapshot of what is in the distant field of view (*See Figure 3, below*).

DCPL returns stay active for 5 seconds before being wiped.

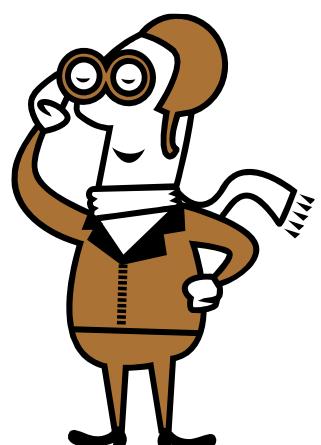
On the HSD (*normally right MFD in Nav Mode*), the AIFF is active as well and will display friendly interrogated returns based on the CPL and DCPL in the FCR (See Figure 4).

If you do not want the AIFF to display, on the HSD, press CNTL (OSB 5) and then OSB 3. This turns AIFF On/Off.



To return either or both MFDs then back to normal hit the CNTL (OSB 5) on each again.

NOTE → IF the A/C does NOT possess an IFF System, IFF operations will NOT be available in that particular aircraft...



RWR Symbology



With FF5, the Virtual Pilot will need to recognize some new RWR Symbology. This Section will teach you all that you need to know.

In the following tables, you will find both the vehicle name, and the symbol with which it is represented on the RWR display.

2S6, K-30, M163		A
A-4	- <i>All Variants</i>	B
A-5, Q5D		Chevron
A-50		S
A-6E, KA-6D		6
A-7D/E		7
AA-12, MICA EM, PL-12		M
AA-9		M
AH64, AH66, KA3B,		H
AIM-120 C-5		M
AIM-120 C-7		M
AIM-120B Rb-99		M
AIM-54A & C		M
AJS-37		37
AMX		X
AV8A+B, Harrier GR9, Sea Harrier		8
B-1		B
B-2A		B
B-52's		B
Barlock B		5
Bill board, High Screen, SA-12		S
Buccaneer		Chevron
CF18, F18C, D, E, F		18
Crotal NG, Crotal Radar		C
E2C P3, S3B,		S
E3		S
E-8, RC=135		S
EA-6B		6
EF-111, 111F		111
EuroFighter, Typhoon F2		E
EW Radar,		S
F/A-18 A, E & F		18
F-100D		100
F-102A*		102
F-104J, RA-5C		104
F-105D, 105G		105
F-14	- <i>All Variants</i>	14
F-15	- <i>All Variants</i>	15
F-16	- <i>All Variants</i>	16
F-22		22
F-35		35
F-4 Phantom	- <i>All Variants</i>	4

F-5A, 5E, RF5E	5
F-8E	8
Fan SongB SA-2	2
Fire Can 20mm Phalanx	A
Fire Control	S
Flap Lid, Tomb Stone	10
Flat Face SA-3	S
H6a	6
HQ-17, SA-15	15
HQ-7	9
J-10	10
J-11, SU-27, 27UB	27
J-35 Draken	35
J-5, MiG17PF	17
J-7B, 21F13, 21MF, 21PF	21
J-7E, J-7PG, Mig-21/93, Mig-21bis	21
J-8B	8
JA-37	37
Jaguar GR3	J
JAS-39A	39
JSDF F-1	1
JSDF F-2	16
KFIR	K
Long Tack SA-6, SA-8	L
Low Blow SA-3	3
M1992, S-60, 95SPAAG ZSU-23/23-4	A
MiG - 23BN, 23ML	23
MiG-19, J-6	19
MiG25	25
MiG-27	27
MiG29	- <i>All Variants</i> 29
Mig31	31
Mirage	- <i>All Variants</i> M
MPQ-46/48	H
MSQ-104, Patriot ADS	P
Naval	BOAT
Naval Ships	BOAT
Nike	N
Pat Hand SA-6, SA-4, SA-8	P
Rafale	- <i>All Variants</i> R
Roland Man, Marder, Gepard	R
SA 13	13

SA-17, Snowdrift, Spoon Rest	17
SA-8	8
SA-9	9
Square Pair SA-5	5
SR71	71
Straight Flush	6
Straight Flush SA-6	6
SU-15	15
SU-17M4	17
SU-24M	24
SU-25	25
SU-30M, MKK, MKK2	30
SU-33	33
SU-35	35
SU-39	39
SU-7	7
SU-9	9
Super Etandard	S
Thin Skin	S
Tornado	- All Variants
TU-160	T
TU-22M3	B
TU-95, 95MS	B



GPS MUNITIONS “STEP”

FF5.0 sees the addition of a small, but significant improvement to the deployment of GPS ordnance.

You will notice that the SMS MFD of GPS Guided Weapons has an additional button (OSB #20).

A label will appear showing “AUTO STEP” or “MANUAL STEP”.

Whilst in GPS Weapons PB Mode, and whilst releasing MORE than one (1) bomb simultaneously (*one pickle = multiple bombs*), this new button (OSB #20) will determine if EACH bomb will guide to it’s OWN, individual target (*as has been the default and unchangeable case until now*), or if ALL rippled bombs will guide to a SINGLE target.

“AUTO STEP” → Each bomb will guide to an individual target.

“MANUAL STEP” → All bombs will guide to a single target.

“MANUAL STEP” is very helpful for important targets (*such as runways and large structures*), which often require MORE than one bomb.



GPS DEPLOYMENT

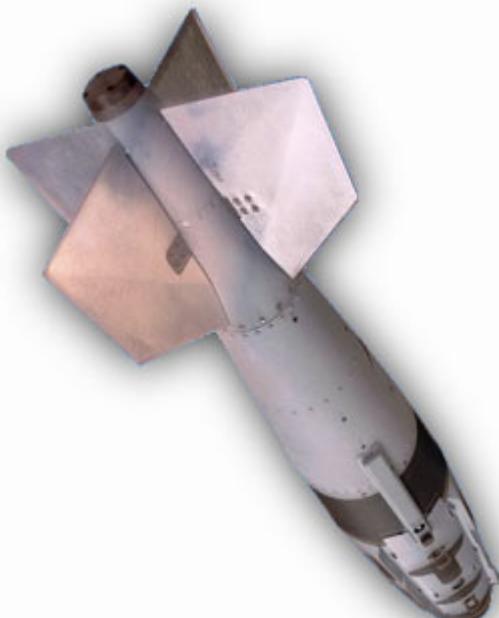
FreeFalcon5 features some changes to the use of GPS type weapons compared to the previous version (FF4).

DISCLAIMER: While these changes are exciting and add functionality to Falcon 4.0™, please be aware that they are a Work In Progress. We would ask your understanding of this, and your acceptance of the current limitations of development in this area. Naturally, if you feel the implementation of these weapons is not “realistic” enough for your tastes, you may simply elect not to use them at this time.

The following tutorial is designed to show you how to properly target and deploy JDAMs and JSOWs in FreeFalcon5. Both JDAMs and JSOWs are GPS guided munitions and is designed to be used only to target **stationary** targets. These weapons are **Not** designed to be used for attacking moving targets.

Both weapons operate in two (2) basic modes:

PB (Pre-briefed targets): PB targets are those targets that have their GPS coordinates pre-loaded into the FCC and are then transmitted to the bomb by selecting the relative target from the scrolling target list in the MFD.



TOO (Targets of opportunity): TOO is used when targeting something that is not a PB target and requires the use of the GM radar in CCRP mode ore a “Targeting pod” (TGP) in order to successfully reset the GPS coordinates on the weapons for a new target.

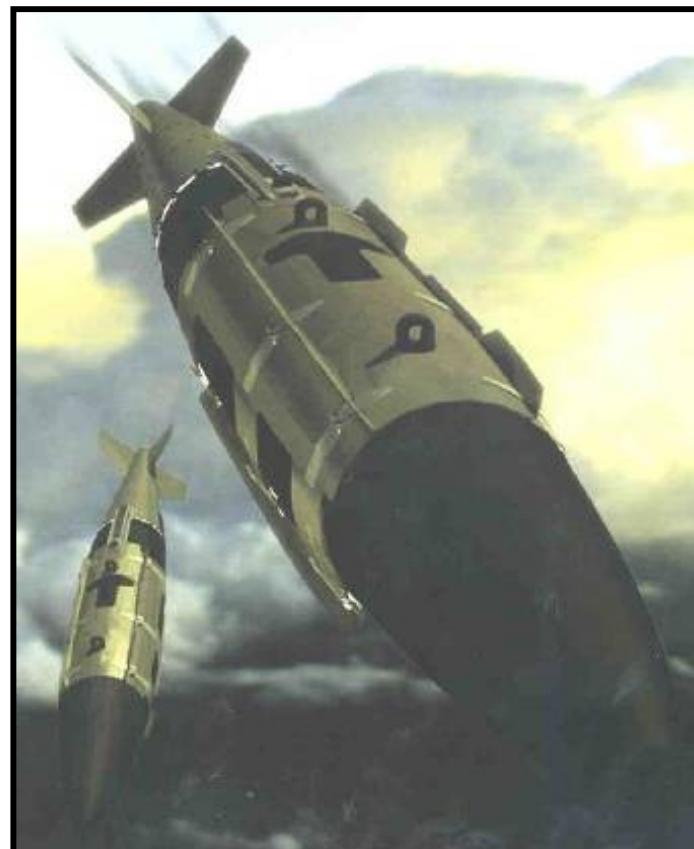
While the delivery methods of each weapon differ in some aspects, the targeting functions are the same. As long as they remember some of the basic rules of GPS deployment, Virtual Pilots will be able to enjoy this upgrade to Falcon 4.0™ and integrate these weapons into their mission loadouts.

JDAMs (GBU-31/32/34/35/38):

JDAMs are regular Mk series dumb bombs with GPS/INS guidance kits attached. They do not have any type of propulsion systems and are therefore – due to being free fall weapons - limited in range. Just like regular dumb bombs, JDAMs dropped at lower altitudes will have lower ranges than those dropped at higher altitudes. **The maximum range of any JDAM when dropped in level flight at cruise altitude should be around 5 to 8 NM from the target.** Under some conditions and altitudes, ranges can be extended, especially if the bomb is lofted during release.

Note: Ground units such as air defense units will not allow you to “target step” if you have chosen to use JDAMs for strikes against ground units.

CCRP: CCRP gives the pilot the necessary bombing range and delivery cues required to tell if the target is within range of the JDAM. Since JDAMs are free fall bombs, they will have similar ranges as LGBs or regular dumb bombs. You will still have to fly the standard CCRP delivery profile in order to get the JDAMs to release.



JSOW (AGM-154-A/C):

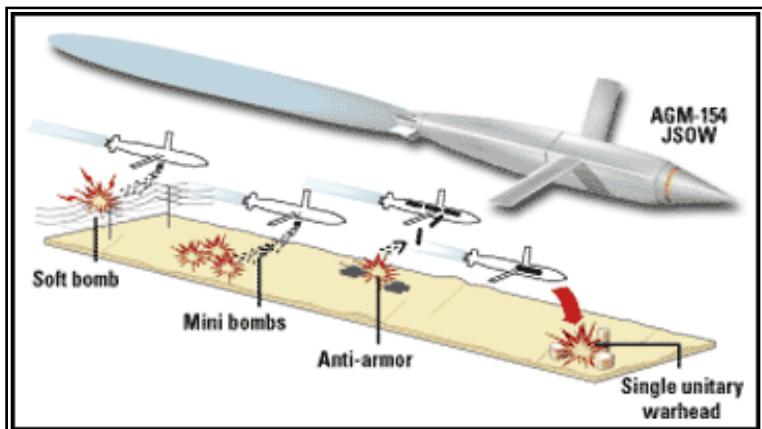
JSOWs currently come in two different types: CBU dispensers and Penetration type bombs. The AGM-154 JSOW is a gliding bomb munitions dispenser, designed to allow the launching aircraft to strike from long distances against PB targets or TOO in high threat areas.

- The **AGM-154A** is a CBU type gliding bomb cluster munitions dispenser, designed to primarily provide an economical way to strike air defenses beyond their threat ranges. The F-16CJ was the first operational and primary user of this weapon, although several other types of aircraft are able to carry it as well. JSOW-As are not recommended for use against hard targets and will likely produce only minimal damage to non-vehicle targets.
- The **AGM-154C** is a penetration type version designed to allow the launching aircraft to strike from long distances against PB targets or TOO in high threat areas. The USN F/A-18 fleet is the primary user of this variant.
- The **AFDS**, which is used by several European aircraft and the **Bombkapsel m/90 (Mjolner)** used by SAAB aircraft, are similar to the JSOW-A. They are gliding bomblet dispensers with GPS guidance for use against soft targets like vehicles and air defense sites. They also are likely to have a shorter range than JSOWs.

Developer Notes on JSOWs:

The operation and deployment of JSOWs depicted in this patch is considered a “Work In Progress”. They are in no way considered “complete”. While the ordnance functions in a similar way to the real weapons, realistic HUD and MFD symbology is not implemented. This is due to the lack availability of real-world information at the time of development. Additionally - in order to get the bombs to glide realistic distances - the flight profiles of JSOWs are not considered realistic. Should they chose to view the bomb during it's flight path (we recommend staying in the pit), pilots will likely notice some odd behavior.. Much of this will depend on altitude, release angle, speed of aircraft and range to target. In most cases, the JSOW will tend fly up to the target at high altitude, then make a slow turn down for its final descent.

For best results, it is recommended that pilots release JSOWs in level flight while at 25k' AGL for targets 30NM away or less. For targets from 30 NM to 50 NM in distance, a **nose pitch of 10-15 degrees** in the HUD is recommended upon release. This will provide some lofting of the weapon and should help it reach the target.



Please note that higher pitch angles will likely give unrealistic flight profiles for the JSOW. Tipping the nose down or up may cause the bomb to fall short or loft into an unwanted flight profile since the AoA of the aircraft basically is used to aim the JSOW during its flight.



As always, should the virtual pilot find the realism attributes of the JSOW to be less than satisfying, they may simply elect to not use the weapon, and substitute it with alternate ordnance..

QUICK START / BASIC RULES:

A new feature in FF5 is that the “Laser/Targeting Pod” is present using GPS guided bombs. There are two ways of using it:

- Use it to monitor and visually confirm mission success (great feature).
- Use it to confirm and designate targets in **TOO** mode.

The Only release-mode available for JDAM/JSOW bombs is **CCRP**. It is automatically activated when the bomb/s is powered up.

All modes and “tactics” described in this guide are valid for both JDAM and JSOW bombs.

AUTO STEP – PB mode:

In this “automated” mode, all you have to do is select your primary target on the JDAM/JSOW SMS page on the right MFD. The targeting systems then assign targets in an ascending order, matching the number of bombs your AC carries.

This means that **only one bomb is assigned to each target**, regardless of if pickled in pair or in single/pair ripple.

Choose your primary target.

Power up the bombs, and the CCRP will show you when to pickle.

MAN(manual) STEP – PB mode:

In this mode **all** bombs pickled will seek the target you have chosen on the JDAM/JSOW SMS page on the right MFD. This mode is a very useful targeting “hard” targets that need **more than one bomb to be destroyed**.

This is a “Single target” mode meaning that it is **not possible to assign several targets in one pass**.

Choose your target.

Power up the bomb/s, and the CCRP will show you when to pickle.

Note 1. AUTO STEP – PB + MAN STEP – PB mode:

The “laser pod” TGP page is used **Only** to watch bombs impact.

Never assign anything with TGP in these two modes.

Note 2. AUTO STEP – PB mode:

The TGP and/or AG radar will “Auto-lock” a target at target waypoint when the bombs are powered up. This **will not affect** your chosen target priority or hit success in any way.

TOO mode: (**MAN STEP**)

In this mode, one is free to assign any desired target, as long as it's a stationary target. Use the AG (GM) radar in DBS-1/2 mode ore the “Laser Pod” TGP page to assign targets. Also - in this mode - all bombs pickled will hit the assigned target, but this is also a “Multiple targets” mode, meaning that it is possible to assign and pickle at several targets in one pass, using TGP or GM radar as SOI.



← This image shows the JDAM/JSOW SMS Page in **AUTO-STEP PB** mode.

In the image above, the OSB functions and Status Information are as follows:

1. Auto/Manual Step-selector + Status
2. Master-Arm Status (On)
3. PB/TOO Selector + Status
4. GPS Bomb “Power” switch + Status (On)
5. PB Primary Target-site Name (TGT)
6. Designated Objective GPS Target (OBJ)
7. RNG to Target in NM
8. TGT Selector Switch-Up
9. TGT Selector Switch-Down

These following three images show JDAM/JSOW MFDs using **TOO mode**:

AG Radar in GM DBS-2 mode



TGP Page, Not SOI



GPS SMS page in TOO mode



AG: Air to Ground

GM: Ground Map

SMS: Stores Management System

SOI: Sensor Of Interest (*active sensor*)

JDAM/JSOWS IN TOO (TARGET OF OPPORTUNITY) MODE DELIVERY:

There are two ways to designate targets in this mode →

Using the Laser/Sniper pod (TGP)

&

Using AG radar (GM) in DBS-2 mode

Using the Laser/Sniper pod (TGP).

The method is very similar to that used for LGBs, but with one major difference: The laser function is not used. This means that you are not able to change the target for “flying” bombs, by moving the TGP cross after the bombs are released. In other words, the flying bombs will hit the point on the ground at which the TGP cross was pointing, **at the instant the bombs were released.**

However, as stated earlier, after one has released the first bomb/s at the primary target, one may move the TGP/Radar cross to the next target, and release again (if one has remaining ordnance). The time available to choose targets spans from approximately 3 to 8 sec in one pass (JDAMS) (*depending on speed, altitude and release angels*). Also, one need not be aligned 100%, when releasing, as the JDAM bomb/s steer themselves to target when launched within reasonable parameters.

PROCEDURE:

Passing IP waypoint:

- * Activate target waypoint.
- * Activate AG mode (ICP).
- * On right MFD SMS page - choose TOO mode
- * Configure single/pairs etc.
- * Power up the bomb/s.
- * Master Arm – “On”.
- * Switch to TGP page on right MFD and activate (AG mode).
- * Zoom TGP as desired.
- * The TGP cross is now over target area.
- * Lock up a building and unlock again.
- * The TGP is now in “Area” mode, and SOI.
- * Sleeve the TGP cross over desired target and line up for drop.
- * Locking up the target or just using “Area” mode is optional.

Using AG radar (GM) in DBS-2 mode.

If the weather conditions make the use of Laser/Sniper pod impossible, AG radar (GM) in DBS-2 mode may be used in TOO mode. This method requires a little more planning on the RAMP. The target area must be properly reconnoitred and memorised. Aspects such as “size”, “shape” and “placement” of buildings, are important. This is because the DBS-2 radar mode only shows shape, size and placement of buildings in relation to each other.

PROCEDURE:

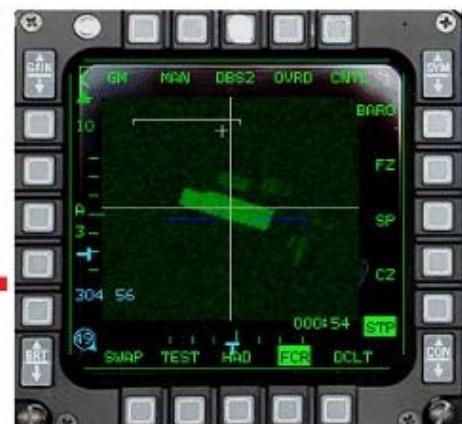
Passing IP waypoint:

- * Activate TGT waypoint.
- * Activate AG mode (ICP).
- * On right MFDs SMS page - TOO mode
- * Configure single/pairs etc.
- * Power up the bomb/s.
- * Master Arm – “On”
- * Press the “NORM” button on left MFD (AG radar) 3 times to enter DBS-2 mode.
- * The radar cross is now over target area
- * The radar cross is now SOI.
- * Sleeve the DBS-2 radar cross over desired target and line up for drop.
- * It is best to NOT lock up the target using this method.

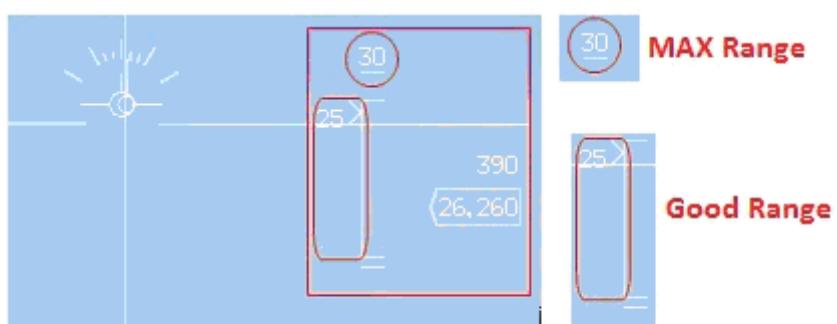


Sensors to watch:

Note: This HUD image below only applies to JDAM usage.



When the caret inside the red circle reaches the point of the red arrow, press & hold the Pickle button.



HUD section using JSOW

Pickle when release caret reaches “Good Range”.

JDAM/JSOWS IN PB (PRE BRIEFED) MODE DELIVERY:

AUTO-STEP mode:

A straight forward and relatively easy mode for deploying JDAM+JSOW(C) bombs. As described in the quick guide, this mode is used to attack multiple PB targets with multiple bombs in one pass.

PROCEDURE:

Passing IP waypoint:

- * Activate TGT waypoint.
 - * Activate AG mode (ICP).
 - * On right MFDs SMS page, check if “Auto-Step” mode (default) is activated
 - * Configure single/pair etc.
 - * Now choose your primary target, list up or down by using OSB 16 or OSB 17.
 - * Power up the bomb/s
 - * Switch Masterarm On.
- * Now you have two options:
- 1 - Use the TGP to watch the impact → *Switch to TGP page on right MFD. Zoom TGP as desired. Don't touch anything on any MFD after this until bombs are off. The safest way to use TGP in this mode is to activate it after the bombs are off.*
 - 2 - Leave the SMS Page active on the Right MFD

Either way, the bombs will hit the target.

MANUAL-STEP mode:

As explain in the quick guide, this mode is used if you want to bomb one single target in one pass. All bombs released, will hit the chosen target.

PROCEDURE:

Passing IP waypoint:

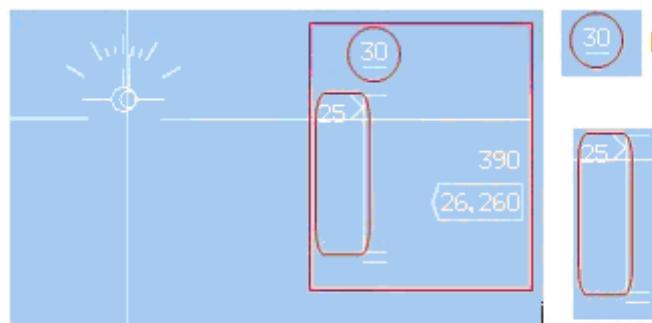
- * Switch to TGT waypoint.
 - * Activate AG mode (ICP).
 - * On right MFDs SMS page, Choose “Manual-Step” mode
 - * Configure single/pair etc.
 - * Choose your target, list up or down by using OSB 16 or OSB 17.
 - * Power up the bomb/s
 - * Switch Masterarm On.
- * Now you have the same option as in “AUTO-PB” mode to use TGP to watch and (*hopefully*) confirm mission success.

Sensors to watch:

Note: This HUD image below only applies to JDAM usage.



Optional



HUD section using JSOW

Pickle when release caret reaches “good range”.

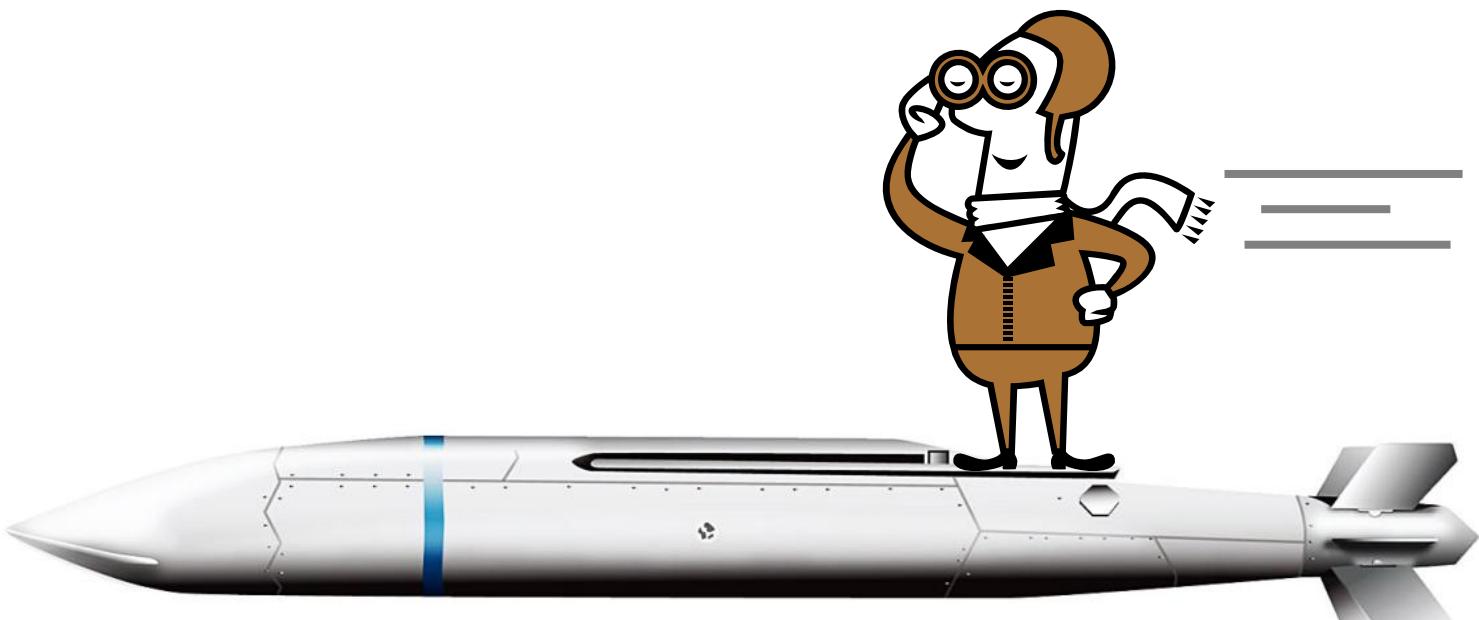
Some Final Notes:

You need to understand the difference between "units" and "objectives". The target list is derived from the objectives, and is comprised of features. Units do not have a target list since they do not have any features. They only have vehicles. So if you target a unit using PB, you **will not** have a target list and if you target an objective using TOO → **No list**.

The only time you get a target list is when you have placed a "strike" or "bomb" waypoint over an **objective** and select the objective, which is how you get PB. Or you fly a strike mission in a Cam or TE. Then the individual features in that objective are placed on the target list.



If this cue appears, switch up/down and back again using TGT-Step OSBs to make it disappear. It's a temporarily "lost" feature.



"Pre target" GPS Guided JDAM Level Bomb Run

A short tutorial, with The Norwegian¹

1st . Make a simple TE with no distractions.

2nd . Include an F-16 C+ and a target.

(For this tutorial, I've chosen the "Wonsan Machine Tools - Factory Complex" as my target.)

3rd . Arm yourself with 2 x GBU-31 GP.

AG mode engaged, and Master Arm - On.

Level at 24,800 feet, and pushing throttle to 100%(military) thrust to gain speed.

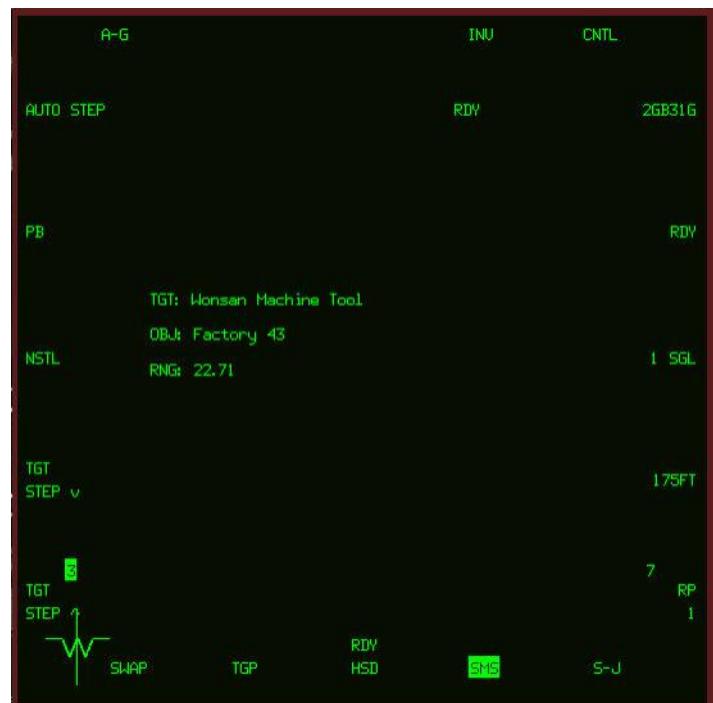
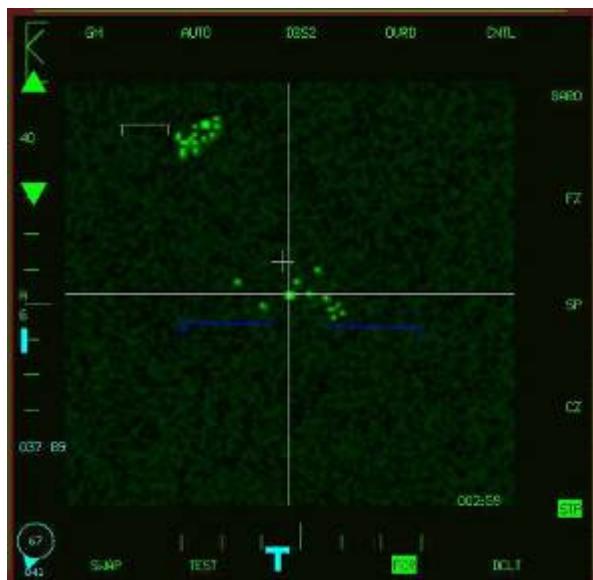


The use of AG (GM) radar (DBS2) and/or TGP is the Pilot's personal choice in this "GPS" guided bomb run. But DON'T lock anything up, with the AG (GM) radar, or the TGP...! That will set the release mode to "TOO", and BOTH bombs will hit the bugged target and NOT the pre-planned ones...!

¹ Written to allow Ara' and Molni to be able to hit something with JDAMS ;) - The Norwegian

I'll explain the use of AG radar-TGP in TOO mode in a later tutorial.

Engage the Target Waypoint.



I've chosen "factory 21" with the "target step up" (up caret) OSB as my first target on the AG SMS page. I've also selected to drop in pairs. This means that bomb-1 will hit "factory 21" and the second will automatically target the next building on the "target step" up list.



← Power up the bombs.

The bombs are now powered up and navigation data for each bombs target is stored in the bombs.

The CCRP targeting HUD symbols are now showing on the HUD.



I'm still 21 miles out and choose to activate the TGP system simply to watch the impact and confirm the hits...



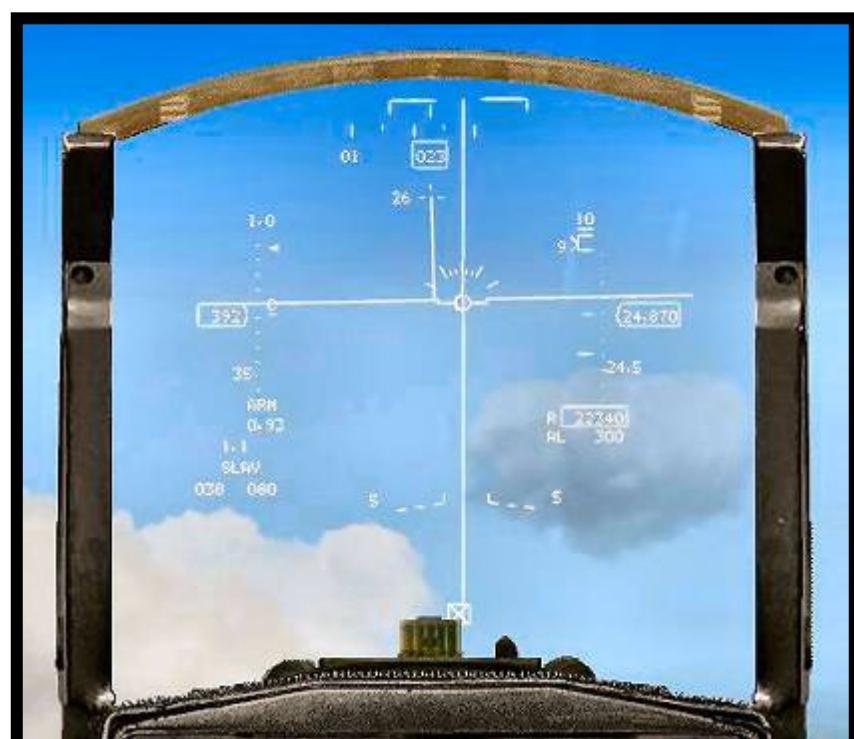
Again – **DO NOT** lock up anything with the TGP...!

9 miles to target →

The release caret is closing on the bottom of the “Launch” zone symbol in the HUD.

Press and hold the pickle button until bombs Release

(6 to 8 miles out depending on speed).



If you've followed my instructions carefully...



...you'll see **this** on your TGP screen...



Skåle

JSOW TACREF

The Joint Standoff Weapon or JSOW is a highly lethal, low cost glide weapon developed by Raytheon (formerly Texas Instruments) for the USAF and the US Navy. Its intended use is against a variety of land and sea targets with launch well outside point defense range, due to the weapon's standoff capability. The JSOW is a "launch and leave" day/night capable weapon, and is also able to be deployed in adverse weather.

The JSOW is capable of flying a preplanned route to the target using terrain masking. If the preplanned launch point can't be reached, the pilot may still release the weapon (*if the target is within launch parameters*) and let the JSOW determine its own flight plan.

The first use of the JSOW in combat occurred in 1999 against Iraqi air-defense sites. This was enacted by the USS Carl Winson's air wing. The results exceeded expectations and helped to accelerate efforts to get the JSOW into full production.

AIRCRAFT	VEHICLES	MUNITIONS
<p>AGM-154 JSOW</p> <ul style="list-style-type: none">+ General Information+ Performance+ Dimensions+ Warheads <p>- PLATFORMS</p> <p>B-2A</p> <p>F-15E</p> <p>F/A-18C</p> <p>F/A-18D</p> <p>JSDF F-2</p>	  	<p>MUNITIONS</p> <p>The Joint Standoff Weapon or JSOW is a highly lethal, low cost glide weapon developed by Raytheon (formerly Texas Instruments) for the USAF and the US Navy. Its intended use is against a variety of land and sea targets with launch well outside point defense range, due to the weapon's standoff capability. The JSOW is a "launch and leave" day/night capable weapon, and is also able to be deployed in adverse weather.</p> <p>The JSOW is capable of flying a preplanned route to the target using terrain masking. If the preplanned launch point can't be reached, the pilot may still release the weapon (<i>if the target is within launch parameters</i>) and let the JSOW determine its own flight plan.</p> <h2>TACREF</h2>

RESCUE

A-A MISSILES

A-G MISSILES

ARMS

BOMBS

STORES

SURFACE

A NOTE ON BUBBLES

The “Bubble Distance” (*which determines when an Object is rendered/exists within the 3D World*) needs to be considered when using Long-Range weapons.

Obviously, if an object is not being rendered within the 3D World, then - it does not actually exist within the 3D World. Thus - something which does not exist cannot be “destroyed”. The “Bubble” is centered around your aircraft. Thus - keeping something within proximity to your A/C, effectively forces it to be rendered (or exist). It is important to not turn away from a target after GPS-Ordnance release, and fly to a distance at which the target is “outside of the Bubble”. It will cease to exist, and your weapon will hit nothing.

This is probably a good thing, otherwise we would simply climb to 30k’, release the weapon from 50 miles out, turn around and go home. Not exactly the level of “excitement” or “fun” which we attempt to generate through our simming.

After releasing Long-Range ordnance, make sure you do not get further away than the following distance, BEFORE your target is destroyed:

GROUND TARGETS → 45nm (*40nm for safety*)

By following this guideline, you should avoid any nasty surprises during debrief.



HARM TARGETING

With Yoni

HARM (or ARM) targeting has been improved in FreeFalcon 5.0.

This article will explain – in detail – these new procedures.

ARM missile SMS page

The SMS page for ARMs now looks similar to that of other AGMs (*like the Maverick*).

A “Power” mode has been added, so ARM missiles must be **Powered On** before firing.

Pressing OSB #8 for BIT (*Built In Test*) will cause the “BIT” text to flash, simulating a BIT test. Be advised that – at this stage – this feature is N.I. (*not implemented*).

NOTE → ENSURE that missiles are “powered on”, before trying to fire!



ARM delivery modes

There are basically three (3) different modes to fire ARMs (*Anti Radiation Missiles*).

The 3 modes are:

1. **HAS** – HARM As Sensor mode
2. **POS** – Position Known mode (*Basically a pre-briefed mode*)
3. **HTS** – Accessed now via the HAD (*HARM Attack Display*) mode page.

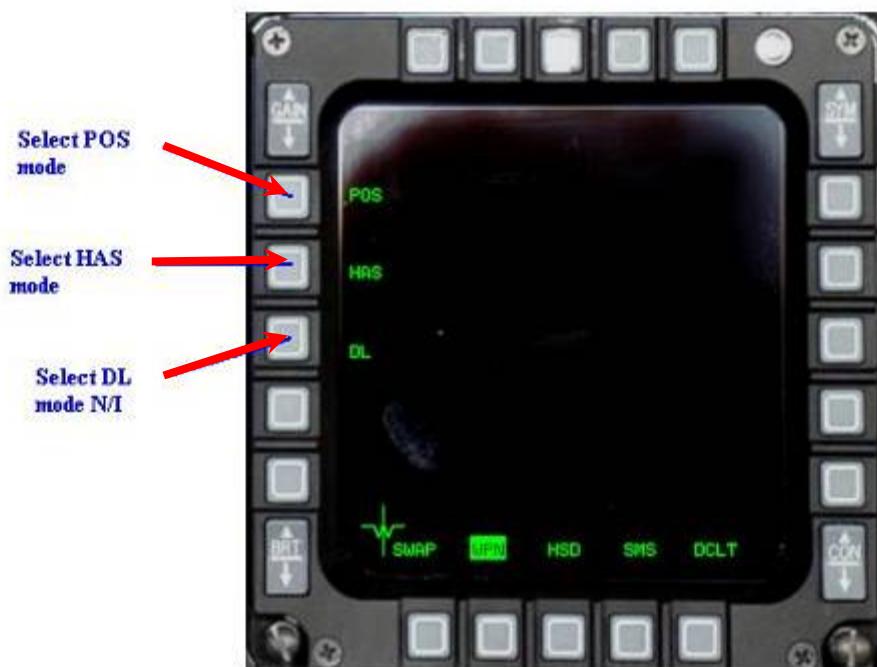
Note → The 3 modes are based on the AGM-88 HARM, as it is the main F-16 ARM weapon. Some modes will be available only when some conditions are fulfilled. There are many ARM capable AC in FF5, and many types of ARMs. So some missiles and AC combos have varying ability, regarding firing modes etc.

Note → Availability of the different modes is dependent on AC/Missile capabilities! Only HTS pod carrying AC may use the HTS mode. Only advanced ARM missiles have the ability to use the POS (*which is a pre-briefed mode*) mode.

Note → HAS and POS modes are both on the WPN MFD page. Also, as the sensor is the missile itself (*along with the system in the pylon*), both depend on ARM weapon availability. HTS HAD mode is on the HAD MFD page. HTS mode is independent of weapon availability, as it's using a HTS pod as a sensor.

WPN MFD Page - Mode Choice Menu

When ARM weapon is selected, upon entering the WPN page on the MFD, one will see the Mode Choice Menu, displayed.



Choosing a mode will switch the system into that mode.

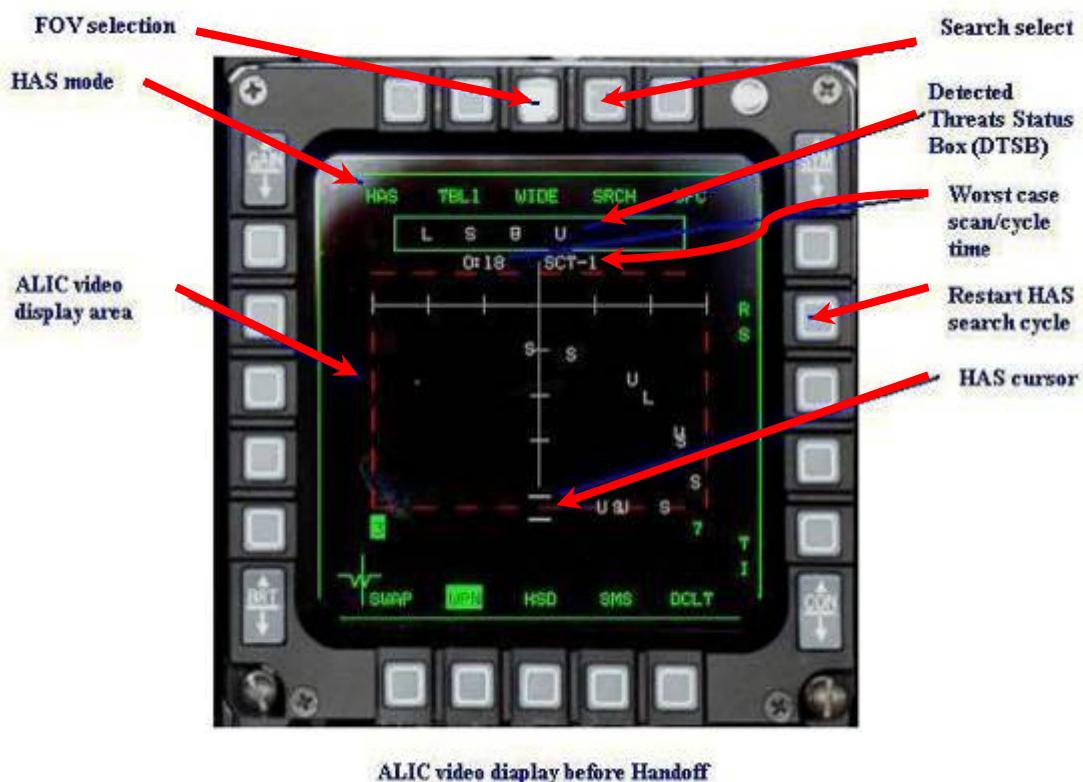
Note → *DL – Data Link mode is currently N.I.*

HAS Delivery Mode ²

HAS (*HARM As Sensor*) mode uses the HARM seeker video to locate threats.

HAS mode works under the MFD WPN page as it is a weapon-based system. Therefore, it only exists when there is an appropriate weapon on board which is selected as the current weapon.

HAS MFD page:



The Detected Threat Status Box (DTSB), Near the top of the MFD contains the threat types detected by the HARM seeker-head. Detected threats are displayed left to right (*up to 5 threats*).

- * After a threat Handoff, the detected threats remain displayed.
- * Threats are blanked from the DTSB when no longer detected.

ALIC (*Aircraft Launcher Interface Computer*) video of detected threats is displayed in the center of the HAS WPN page. The ALIC provides 2 video displays:

- * Display used for searching
- * Display used after Hand-off

The detected threats are displayed on the relative azimuth and elevation from the nose of the missile. When detected, the threats are displayed with an appropriate identification symbol. Detected threats are stationary with respect to the ground as the aircraft rolls and pitches.

Threats are displayed at the bottom line of the video when they go below the seeker-head FOV.

Please Note - When switching to HAS mode, SOI will not automatically pass to the WPN page. One must pass it manually, using DMS-down.

² The notes for this Section are taken from the *MLU Manual*...

Pressing **OSB #1** will switch the system back to the mode choosing menu

Pressing **OSB #3** for FOV selection will change the FOV of the display between Wide (WIDE), (which is the default view) and Center (CTR), which gives a “Zoomed” view of the display.³

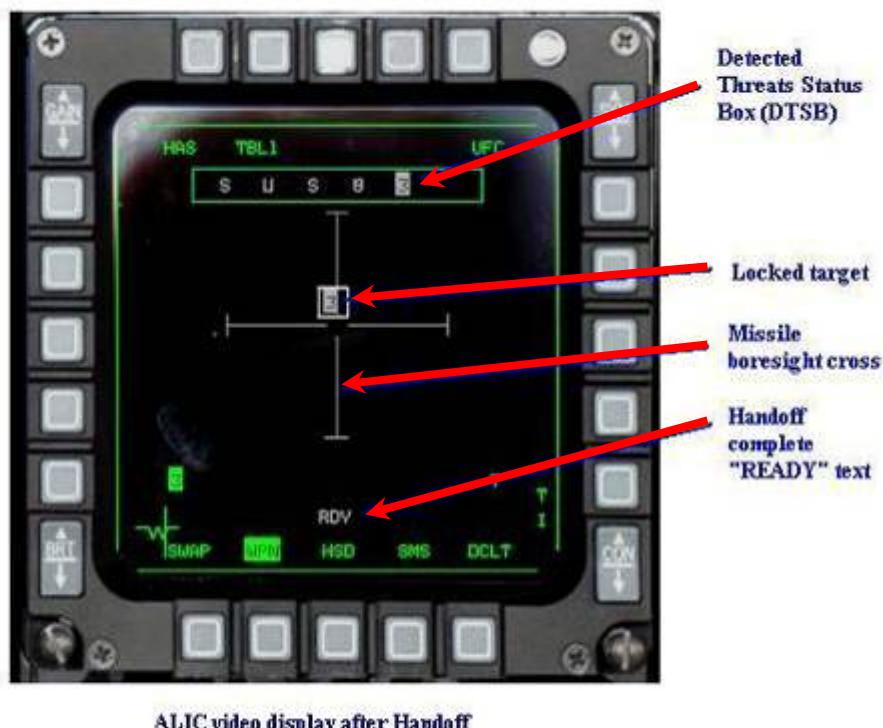
Pressing **OSB #4** will get you to the **Search Select Page**. More details about this page later.

HAS search mode takes time to process all detected threats, and display them. This results in threats NOT being shown instantly on the display, but having a DELAY before showing up. The length of the delay, depends on how many threats there are. So – an evaluation of the worst scan time will be displayed just above the ALIC display.

Pressing **OSB #7** will restart the scan cycle, and blank previously displayed threats.

After a threat is Handed-off to the missile, the display changes to represent the missile boresight, and the threat video responds to aircraft roll, pitch, and azimuth changes.

“RDY” is displayed after the Handoff is complete. If the threat leaves the missile FOV, the Hand-off is dropped; the ALIC returns to the search mode; and, the display reverts back to the PRE-Hand-off format. While in Hand-off mode, the other detected threat types are blanked from the display (*but still show up in DTSB*).

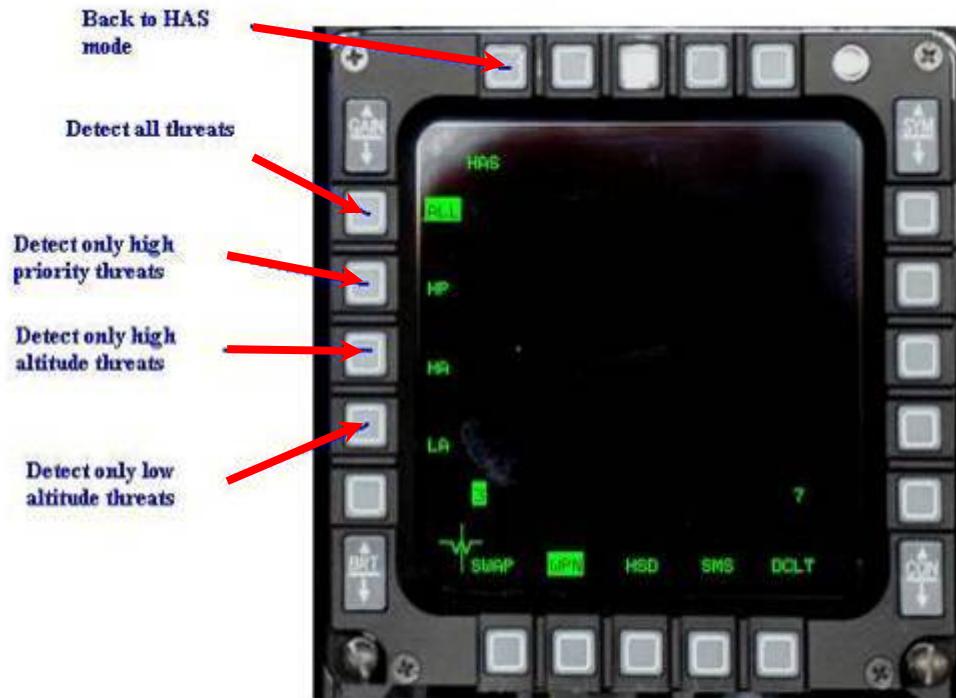


NOTE → Releasing a missile in HAS mode **before** the Handoff is complete (*you can judge this, by the “RDY” text at screen’s bottom*) will cause the missile to miss...!!

³ In the real system there are also Right and Left zoom modes which aren’t implemented at this stage.

While in HAS search mode there is now an option to filter out the threat-types which will be detected by the system.

Pressing **OSB #4** while in the HAS search mode will get you to the **Search Select Page**:



HAS Search Select page

There are 4 filtering choices

1. ALL – All threats will be detected (*default*)
2. HP – High Priority – Only high priority threats will be detected. Basically, only SAMs and AAA radars.
3. HA – High Altitude – Only high altitude threats will be detected. Basically, only the high altitude SAMs radars.
4. LA – Low Altitude – Only low altitude threats will be detected. Basically, only small and low altitude SAMs radars, and AAA radars.

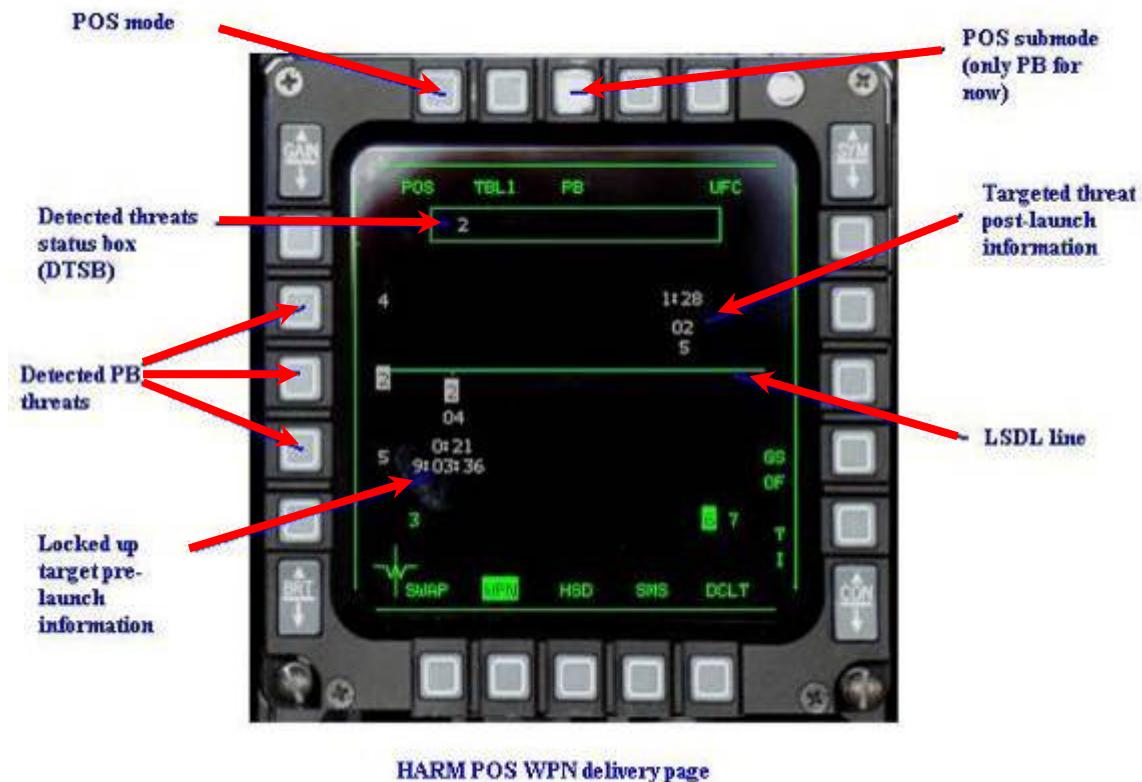
Pressing one of the **OSBs 17-20** will assign the selected filtering mode and will get the display back to the HAS search page. Assigning different filtering modes, may also affect search times, as there may be less threats processed. Pressing **OSB #1** will take you back to the HAS search page without changing the selected threats filtering mode.

Developer's Note → *The Real-Life system does not work this way. However, the idea is basically the same. The real system detects threats based on pre-defined threat tables. Such an option is not implemented, at this time, so the threats are detected by their corresponding symbols, and the filtering process works as noted above. The real system has the pre-defined threats assigned to OSBs, and each may be selected by pressing the corresponding OSB.*

POS delivery mode

In the POS mode, the aircraft attitude and target position are passed to the missile. After launch, the missile flies to the location of the target, based on those exact coordinates.

Note – *POS mode in the real system has 3 sub-modes (or flight profiles): EOM (Equation Of Motion), RUK (Range Unknown) and PB (Pre Briefed). Currently only PB mode is implemented.*



Display information⁴ →

The Detected Threats Status Box (*DTSB*) is just below the top line of text, and contains the threat that is Handed-off when detected by the missile. When deselected, the threat is blanked from the *DTSB*.

The center of the HARM WPN page contains missile employment information. It is divided into two sections (Pre-launch + Post-Launch) by a Launch Status Divider Line (*LSDL*).

Pre-launch information is displayed below the *LSDL*, and directly above the selected missile station. Pre-launch information includes: The selected threat type; The selected threat position (steerpoint number); Missile estimated Time Of Flight (TOF) (*in mm:ss format*); Time On Target (TOT) (*in hh:mm:ss; 24 hour format*); and, missile loaded stations (*Selected station is highlighted*). The above data is displayed from top down.

Post-launch information is displayed above the *LSDL* line in reverse order (*bottom to top*). Post-launch includes: The threat type attacked; The threat location; and, estimated Time Until Impact (TUI). The TUI is displayed for five seconds after reaching zero (00:00). Post-launch data is retained and displayed until power is cycled or inventory is changed.

⁴ From the MLU Manual...

Some explanations on operating the POS mode in FreeFalcon 5.0 →

In the real system, pre-defined steerpoints are used as HARM POS steerpoints that might later be used as exact locations or reference locations for POS threats.

In FF - since the DTC, or similar system is not yet implemented - steerpoint position is used to allow pre-briefed launch. So this is what you should do in order to attack a pre-briefed radar threat:

1. Before flight, on the UI map, locate the threat (probably SAM radar etc) and note the coordinates.
2. Insert the coordinates via ICP buttons into one of the valid steerpoints (*do not use first, last or 2nd last steerpoints. The system doesn't use such steerpoints*)
3. Choose the ARM weapon which is POS capable (*not all are*) and navigate to the POS Page. Now, the pre-briefed threat symbol should show near one of the **17-20 OSBs**.
4. Click on the corresponding OSB in order to Handoff the threat to the missile, while Handoff, the corresponding symbol will be highlighted until the Handoff is complete, and pre-launch information will be displayed above the LSDL.
5. When Hand-off is complete (*make sure of that or the missile will miss*) and missile is in-range (*no HUD symbols, as yet...!*), one may fire the missile.
6. Note that a post-launch information data display is showing up above the LSDL line, and that the TUI timer is ticking down.

Note → POS mode allows you to target pre-briefed threats even before they emit any radar energy. At times, a great solution against tough SAM systems (*like the SA-10, etc*).



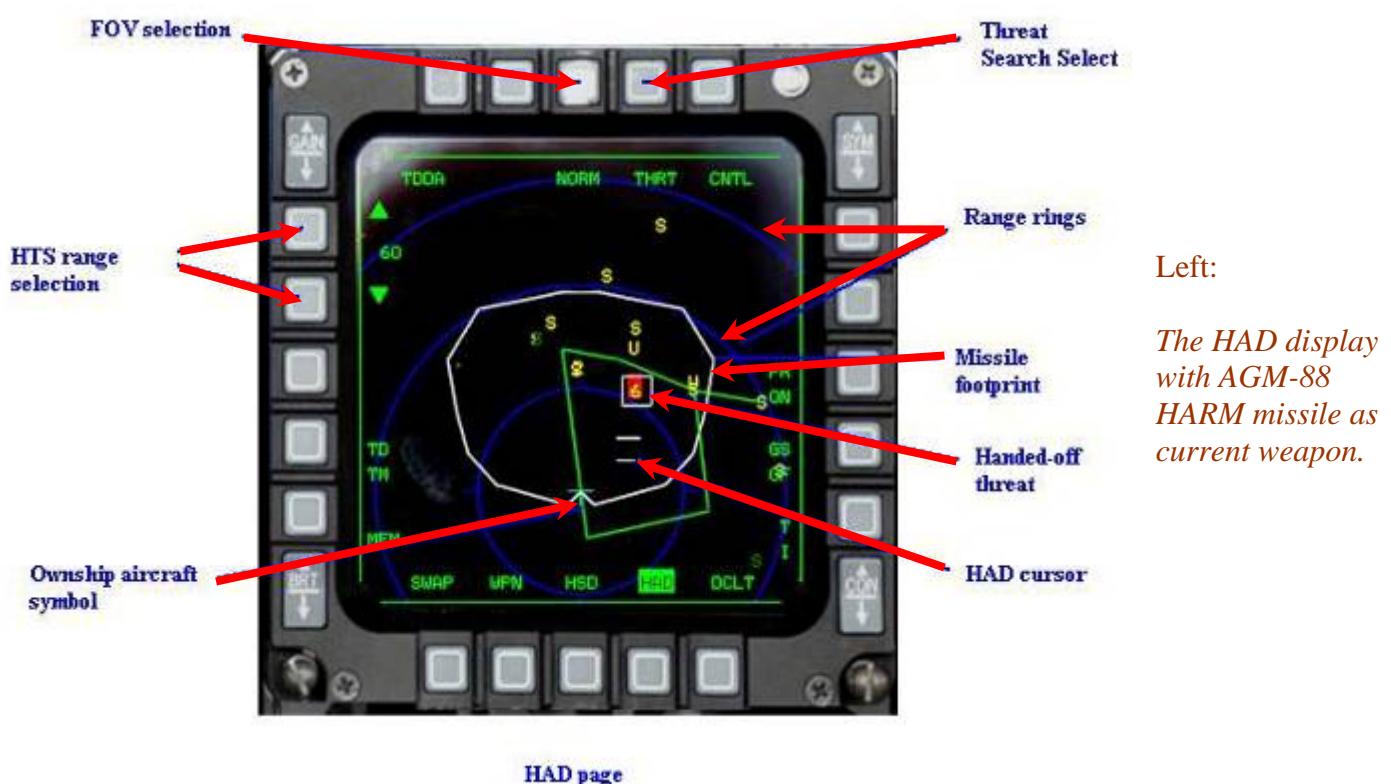
Developer's Note → Sometimes, even when this procedure is followed, and the coordinates are inserted to a valid steerpoint, the symbol might not show up at all stages of flight. *This might be related to Falcon's bubble*. Getting closer to the area of the threat should make it show up.

Developer's Note → While in POS mode (*and sometimes HAS mode*), **Tertiary table** on OSB #2, **UFC button** on OSB #5 for DED threat table access, **Geographic Specificity** (GS ON, GS OF) on OSB #9, and **Target Isolate** (TI) on OSB #10 are **NI (not implemented)**.

HTS Targeting

HTS targeting is available only for aircraft which have the option of carrying the HTS pod (*or equivalent system for non- F-16's*). The HTS display information is now available on a separate MFD page called **HAD** (HARM Attack Display). HAD mode is now part of the MFD main menu, and may be selected via **OSB #2**.

Note



Left:

The HAD display with AGM-88 HARM missile as current weapon.

Basically the improved HTS display works similar to the old display (*the one which was attached to the SMS page*), with some added features. FOV can be changed via OSB #3, stepping between “NORM”, “EXP1” and “EXP2”. The normal mode is a normalized display with the AC ownship marker at a fixed point and detected threats changing position accordingly, while EXP1 and EXP2 modes, “freeze” the display when selected, and allow a “Zoomed” view of the area selected by the cursor. Each zoom mode doubles up the zoom, in relation to the current selected range.

HAD range can be changed between 8 to 120NM and is now independent of HSD range. Displayed threats may be filtered by selecting the “THRT” button at OSB #4 which will get you to the Search Select page that is operated and read exactly the same way as for the HAS mode Search Select (*see above*).

The Missile footprint is based on current weapon Rmax range and will grow/shrink according to the aircraft’s flight properties (*speed, altitude, etc*) which affect missile Max-Range. The Cursor is moved around normally (*while HAD is the SOI*) and selects threats to be handed off to the missile.

Threats are now colored based on current state:

<i>Green</i>	<i>Non-emitting threat</i>
<i>Yellow</i>	<i>Emitting threat</i>
<i>Red</i>	<i>Tracking threat</i>
<i>Flashing Red</i>	<i>Launching threat</i>

EXP1 mode:



In the expanded mode, the display is “frozen” and the only thing that moves around might be the ownship marker and a possible moving threat. The Ownship marker will turn around as the aircraft is changing orientation towards the displayed threats.

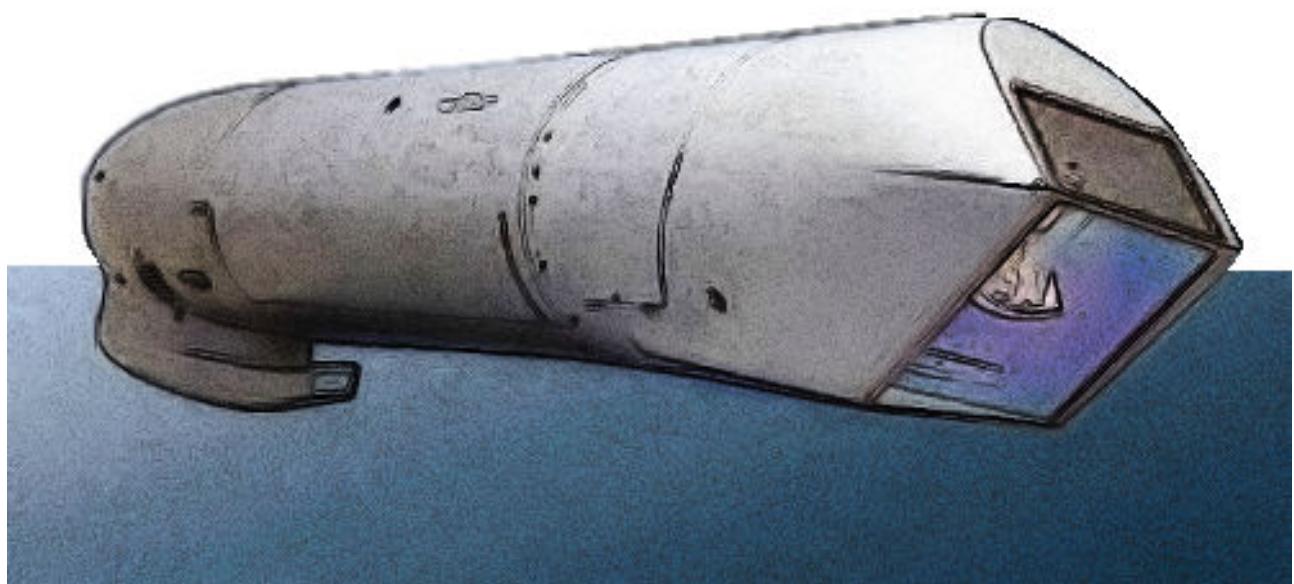
A NOTE ON ARM TARGETING

ARM targeting is possible using the missile's own sensor (located physically on the missile), or the dedicated sensor of the HTS pod (attached physically to the aircraft).

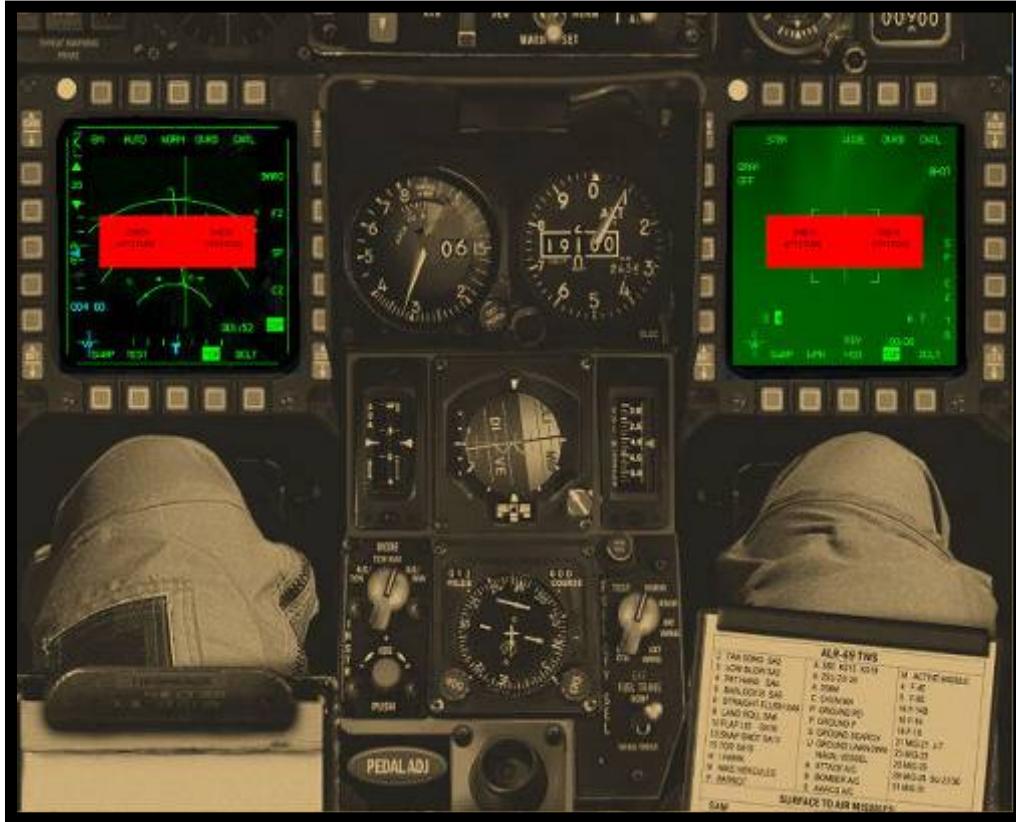
If the HTS pod is carried by the aircraft, you have the choice between HAS targeting (*using the missile sensor*) or HTS targeting (*using the pod attached to your AC*).

Due to the less sensitive nature of the missile's sensor, in HAS mode radar symbols will NOT show different states, like 'emitting', 'non-emitting', 'tracking', or 'launching'. Only the HTS pod is powerful enough to be able to discern this information.

So if the aircraft carries an HTS-pod, it may be advisable for the pilot to use HTS Targeting, in preference to the HAS Mode.



AAF



As per the MLU Manual, MFDs now feature an **Attitude Advisory Function (AAF)**

An attitude advisory is triggered when all of the following conditions exist:

- 1) TGP format is displayed
- 2) TGP mode is A-G
- 3) INS attitude data is valid
- 4) Aircraft exceeds any of these defined attitudes:
 - a) Bank > 75 deg; Pitch < 0 deg.
 - b) Pitch < -20 deg

When these conditions are met, a flashing rectangular box with the double set of words "CHECK ATTITUDE" (*see picture above*) is displayed on both MFDs.

The attitude advisory is disabled whenever one or more of the four conditions listed above no longer exist.

As per the MLU, the "Check Attitude" box default colour is red.

A NOTE ON GRayscale MFDs



In Real Life, both Green and Gray MFDs are present in the Viper. It largely depends on Block/Upgrades and Airforce.

In FF5, GRAYSCALE MFDs are selectable in both TGP and WPN modes. GRAYSCALE is also selectable with TFR.

So, if - for example - one were using Mavericks with a green display, one would simply press the "GRAY ON" OSB to change to Gray. Conversely, pushing the "GRAY OFF" OSB, would change from Grayscale to Green.



TWS

(Guiding On Multiple Threats)



Instructor: JAEGER_301

Tired of waiting until your missile goes “Pitbull”...?

There is a way to max out your resources with the AMRAAM and TWS.

Why Deploy ‘Track While Scan’ (TWS)...?

One of many problems with the early SARH missiles was that the radar had to be locked in the STT mode (Single Target Track), and – as a result – the pilot’s Situational Awareness (SA) was ruined.

As a solution to this breaking of the SA, both the TWS radar mode, and the AMRAAM missile ⁵ were developed. TWS is able to track multiple targets simultaneously, and can guide up to four (4) missiles to different targets at the same time.

To achieve this result, every missile in TWS has a specific ID for the target and the missile.

TWS allows the Pilot to launch missiles almost simultaneously against different targets, whilst also selecting the closest possible threats.

CAUTION → TWS locks onto the **closest possible threat ...!**

In order to be certain it is not a friendly aircraft, be sure to declare with AWACS.

Be aware, once you have bugged a target, the scan is limited to a 3 bar - / + 25 degrees cone.

⁵ Advanced Medium Range Air to Air Missile

Considerations of Deployment:

The following procedure works best against slow moving targets, like bombers or transporters. Due to the weaker Radar beam in TWS, it is likely that the radar lock will break more often.

This limitation means that the procedure below, is not recommended against agile targets.

Launching Missiles in TWS Mode:

FIRST:

- Change the Radar mode in your left MFD to TWS.
- Change your right MFD to SMS.
- One should now see the *ID1 symbology* in the right MFD



NEXT:

- Lock the target (*also know as “bugging” the target*)

There are two ways to ‘bug’ a target.

1. Slew the cursor over a track file and designate it.
2. *TMS + Right*⁶ to bug the closest tracked target.⁷

⁶ Keystroke = *Right Ctrl + Right Arrow*

⁷ Further *TMS + Right* will scroll through the available targets.
One may deselect a bugged target with *TMS + Down*

LAUNCH SEQUENCE:

1st Target

- Assign the first target with *TMS + Right* → ID is **ID1**
- Launch

2nd Target

- *TMS + Right* and select **ID2**
- Launch

3rd + 4th Targets

- After each launch, change the ID (up to **ID4**),
- For the 5th missile, click again on ID, and it will return to **ID1**.

Things to Avoid:

Do not launch the 1st missile in RWS and then switch to TWS before the first missile goes “pitbull”.

Do not hard-lock or STT when a missile in TWS mode is in flight.

The TWS ID is lost, and the missile will go “maddog”.

Do not launch several missiles with the same ID.

Every missile will go for the same target, even when you bug a different target with the radar.



A NOTE ON MADDOG

Shooting MADDOG...?

Be sure your Radar is set to BORESIGHT MODE.

Without it, your MADDOG will NOT find it's target...!



ROCKETS

with Snail

Rockets are back in FreeFalcon. Though it is a WWII weapon (as is the cannon) they are fun to use. Here is a guide to the Training Mission.

Training TE: # 23 rockets

Rockets are unguided. There is only a predicting HUD sight with a pipper, but this isn't accurate, due to the nature of this weapon. The more horizontal rockets are fired, the less accurate the pipper is. So nose down is the best way to use them.

Initial conditions: you start in the air, flying an AJS37 Viggen.

Your Viggen is loaded with 4 rocket pods, each containing 6 rockets. In FreeFalcon5 a rocket pod is fired totally when you pickle once; you can't select individual rockets to be fired. The pods can be fired single or in pairs. You are flying at 7,000 feet altitude, 390 kts, 15 miles from the target. The target is an airfield with "Bear" bombers present on the RAMP.

There is plenty of time to look around, and make the necessary preparations.

Procedure:

First choose Air-to-ground weapons by pushing the AG button on the Right Hand Panel. In the Radar Screen (MFD) you'll see the rockets available. You can choose between single or pairs.



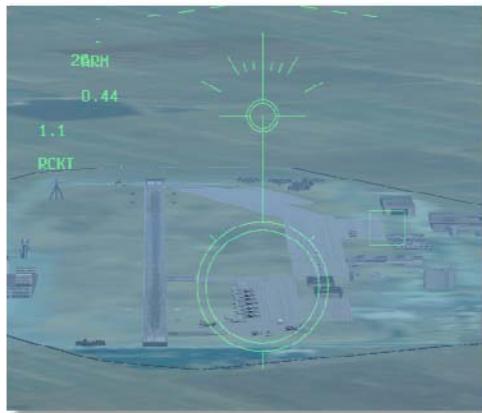
Centre MFD



The HUD in 2D view looks like above.

The airfield is in sight. The double circle is the rocket pipper. The inner circle becomes active when the ground is within reasonable range. As you get closer it disappears slowly; counter-clockwise.

Here are the parked TU95's →





Keep flying level until you are close to the airfield (*approx 3 miles; check it with Right DMS*).

You will probably have to maneuver a bit to get the target at the right spot.

When you are within range, the airfield is beyond your HUD sight; you need to enter a steep dive.

Dive. The airfield appears in the HUD and there is your target: nicely lined up. At this point you have little time to move your plane in the right direction. When the inner circle of the pipper has disappeared and the outer circle has got a 'hat' you are definitely in range. As you can see, the dive angle is approx. 30 degrees. Point the pipper at the closest aircraft and fire your rockets. They will probably hit some aircraft in the middle of the row.

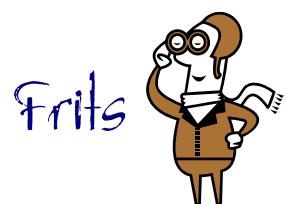


Where the rockets explode, depends on your dive angle and altitude. The steeper and lower you fly, the closer they will hit to the predicted impact point.

While you gain speed, pull your stick in time to avoid lawn-darting. Now maneuver your aircraft in a position for a second pass. And when you are out of rockets, you can end this session practicing air-to-air kills with your gun because despite of the havoc you have caused, some TU's will have taken off. Have fun!



There are two known issues: a rocket pod is a single 3D model, so there is no visual difference between a filled and an empty pod. As this document is written, damaged or destroyed targets won't show up in the debrief.



STARRY STARRY NIGHT

Instructor: **DEW DOG**

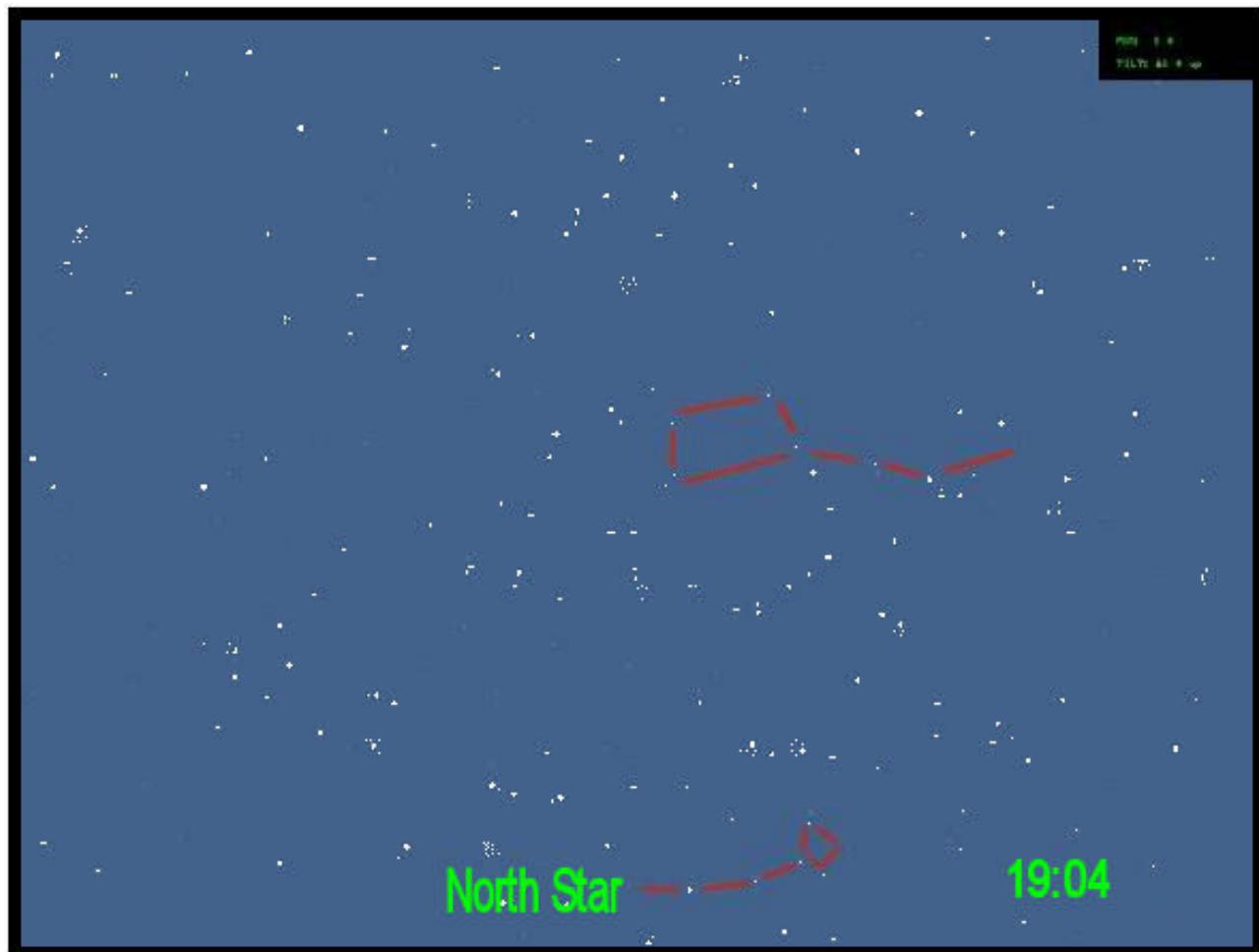
FF does have stars with constellations in the current version. You need a little practice to learn to find the constellation depending on what time of day you are flying.

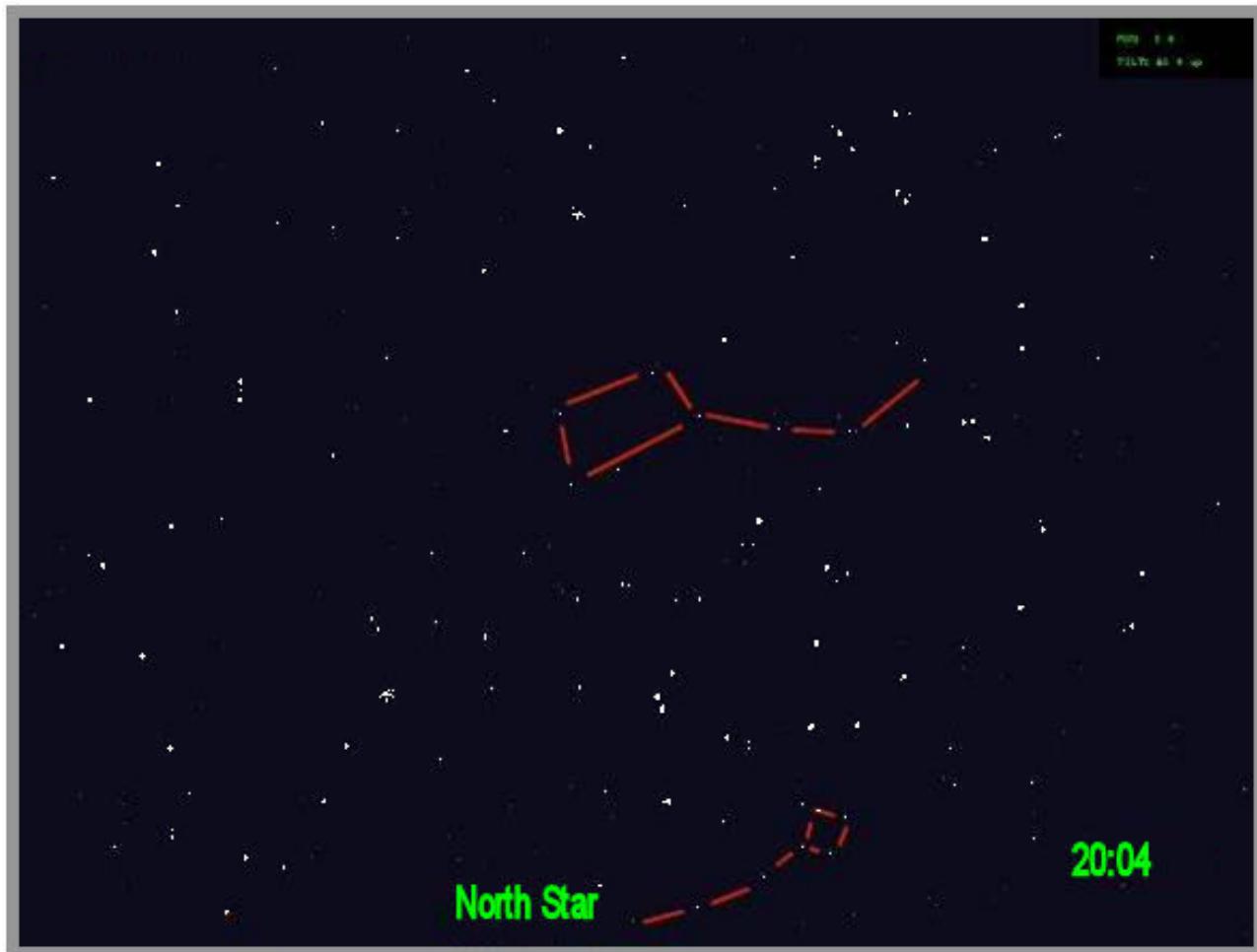
For example to find the North Star you need to be flying directly to a heading of 000 degrees. Using your zoom control, zoom out as far as possible to see the maximum sky. A trick in real life to find the North Star, is to first identify the Big Dipper Constellation, then allow your eye to follow the path created by the 2 stars marking the front of the dipper's pot. This will point you directly to the North Star. You then confirm it's the North Star as it is the tail of the Little Dipper.

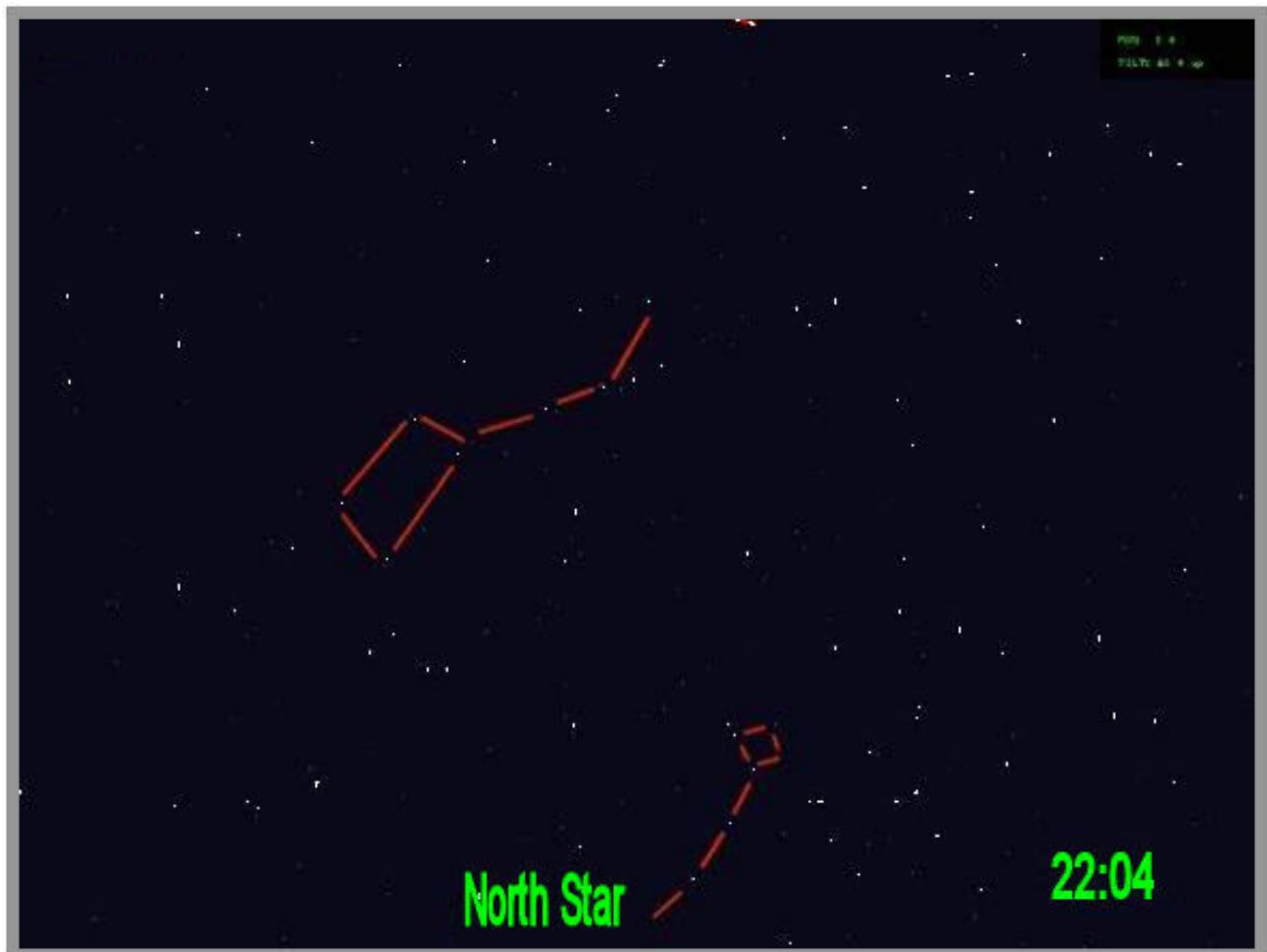
You also need to know what angle of elevation to view the constellations, again depending on time of day. All constellations revolve around the North Star and will be in different positions each hour.

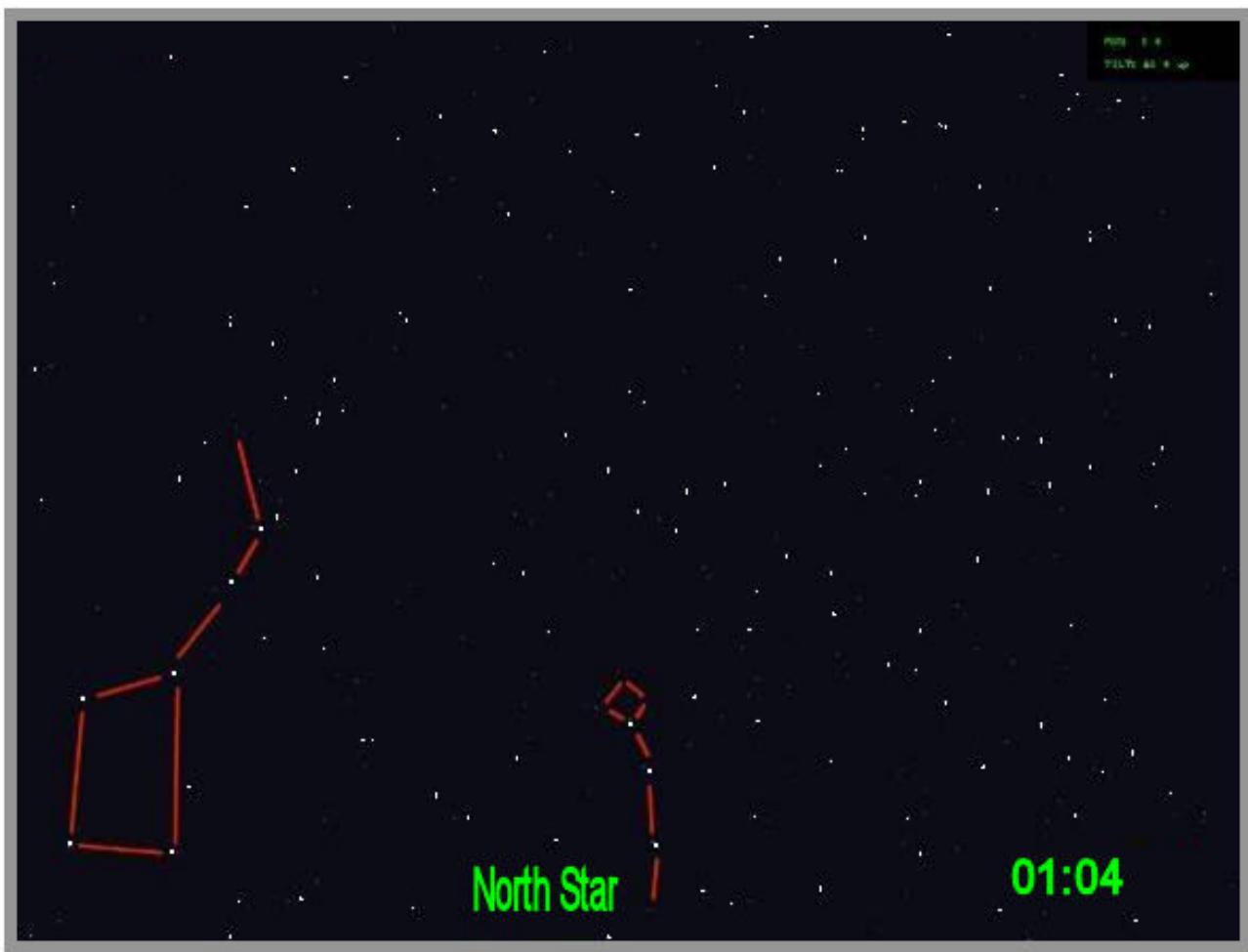
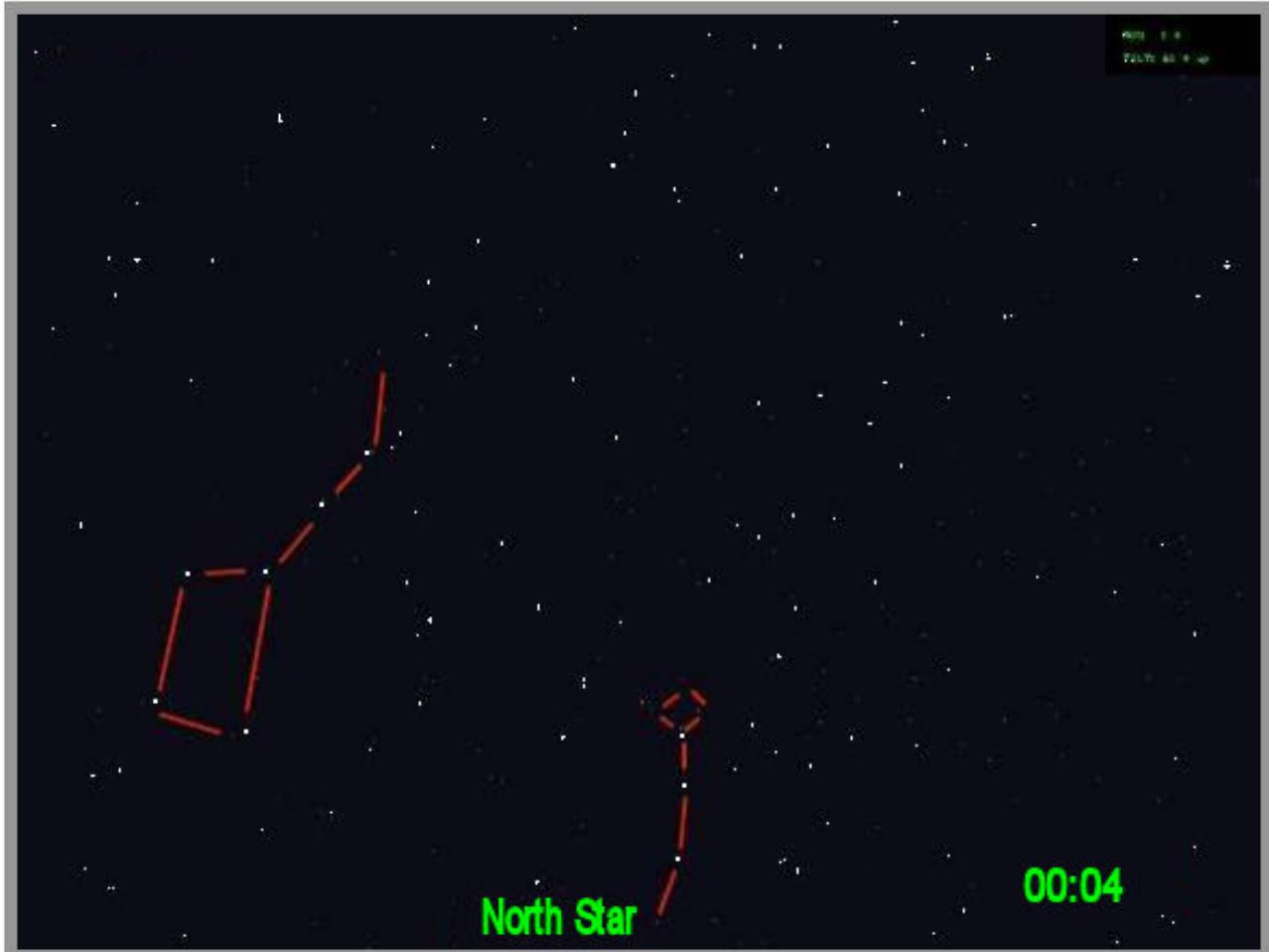
In the photos below the hours 19:00 to 01:00 are view with up-up-up view from the beginning view position in the 2d cockpit. The remaining hours of 02:00 to 05:00 are seen with only up-up view.

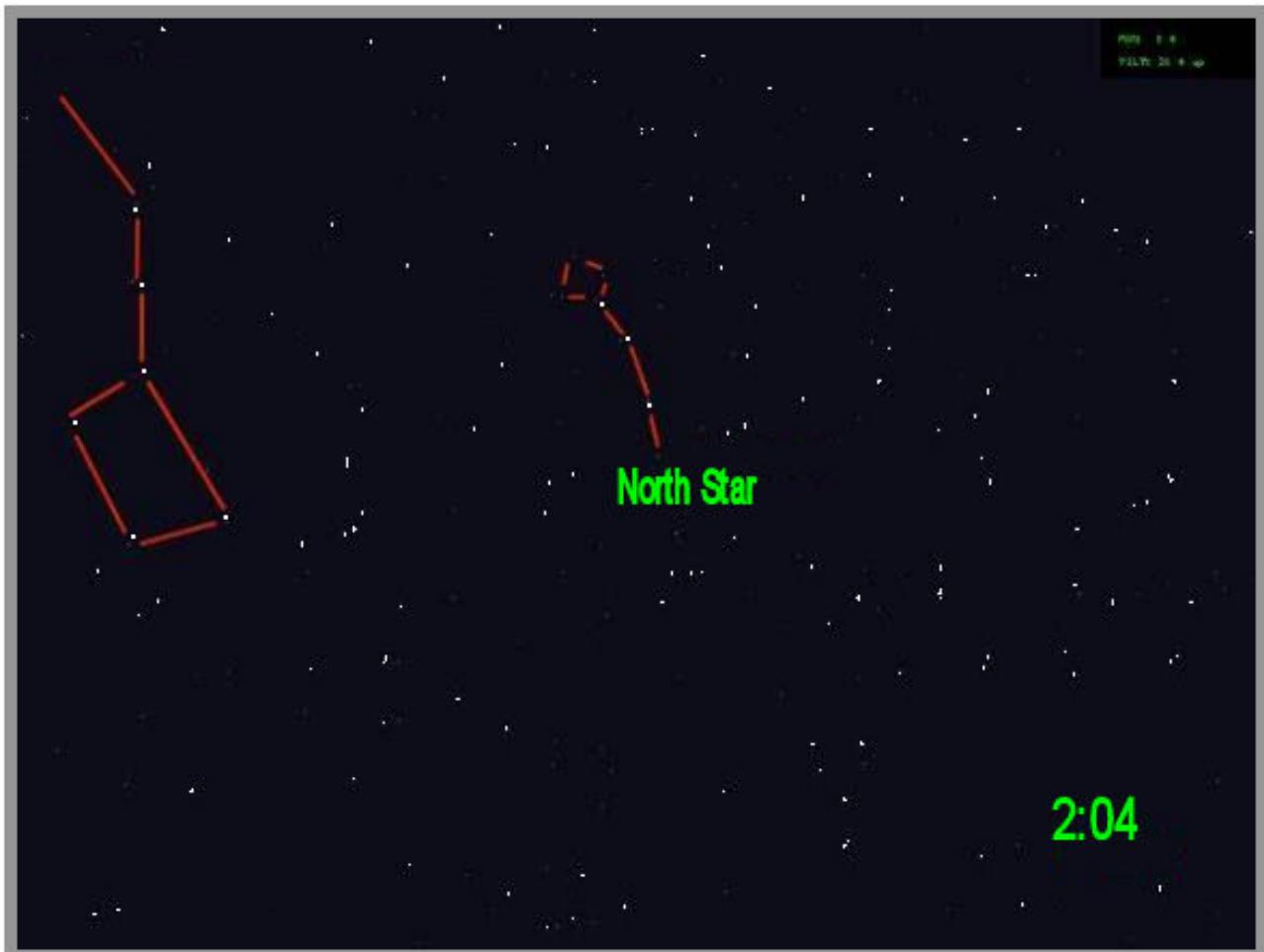
If you have trouble finding the constellations you could choose LESS STARS from the “Skyscape” Section of your FF Config Editor. Using the “LessStars” Option will make it easier to see the Dippers but – overall – you’ll see considerably less, and less-bright stars for realism/immersion.













LANDING THE VIPER

Instructor: PAUL "S.O.W." WILSON

Ever since Falcon 4.0™ came out, one of the most difficult tasks for people new to the program has been figuring out how to land properly. This tutorial was written for those people who are looking for a landing technique that they can use for their F4.0 experience.

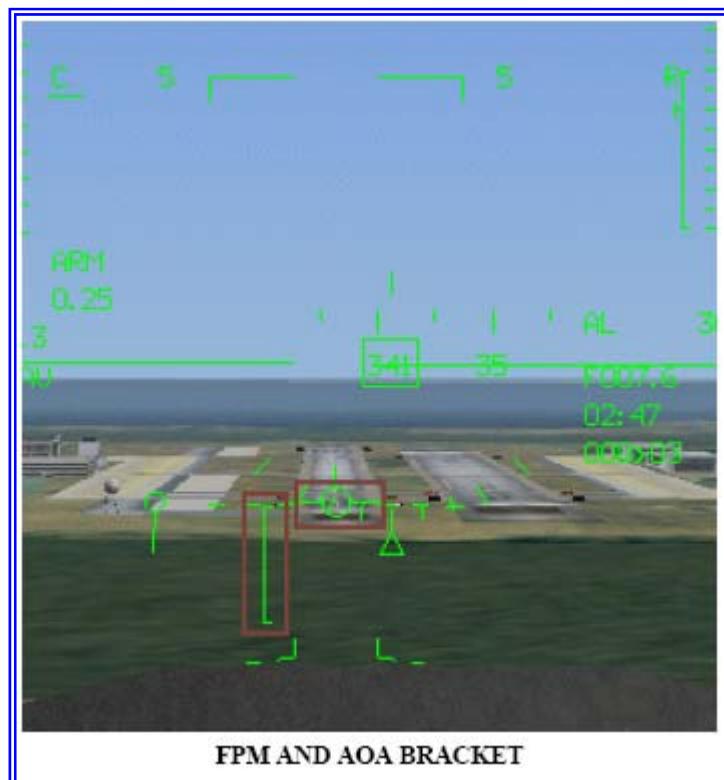
Still, don't get the idea that this is only a tutorial for beginners. Many people are able to land just fine but they may not be landing in a way that is safe or easy. I personally had a great system for landing that I used for almost a year before learning of another system that worked better. I took it upon myself to learn how to land using this new system.

The system I refer to is based on the approach that *real* F-16 pilots use to land the *real* aircraft.

Some of you may find that this approach is much different from the one you have used in the past. If you are interested in landing properly like a real F-16 pilot, or if you are simply interested in seeing how it is done, read on!

Perhaps most people who land using Falcon 4.0™ monitor their Flight Path Marker (FPM) and airspeed above all else. The approach that I outline below ignores airspeed and places emphasis on the AOA bracket. By using the FPM and AOA bracket, you can do very nice landings at any weight without having to monitor airspeed at all. In fact, you will notice that the airspeed isn't displayed at all in any of my screenshots below!

Once you are on the glideslope and your speed is low enough to drop your gear, you can ignore airspeed and focus on landing using the FPM and its relation to the runway and the AOA bracket. Once you follow the proper procedure for landing, your airspeed will be exactly where it should be automatically.



The image above shows both the FPM and the AOA bracket. They are both outlined inside of a red square.

You will all be familiar with the FPM but you might not be familiar with the AOA bracket.

The AOA bracket is a bracket shaped item on the HUD that indicates your angle of attack (*the number of degrees between the direction of travel - the FPM - and the direction your nose is pointed - the gun cross*).

It generally appears on the HUD after you lower your landing gear -

- If the FPM is above the AOA bracket then your angle of attack is lower than 11 degrees.
- If it is at the top of the bracket (see *image above*), then you are at 11 degrees angle of attack (AOA).
- If in the middle you are at 13 degrees AOA (*optimum AOA for landing*)
- If at the bottom then you are at 15 degrees AOA (*too high of an AOA for a safe landing*).

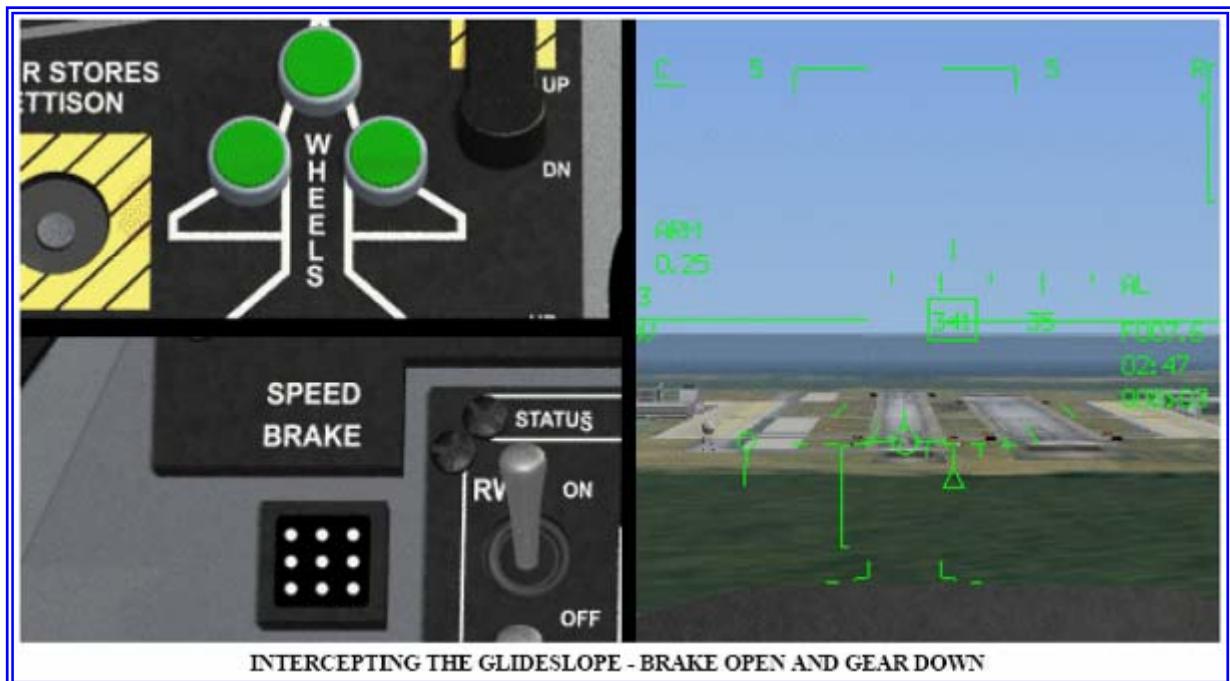
Okay. Hopefully you have an understanding of what we've discussed above, so – let's move on to:

L A N D I N G T H E F - 1 6

When approaching the runway and within a few miles distance, lower your brake and get your speed below 250kts. Lower your gear when it is safe to do so.

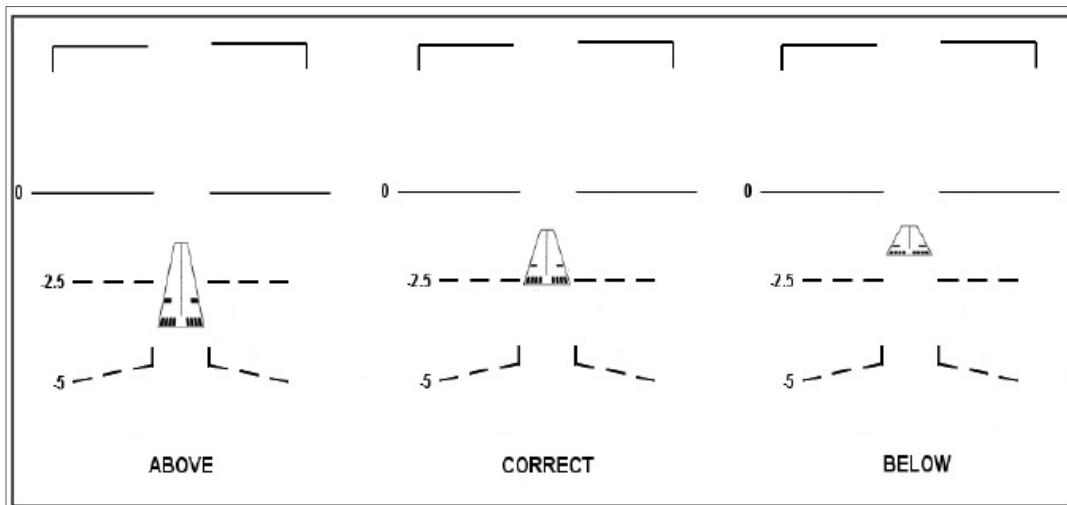
You will want your glideslope to be 2.5 to 3 degrees. If the front of the runway lies in the middle of the 0 and -5 degree pitch ladder on the HUD then you will know that your glideslope is correct.

A dotted line can be seen in between the 0 and -5 pitch ladder. This is the 2.5 degree Pitch Indicator Line.

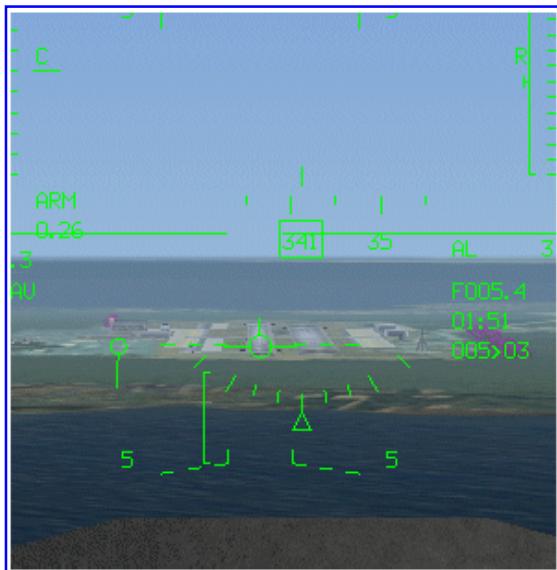


This **2.5 degree line** can help you make sure you are on the glideslope:

- If you are *above* the glideslope then the runway threshold will be *below* the 2.5 pitch line.
- If you are *below* the glideslope then the runway threshold will be *above* the 2.5 pitch line.



Once you are on the proper glideslope, place your FPM on the front of the runway using the control stick.



This event can be seen in the image at left.

There is another way to know whether you are on the glideslope or not. You can use the **VASI lights** which are located at the front of the runway.

On each side of the runway you will see two sets of lights. One set sits in front of the other.

If both sets of lights are "white" then you are too high. You need to lower your altitude and get back onto the glideslope.

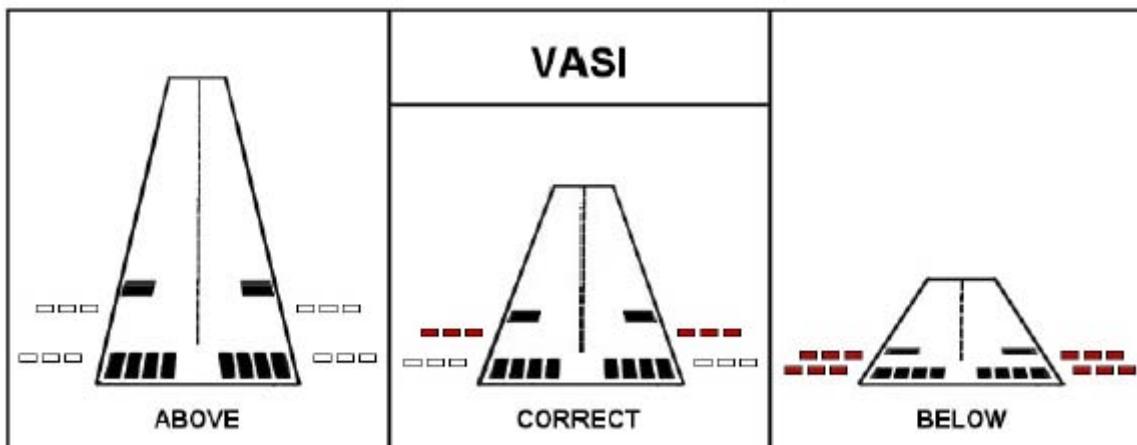
When you are on the glideslope the far set of lights will be red and the close set will be white.

If you are low then both sets of lights will be red. You will need to gain altitude to get back onto the glideslope.

"WHITE OVER WHITE" → Too MUCH height.

"RED OVER WHITE" → You're ALL RIGHT.

"RED OVER RED" → You're DEAD.



Very good. Two things have now occurred:

1. We are now on the 2.5 degree glideslope (*the runway threshold is on the 2.5 degree pitch ladder line*).
2. The FPM is sitting on the front of the runway.

There is now a third thing we need to do. **We need to get the FPM to the top of the AOA bracket.**

We can control our angle of attack using the throttle. If the FPM is above the AOA bracket then you will need to reduce power so that your AOA increases. I will usually drop the throttle completely to idle.

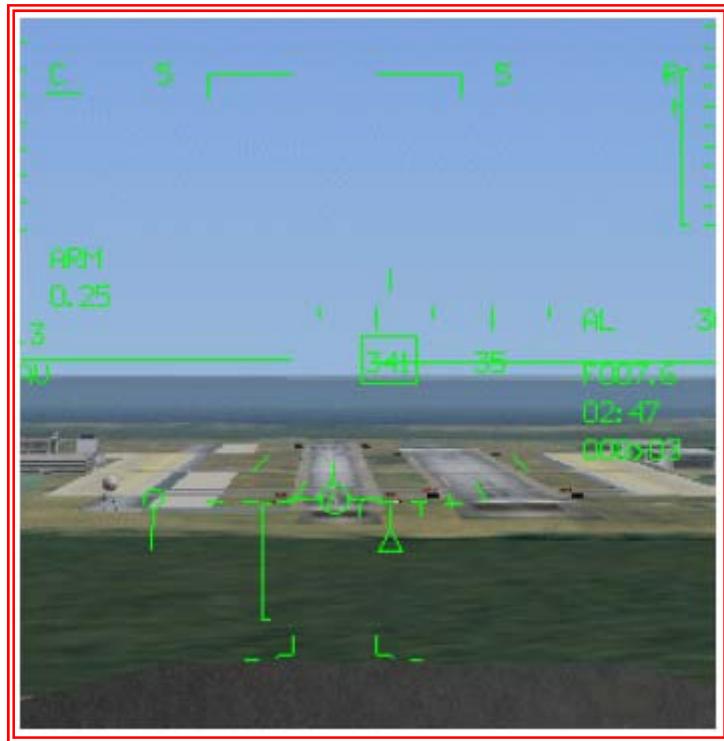
Remember to keep the FPM on the front of the runway while you increase your AOA. With your throttle at idle the separation will happen quickly.

In the image above the FPM would meet the top of the bracket on idle in about 10-15 seconds. Once you have gotten the FPM near to the top of the AOA bracket you will need to increase your power to keep the FPM at the top of the bracket.

Usually a setting of 6000 fuel flow for light aircraft or 6500 fuel flow for heavy will keep you on the top of the bracket with no real problems.

The image below is probably the most important image in this tutorial.

It shows an F-16 properly aligned for landing:



You will notice that all three conditions are now met:

- We are on the glideslope. The dotted 2.5 degree ladder is at the front of the runway.
- The FPM is at the front of the runway.
- The FPM is lined up with the top of the AOA Bracket.

In other words, the front of the runway, the 2.5 degree pitch ladder, the FPM and the top of the AOA bracket are all lined up with each other.

Now all you need to do is HOLD IT THERE...!

Gorny's Tip: So – you've found the Aces II Ejection seat...? Listen up. Hands are sweating; facial muscles are twitching; you shift uncomfortably in your seat – you're on FINAL APPROACH...! What could be worse? Your lover appears behind you and says: "Wow. You're gonna land. Can I watch...?" Now, you just KNOW you're gonna "lawn dart"! FEAR NOT. Say excitedly: "Land...? No way. Watch THIS...!" Now, pull the Ejection Handle and exclaim: "WOW...! Para-Gliding...! FreeFalcon has EVERYTHING...!"

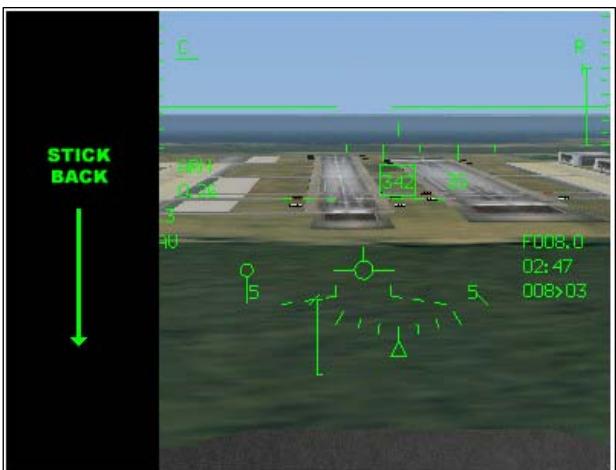
On the following page are four (4) images showing the glideslope alignment problems, and their solutions.



In this image, the FPM is above the Runway Threshold.

All you need to do is push forward on the stick to get yourself back on the runway.

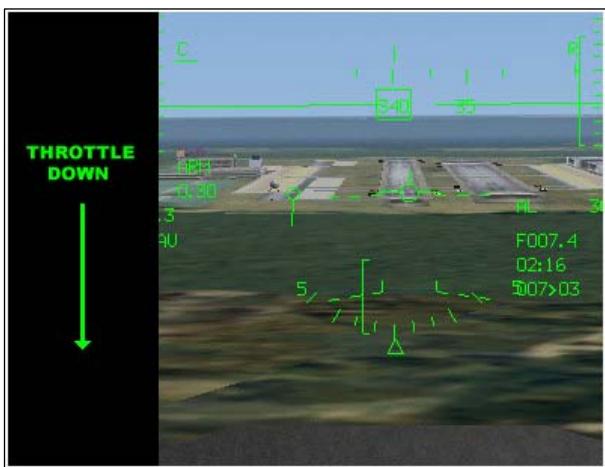
Make sure you are still on the Glideslope.



This image shows the FPM too low in relation to the runway.

The solution...? You guessed it...!

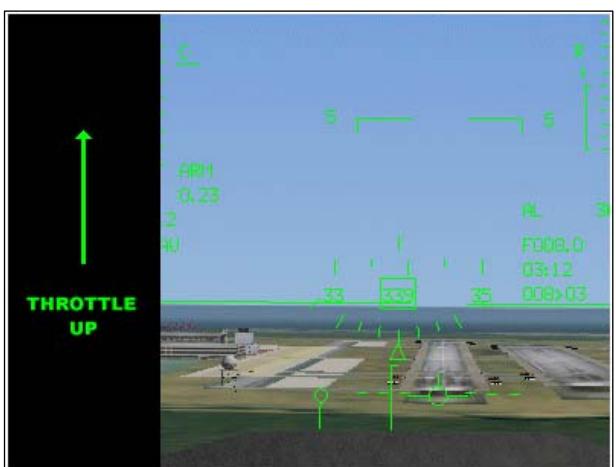
STICK BACK.



This image shows the AOA too low.

(The FPM is above the bracket)

Decrease power slightly to get your AOA up.



This image shows the FPM deep in the AOA bracket.

Here the FPM isn't in a really bad position, but you may want to think about adding a touch of power if it begins to drop anymore.

Here is a final image for reference purposes. It comes from the F-16C/D FLIGHT MANUAL (T.O.1F-16C-1). This particular image shows the 11 degree AOA as being fast, but that is **OK** for the approach.

INDICATOR	INDEXER	HUD DISPLAY	ATTITUDE
		[]	
		[]	
		[]	

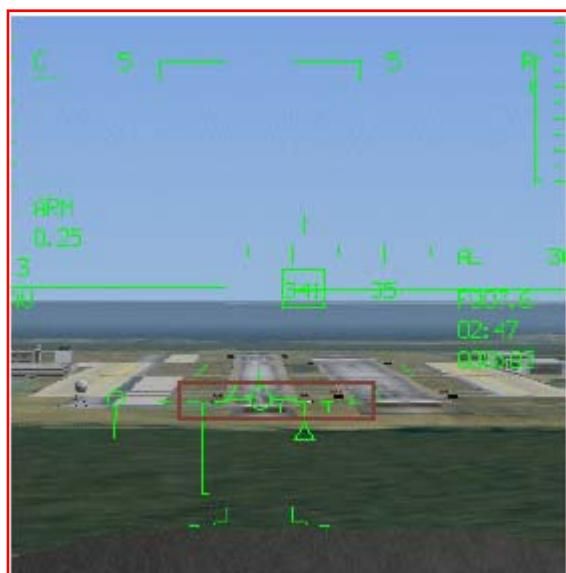
OK, so that is basically it.

You will want to control the location of the FPM with the stick and the AOA with the throttle.

Once you get used to this then landing becomes easy. Once all three conditions are met, and you are on a proper approach, your speed will be exactly where it should be (about 160 kts for a light aircraft and 170-180 kts for a heavy one).

This approach of monitoring the FPM marker and the AOA bracket is helpful in that you don't have to worry about proper speeds for proper weight. Many F4.0 pilots find themselves falling out of the sky because they attempt landings using speed and get their speed wrong (too slow). A high airspeed results in lower AOA landings that could have dire consequences in the form of bouncing or crashing. Staying on the glideslope with a proper AOA keeps you from having to worry about airspeed at all.

Here is that important image again showing an optimal glideslope approach with all three conditions met.



I have placed a red box around that area of the screen showing what you will want to look at clear up until the point where you flare.

You can basically ignore looking at airspeed, altitude, fuel flow, the AOA light, etc. Still, there is certainly no problem with looking around the cockpit occasionally. I personally have a habit of taking glances at the fuel flow but that is just me. The great thing about using the FPM and AOA bracket almost exclusively for landing is that airspeed magically takes care of itself and you can keep your eyes on a small area of the HUD at almost all times. This helps decrease the workload while keeping SA high.



Over the threshold and ready to flare.



I'm now within seconds of landing. I gently flare a little by pulling back on the stick. This causes the FPM to move down the length of the runway. You need only a **TINY flare** (as you are only transitioning from 11° to the optimal AOA of 13°). I also decrease my power as I pull back, and let the aircraft settle those last few feet to the runway.

TOUCHDOWN...!

12° – 13° AOA. Your jet will “stick” to the ground.

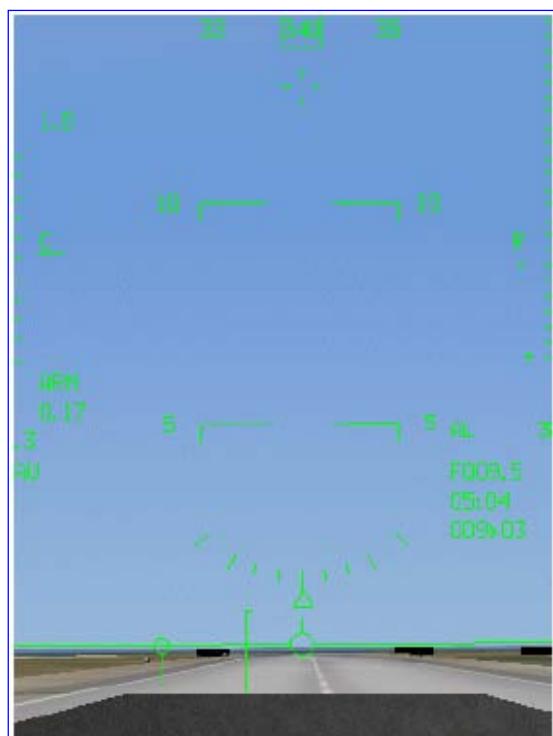
Be careful with the FLARE. It is easy to flare too much and find yourself floating above the runway without settling. Cutting the power helps a lot. Try a few different Flares, and see what works for you.

Be careful. It is easy to flare TOO much, and find yourself at 15° of AOA.

Once you become proficient at this landing technique, you will be able to drop your tires to the pavement at the correct AOA, Speed, and Location on the runway.



PAUL WILSON



A NOTE ON CCIP BOMBING

There have been some concerns raised about the visibility of the Pipper, during CCIP bombing. In some cases, the Pipper will be BELOW the HUD, and – thus – invisible to the Pilot. Certainly problematic.

The following techniques will help.

* **If in 2D ‘Pit** – switch to 3D ‘pit, and then BACK to 2D ‘pit.

The pipper will now be visible.

* **IF in 3D ‘Pit** – switch to 2D ‘Pit, and then BACK to 3D ‘Pit.

The pipper will now be visible.

This will ONLY be effective if your FOV is set to 75 or 85 in the Config Editor.

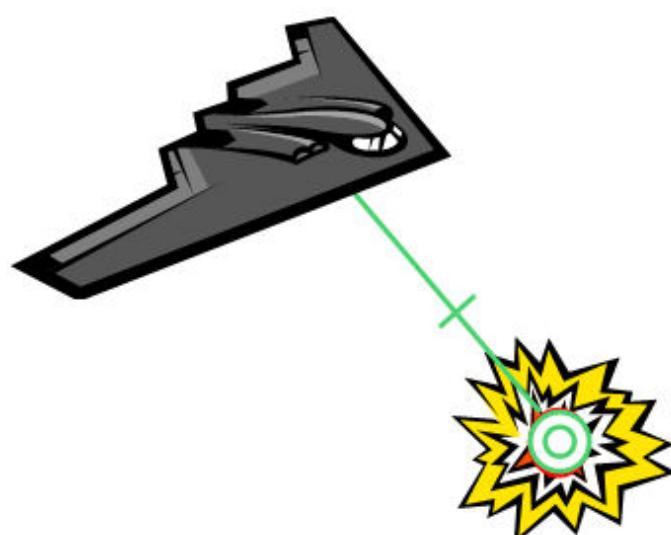
* **Conduct your CCIP pickle in the HUD-ONLY view.**

The cockpits of all FF5 jets have been optimized for CCIP in the “1” view. If using the HUD-ONLY view, the targeting cues will be precise.

The HUD-View option is both recommended, and failsafe.

Snail Says: Some 2D ‘Pits do not have an accurate HUD placement. Therefore, the position of the Pipper in the 2D ‘Pit will not match the position of the Pipper in the HUD-Only View.

BEFORE reaching your target, you should ALWAYS use an object or piece of terrain to compare the position of the pipper in both the “2” view and the “1” view. IF they do not match, you must use the HUD-Only view for accurate CCIP.



Ara'

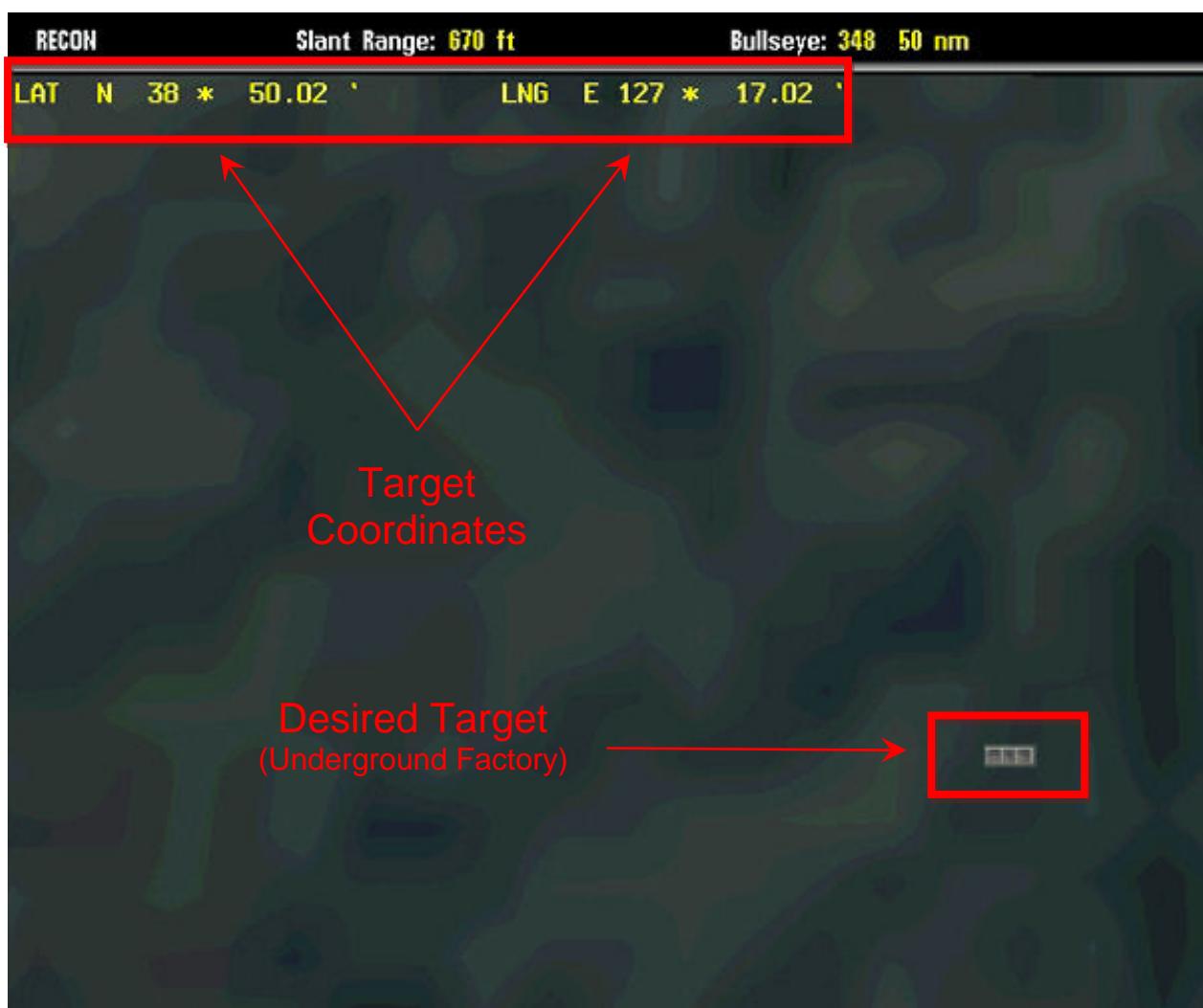
A NOTE ON PRECISION WAYPOINTS

When you have a specific, small, non-moving ground target, (*like an SAM2 radar unit or an underground factory*) which you want to attack with 'dumb' bombs, it helps to use a precision waypoint. It also helps if you have to hit a small target with LGB's. If you enter the right coordinates into your FCC, the waypoint diamond in the HUD will be at the exact position to make a pinpoint CCRP or CCIP attack.

There are two stages → Preflight and In-flight.

Preflight: Recon the target. Click on the exact object you want to attack. In the Recon screen you will find the coordinates of that object (e.g. 38.50.02 / 127.17.02). On a piece of paper, write down these coordinates and the number of the attack waypoint. You need at least six (6) digits in the coordinate. "Omissions" are written as "0". For example - 37.1.84 = 37.01.84.

Pictured below is an example of an underground factory. The factory is selected in the target list, and the coordinates are shown at the left upper corner of the recon screen:



In-flight: Whilst on the RAMP - or during ingress - switch to the attack waypoint on the DED. Then, on the ICP, push "LIST" and "T-ILS 1". The DED shows the coordinates of the selected waypoint. Now, the first set of coordinates can be changed. Enter the desired LAT coordinates (*in this example: 38 50 02*). Push ENTR on the ICP.



Then - enter the LNG coordinates. Note, there may only be six (6) digits visible, but if the coordinate has seven (7) numbers, you **MUST** enter the whole string of **SEVEN** numbers...!

Push enter (ENTR) on the ICP.

If you click return (RTN) on the dobor switch you'll have the usual DED readout again.

IMPORTANT → Don't forget to switch back to your current waypoint.
Now - when you approach that barely visible target - there is a nice diamond on top of it.

Don't miss...!



Known issue: Sometimes the DED doesn't accept the input of coordinates.

Solution: Move the dobbet switch to SEQ and RTN, then try again (*from LIST + 1*).



A.I. MANAGEMENT



So - your A.I. is as dumb as dog's balls...? There ARE workarounds, or - rather - ways of working WITH the A.I., and strategies to get the most out of your Artificial Wingmen. In addition, FF5 features some development of AI behavior with regards "hard-deck" and altitude considerations.

There is no underlying "structure" to this Section. Rather, it is a series of short tips and hints - "one-point lessons", if you prefer - to help raise your understanding of the A.I., whilst shedding light on some of the issues it presents. A more thorough understanding of the A.I. and its limitations, will result in the Virtual Pilot getting the most out of their A.I. controlled allies



Script Monkeys:

The first and fundamental point to understand is that there is NO “Artificial Intelligence”. “Reactions” are based upon “pre-existing conditions”. Simply - Hustler advises that one should drop the term “A.I.”, and replace it with the term: “Script Monkey”. As in a “less than intelligent” entity, which simply follows the script placed before it.

This may be a rather shattering revelation to the F4.0 devotee, yet it is important to understand this basic distinction between “Intelligence” and “Math Co-processor”. After all, it is not possible to use one’s tools effectively, until one has a complete understanding of the fundamental nature of those tools.

For the purpose of “Suspension of Disbelief” (and for the sake of tradition), the terms “A.I.” and “Script Monkey” remain interchangeable in this article.

Talking to the Monkeys:

An understanding of **all** radio-commands is essential. However, some of the more critical command's are:



Rejoin → Especially important for Carrier Op's. Upon take-off, if one fails to call “rejoin”, the AI flight will return immediately to its land-based strip.

Close up → Used with “rejoin” to reign in stragglers. The closer the AI is, the easier to monitor and adjust their behavior.

Weapons free → Used at *IP/Fence in* to get the A.I. ready to fight.

Attack my Target → Used to hand off a target. Designate the target, by padlocking it, or locking it on your Radar, or by slewing your cursors over it. Be aware - if you order your Element to “attack my target”, sometimes both the 3rd and 4th A/C in your flight will attack! the target. For example, if a J-5 were approaching your four-ship flight, and you issued an “attack my target” order, all of the A.I. may attack the J-5. Both overkill, and a waste of ordnance on a low-threat target. In this case, it would be far more efficient to order your Wingman to attack; thus using one missile instead of two.

Attack Targets → Encourages the AI to attack other targets. If used on a group of vehicles, the A.I. will attack as many different targets as possible. This also applies to many enemy A/C within a close airspace.

Resume Mission → gets the A.I. back on AG after a Dogfight.

Go Fluid → If a three or four ship flight, one may consider issuing a “Go Fluid” command to all A.I., as soon as the last A/C has taken off. This will get “3” and “4” to close up the gap to leader. From here, they are much closer during weapons release A-A or A-G.

Go Lower → If you want to sneak into enemy territory whilst using NoE, and wish the AI to do the same, you can use the “Go lower” command multiple-times. That'll ensure the AI flies really close to the ground. Once you reach the target area and want to pop-up, you'll have to use the “Re-Join” command, or else the A.I. will continue to fly NoE...!

Return to Base → Perhaps the most reliable of all orders. But, be aware: Unless they are “bingo fuel”, the A.I. will always fly to the the penultimate or last waypoint, BEFORE returning to base.

Monkeys and Self-Preservation:

The A.I. will NOT obey your commands if threatened, or in danger. If the A.I. reaches bingo fuel, they will try to find their way to the nearest friendly airbase or airstrip. At this time, they will ignore your orders. Your wingman/ element won't obey your orders if they are under attack. This includes missile threats, both incoming and simply "detected". A.I. self-defense overwrites all of your orders, including "weapons free" and "attack target(s)". Obviously, as the situation becomes more "crowded", the A.I. will become more rebellious. Self-preservation means that A.I. priorities will not always match what you ask. Also, your self-preservation skills are most likely better than the A.I.. Use the A.I. to attack the J-5, whilst you take out the MiG-29. Your missile evasion skills are better than the A.I. and you are able to configure your EWS more efficiently.

Ordnance Concerns:

- * Deployment of weapons depends on the current active steerpoint and on the TYPE of steerpoint. For example, one may put any AG weapons on A.I. controlled A/C, but they will NEVER use them if you only have only DCA, Sweep steerpoints in your flight-plan.
- * If you fly and OCA, SEAD, CAS, interdiction type missions the "weapons free" command is effective for A-G weapons, as the AI will try to use them if there are ground targets within range. The usable steerpoint names are: S&D, IP, TGT, SEAD.
- * The A.I. will NOT use GUNS against ground targets...! If issuing an "attack" order against an A-G target to an A.I. who is Winchester, you will always receive an "unable" response.
- * If the flight aircraft has multiple kind of weapons on-board, and the human pilot uses all of one kind of weapons, then AI pilots in the flight will not be able to use the same weapon, even if they have it onboard...! *Example:* if the human pilot uses up all his AGM-65s (or CBUs, or MRMs), the AI will not use it even if the weapon is available on the jet...!! Ensure that you keep at least ONE piece of the desired ordnance on your jet until the A.I. have expended all of theirs. Once the A.I. have released all of that weapon-type, the Human pilot can deploy his last piece of ordnance.
- * The burst altitude for the AI's CBU's is set by "YOUR" burst altitude.

The Hard-Deck:

Much work has been done in developing a "hard-deck" for the A.I. in FF5. This has been adjusted to be both A/C and weapon specific. Obviously, one would expect to see the Buffs operating at higher altitudes than the A-10's. Additionally, the MANPAD threat has been tweaked to reflect a more realistic hazard. Thus - the new "hard-decks" will help to keep the A.I. out of harm's way. One will find the A.I. climbing or diving to "hard-decks" once "attack" orders have been issued. The development of these "hard-decks" will give a further boost to the appearance of "Intelligence" in our A.I.

RAM22 → *Something I find helps me control the wingies a little better, I first give them Rejoin, followed by Resume Briefed Mission and if they don't respond, I repeat.*



A NOTE ON RECON

There are several aircraft which have Recon Roles. Aircraft which have these roles include the **SR-71**, which is featured in your “It’s the Pits” TE.

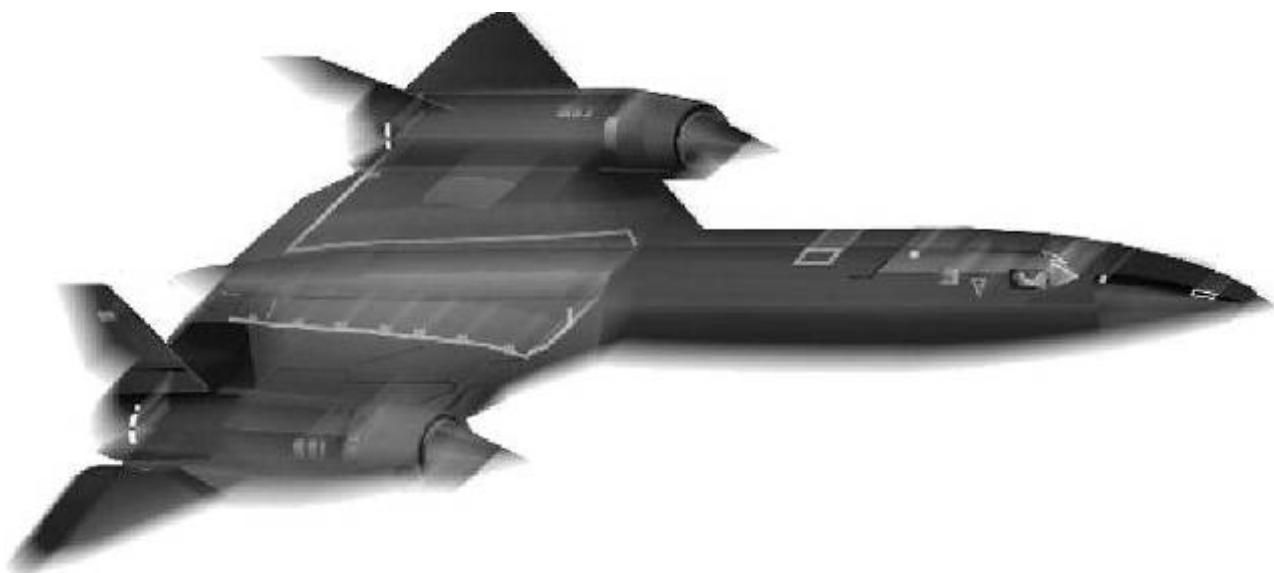
When creating your own TE's, be aware that, this Recon feature is subject to a “Role Bug”. There is a simple workaround for this.

Mission types in the Recon mode are '[Recon](#)', '[BDA](#)', '[Patrol](#)' and '[Recon Patrol](#)'.

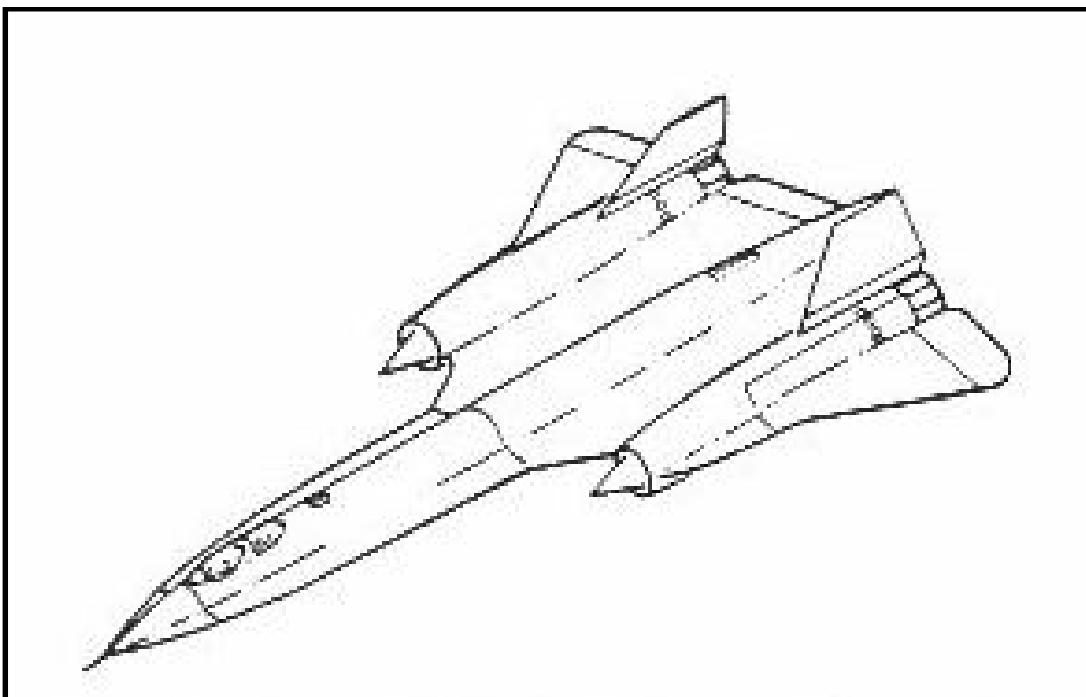
The problem occurs when you create these type of missions either for the AI to fly (or Combat Autopilot), the flight will not go to target but - at some point – will divert, and possibly just fly off in to the wild blue yonder.

To make the mission work you must edit the Flight Plan after you create the mission.

At each STPT where the Action is to ‘Recon’, change the Action to ‘Nav’.



NATOPS FLIGHT MANUAL FREE FALCON AIR FORCE MODEL



SR-71 A Blackbird Lockheed Corporation

This Publication should be used in conjunction with the *Flight Manual Companion* ,
the *FreeFalcon 4.0 Manual*, and this *FF5 Companion Guide*.



CAUTION : This document is to be use only for simulation purpose in the Free Falcon context. Do not try to apply the procedures and or advices contained in it if you have the opportunity to fly this plane in real life. By the way, if you had (or still have) flew this aircraft, your comments, criticism and more are welcome, just contact the Free Falcon team at <http://www.freefalcon.com/forum/index.php>

The SR-71 does not look like your regular F-16, and so requires to be driven a bit differently. By the way, even if we have tried to provide the most accurate and realistic behavior to the Free Falcon's SR-71, there are some flight procedure that need to be slightly modified compared to the Real Life one in flying this plane.

This is a summary of what I think it is mandatory to know before enjoying the Bird in FF5.

1. Flight Domain Limitations.

There are mainly two heavy limitations with the SR-71 in FF5: G-Load and Speed, in real life the Engine limitations are also very restrictive, but they are not taken into account in FF.

a. G-Load

- At low low-weight-low-level-low speed, G-Load is limited to 3.5G.
- For higher altitude (over 50,000ft) and Mach number under M2.0, keep G-Load under 2.5G
- Between M2.0 and M2.6, under 2.0G
- Over M2.6, do not exceed 1.5G

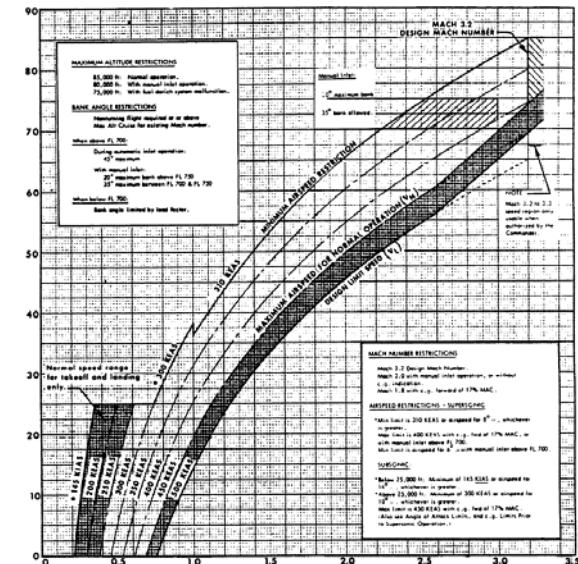
b. Speed

Speed limitation of SR-71 is usually expressed in Mach number (MN) and KEAS (Knots Equivalent Air Speed), a value that is not accessible in our FF SR-71, (KEAS value is closer to CAS/IAS than TAS, but too far away to be confused, even in practical use).

To make it simple:

Under 30,000ft: Keep your CAS between 300 and 500Kts (AoA under 10 deg), except for take-off and landing maneuvers.

As soon as you are higher than 30,000ft: keep your CAS between 300 and 550Kts, never exceed M3.3 and 85,000ft, keep your Angle of Attack (AoA) under 8.0 deg.



2. Take-Off

The SR-71 is a very heavy plane with fuel capacity completed (Gross weight of 136,000lbs), so take-off requires a long runway and a really high speed.

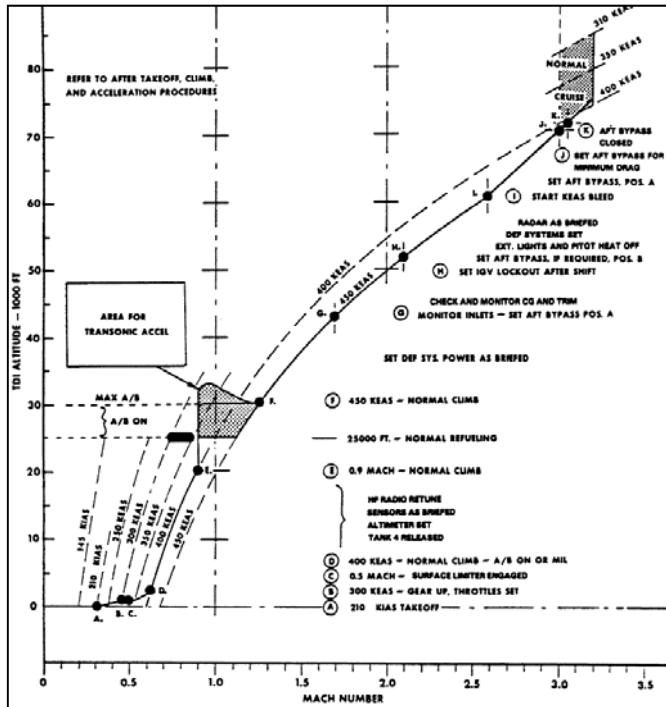
To make it simple, you can apply the following procedure that is very close to the Real Life one (even if simplified):

- Align to take-off, set Brakes
- Set Throttle to MIL power
- Release brakes
- Set Throttle to Full A/B power
- From 120 to 150Kts a buffeting is experienced, ignore it.
- When IAS/CAS reaches 180Kts, pull stick to set AoA to 10.0 degrees.
- Positive Climb rate should occur around 200/210Kts, (in RL tires speed limit are around 239Kts), retract gear when positive Vz is confirmed. (In RL gear can be kept down up to 300Kts, but not in Free Falcon)
- Accelerate to 350Kts and climb up to 1,500ft.

3. Climbing to Cruise level

Climbing start when you have realized the following conditions:

- Course aligned to the selected Way-Point
- Indicated Speed (CAS) is 400Kts
- This is the point (D) in the following figure



c. Go Supersonic

The aim of this step is to transit from M0.9/35,000ft to M1.25/30,000ft. As most of the plane of its generation, the SR-71 does accelerate very fast in transonic regime, in order to shorten the time and the fuel spent to go supersonic, the best practice recommended is to exchange altitude (5,000ft) versus speed.

When 35,000ft are reached (at a climb rate of 8,000ft/min), go to horizontal flight (G-Load down to 0G).

Then, keeping Full A/B power, set descent rate to -2,500/3,000ft/min. Speed (Mach) increase with buffeting between M1.0 and M1.15. Mach indicator should reach M1.2 before altitude reach 30,000ft. Keep descent rate to -4,000ft to ensure mach exceed M1.25, when 30,000ft are reached, fly back to level-flight and enter supersonic climb step.

d. Supersonic climb from 30,000ft to 60,000ft (F to I)

In Real Life, during this step, the pilot just has to keep the KEAS value constant and equal to 450Kts, unfortunately, there is no KEAS indicator in our SR-71 pit, so we propose to drive the speed trough the climb rate:

Altitude	Mach	Climb Rate
30,000 ft	1.25	3,500 ft/min
40,000 ft	1.58	3,500 ft/min
50,000 ft	2.01	2,500 ft/min
60,000 ft	2.56	2,000 ft/min

You will find in the table below the required information: when you cross a given altitude (first column), your mach number should be the one in the second column, and in order to reach the right mach number for the next altitude you have to adapt your climb rate to the value in the third column.

Example: when you cross 50,000ft, your mach number should be 2.0, and your climb rate 3,500ft/min, in order to reach 60,000ft at M2.56, you have to reduce your climb rate to 2,500 ft/min and keep it constant until you reach 60,000ft.

e. Supersonic climb from 60,000ft to 70,000ft (I to K)

Following the same recommendation than for the previous step, the KEAS bleed will be realized by keeping a constant climb rate of 2,000 ft/min. This will lead you to cross 70,000ft at M3.0.

4. Cruising

Cruising start when you have reached the Cruising altitude and speed, i.e. 70,000ft and M3.0.

This point should have been reached in less than 20 minutes from brake release.

The nominal cruising speed M3.2 can't be reached safely at 70,000ft, but only at 72,500 ft. If you have followed a regular climb schedule, your remaining fuel quantity should be around 51,000 lbs, if this is the case, set your climb rate 1,500 ft/min, and you will reach the nominal cruising conditions.

In Falcon Automatic Pilot is not able to be used in supersonic, so it can't be used for our SR-71 (of course this is not realistic, but we do not have find any way to by-pass this limitation).

a. Level Flight.

Now you have reached your cruise level, in level flight your only constraints are the following:

- Keep After Burner engaged
- Keep Mach number between 3.0 and 3.2 (under specific authorization, M3.3 can be sustained)
- Keep altitude between 70,000 ft and 85,000 ft

When mach number seems to go higher than desired (due to gross weight reduction related to fuel consumption), you can manage it two ways: increase climb rate, or set throttle back to minimum After Burner.

b. Turning to next Way Point.

At M3.2 and 75,000ft, the G-Load is limited to 1.5G (near 45 degree bank) and AoA is limited to 8.0 degree.

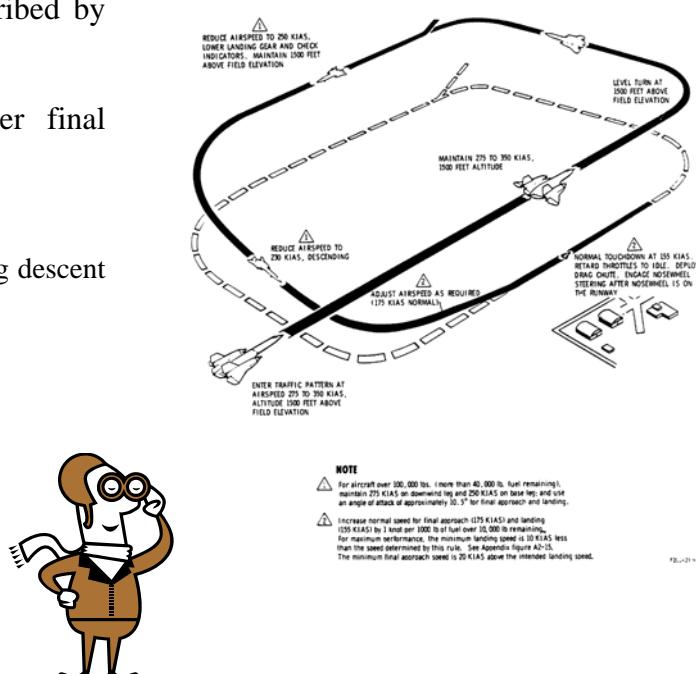
Under these conditions, the available turn rate is around 2/3 deg/s (40 degree/min), and the turn radius is around 45 Nm (100 Nm are required to make a half turn). So the Flight path need to be adapt according to these limitations.

5. Landing.

The Landing circuit to be followed is described by the figure below:

As soon as the base leg is ended, enter final approach:

- Check remaining fuel is less than 40,000 ft.
- Adjust AoA to 10.0 degrees
- Adjust throttle position to reach the following descent rate (according remaining fuel quantity):
 - 10,000 lbs or less : 600 ft/min
 - In [10,000 ; 20,000] lbs : 540 ft/min
 - In [20,000 ; 25,000] lbs : 525 ft/min
 - In [25,000 ; 30,000] lbs : 510 ft/min
 - In [30,000 ; 40,000] lbs : 465 ft/min





GET SOME



SKINS



SKINNING BASICS

PANEL LINES & RIVETS

DOES SIZE MATTER...?





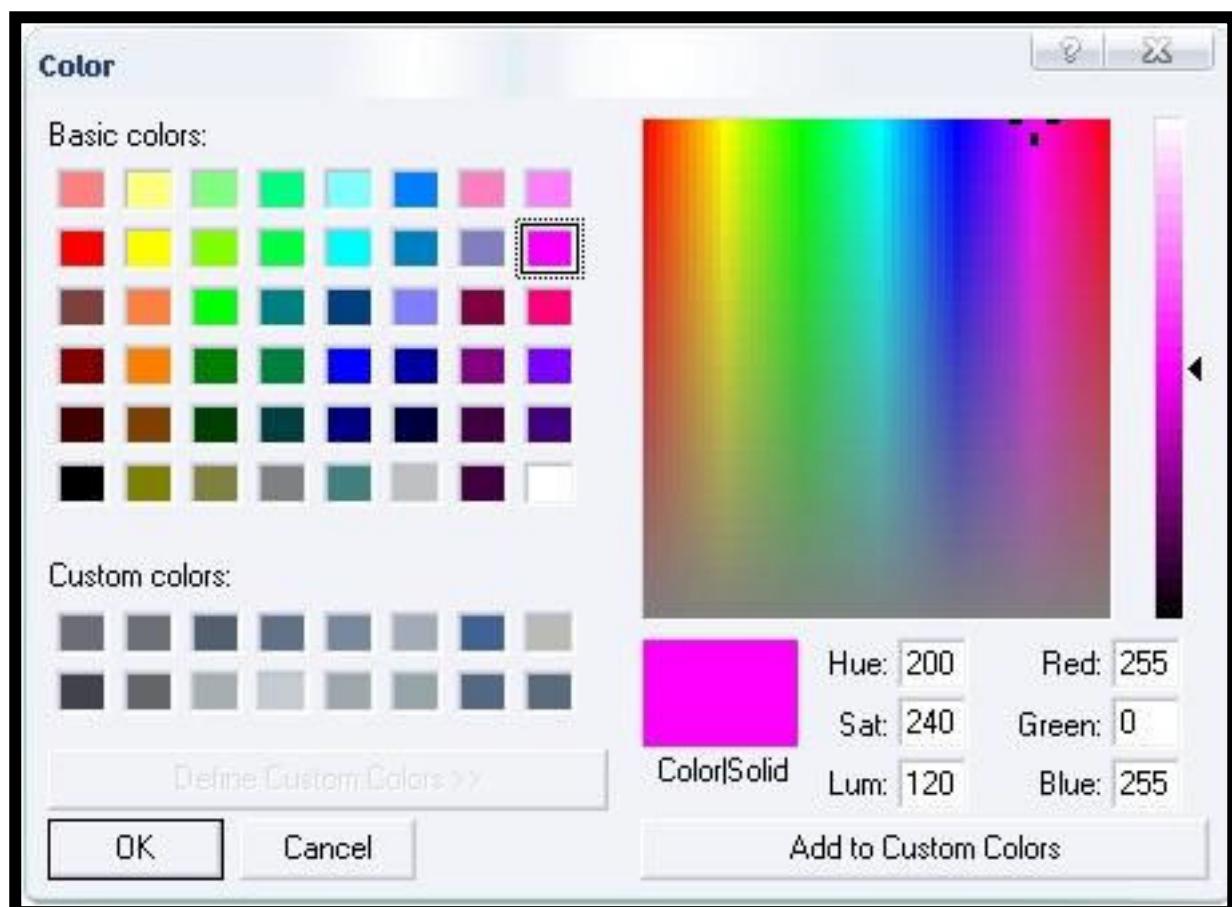
Skinning Basics

with JanHas

There are many ways to create a good dds skin file. Here's how I do it...

There are a lot of drawing programs. I use two: iPhoto Plus 4 (program from 1991) and Adobe Photoshop Elements. I created most of the skins with iPhoto Plus 4 - a simple and effective drawing program.

Sometimes an area needs to be transparent. Before the arrival of the DDS format we used the colour magenta. See the following picture for the right numbers for the colour magenta. Magenta is Red 255, Green 0, Blue 255.



In the next example everything magenta will become transparent (not shown in the sim).



* **Notice** → Make every corner of the skin NOT used for the skin in the sim , **WHITE**.
One pixel is enough...! I'll explain later what this is good for.

Once you are ready for skinning you save it in (24 bit) bmp format.

Now we have two programs we can use to convert the bmp format into dds format skin.

Converting bmp into dds → *The Elephant Way*

The 1st Tool is “**Elephant's bmp to dds convertor**”. This is a simple drag and drop utility.

You can get it here: <http://www.elephant42.net/Download/F4TexConv.zip>

Positive side: it's fast and simple to use.

Negative side: Sometimes the quality of the output dds file is not that good.
Colours may change a little to red / green / blue.

Converting bmp into dds → *The Photoshop Way*

The second program you can use is Adobe's Photoshop series. The standard program is not compatible with the dds file format, but Nvidia has made an Adobe Photoshop Plug-in to make it compatible. Here's the link to the website.

http://developer.nvidia.com/object/photoshop_dds_plugins.html

Note → this Plug-in will ALSO work with **Paint Shop Pro..!**

A program I recommend is the "Windows Texture Viewer" for viewing the dds files.
Here's the link: http://developer.nvidia.com/object/windows_texture_viewer.html

Here's the link to the exe file containing the Adobe Photoshop Plug-ins:

http://download.nvidia.com/developer/NVTextureSuite/Photoshop_Plugins_7.83.0629.150.0.exe

Here's the "dds plugin file" only..

http://www.freefalcon.com/file_library/nvdxt_tools.zip

Just make sure that the “dds.8bi” is in the “Program Files\Adobe\Photoshop Elements 2\Plug-Ins\File Formats” directory.

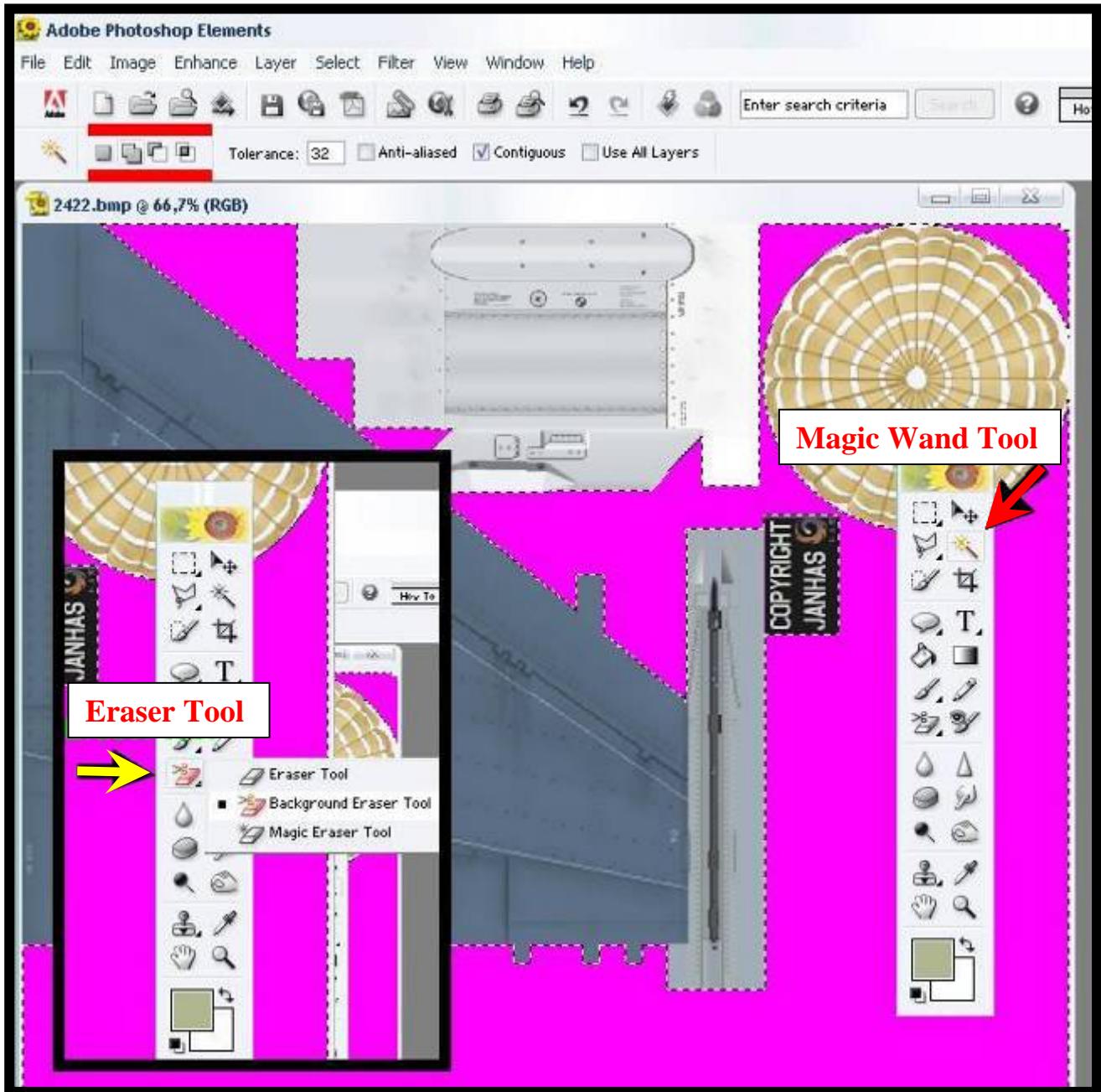
You might need the ntdll.dll file to make it work. That file should be placed in the “Windows\system32” folder. You can get the ntdll.dll file here:

<http://www.dll-files.com/dllindex/dll-files.shtml?ntdll>

Now you open Photoshop and open the skin file.

What I do is select and remove the magenta section with the background remover. Here's how it looks.

Skins



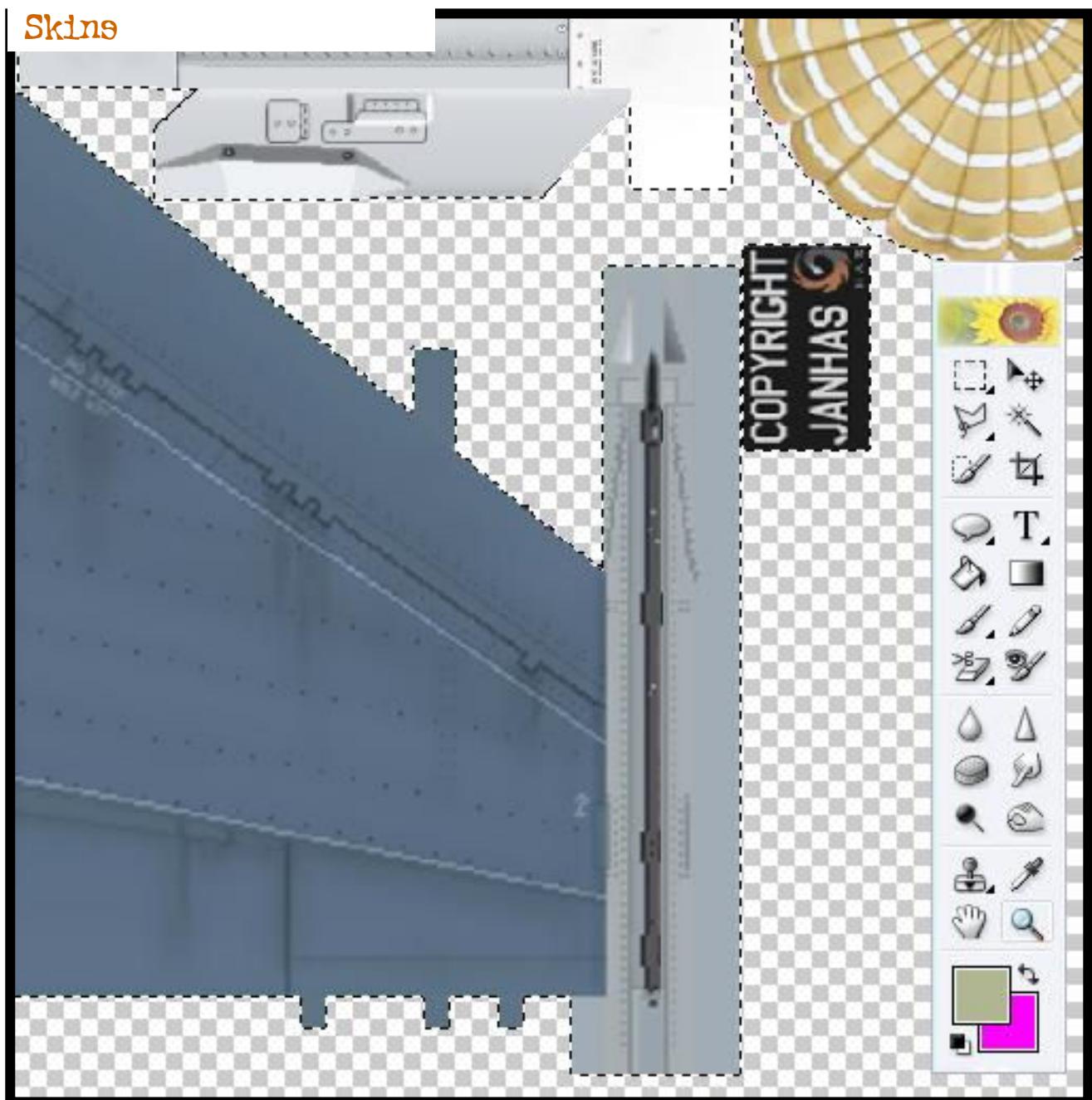
Use (on the right) the "Magic Wand Tool" and select the magenta colour.

Notice: the edges also have a darker or lighter magenta colour because of file saving. Select them also.

Use the additional options [between the two red lines to make selection easier].
(First: select one area. Second: Add areas to the selection. Third: De-select an area from the selection. Fourth: Intersect with selection.) [I use only the first three].

After you have selected all of the area, you need to erase the selected area by using the "Background Eraser Tool" (right clicking on the eraser tool). Erase a little part and then hitting the "delete key" on the keyboard will erase the rest of the background.

You'll now have this →



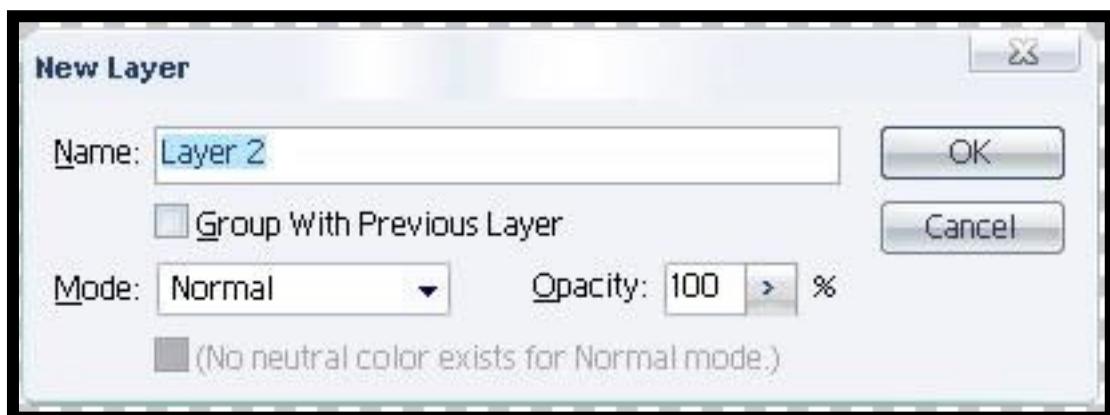
Now select the entire skin (*CTRL A*). This is also the moment to re-size the skin if needed. If you do that, make sure that - after resizing - you select the skin again.

Copy the skin. (Save if you feel the need. It will become a psd format).

Now create a “New” (picture) (*CTRL N*).



Then add a second layer (100% opacity). Naming the file is not needed.



Now paste (*CTRL V*) the skin file.

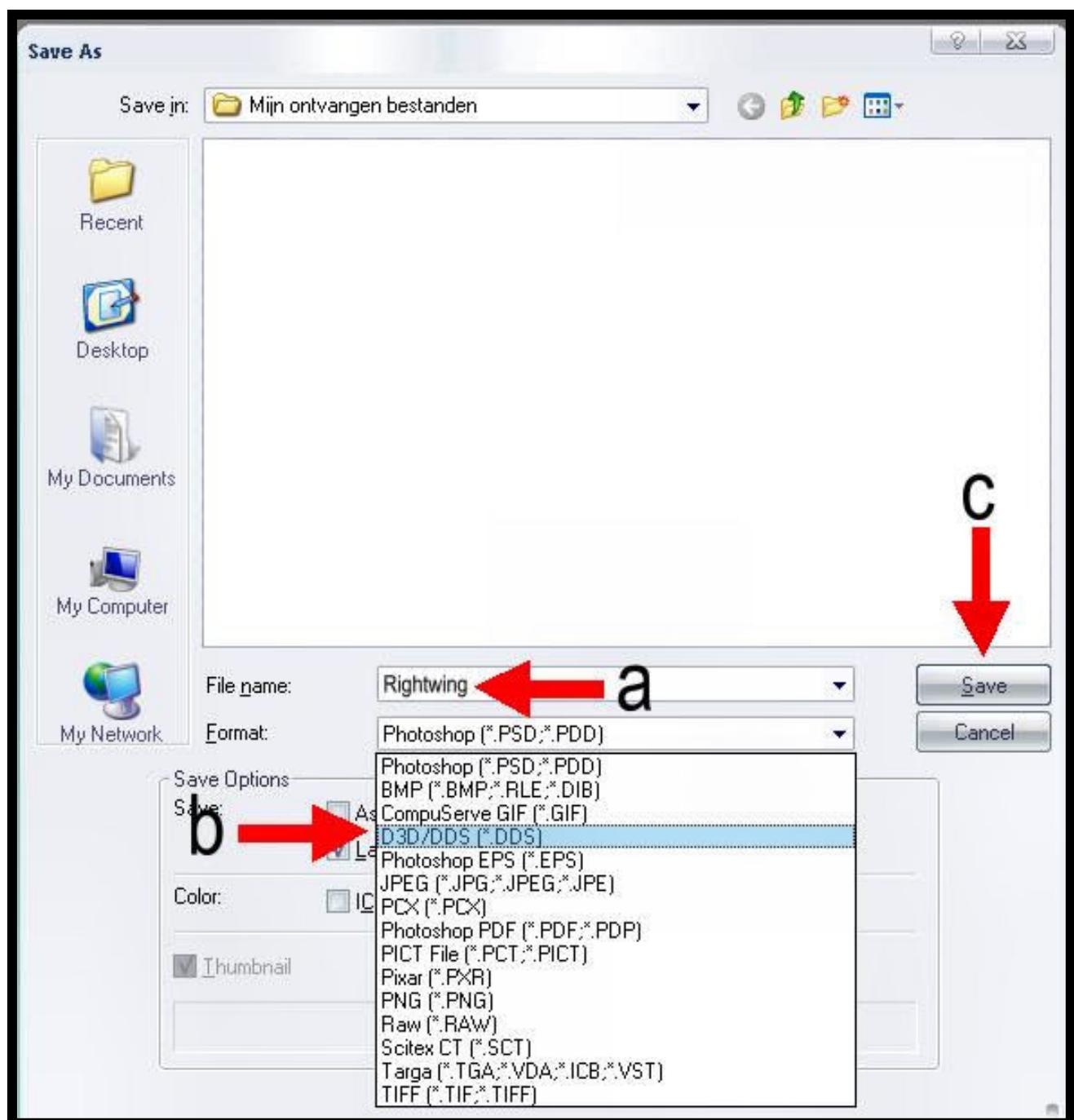
Notice → Here is where the white corners become handy. *For example:* when you have erased near the bottom of the skin the entire area, the pasted skin will be centered in the new file. With the white pixels in the empty corners, shifting to the center will not happen.

Now you have a new file with two layers:

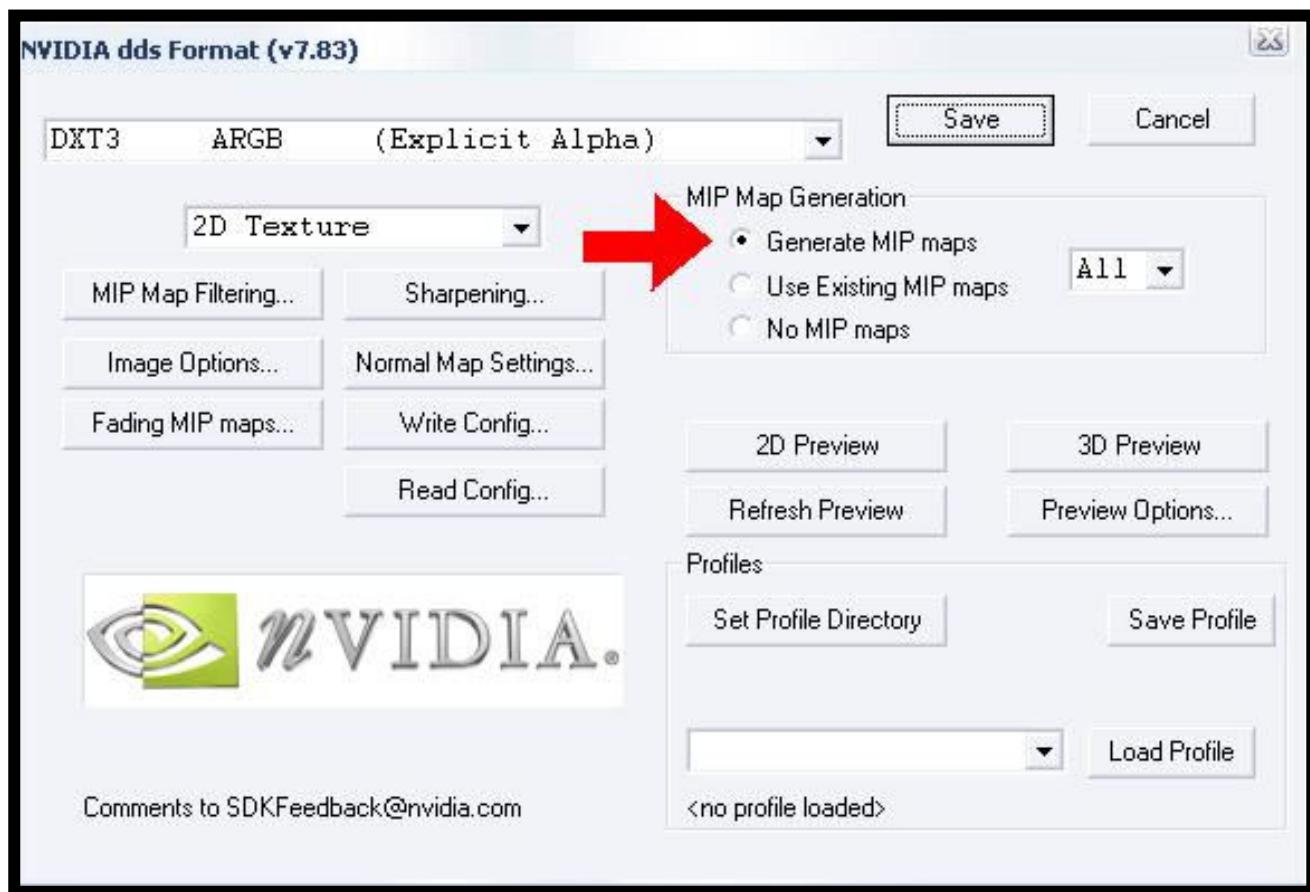
- i. The background layer (1) [also no fill]
- ii. The skin layer (2).

Now it's time to save (CTRL S).

- a. Give your skin the appropriate name.
- b. Select the dds format.
- c. Save.



Now you enter the dds saving options menu.



Select the “Generate MIP maps” option.

Next you have to select the output quality of the dds file.

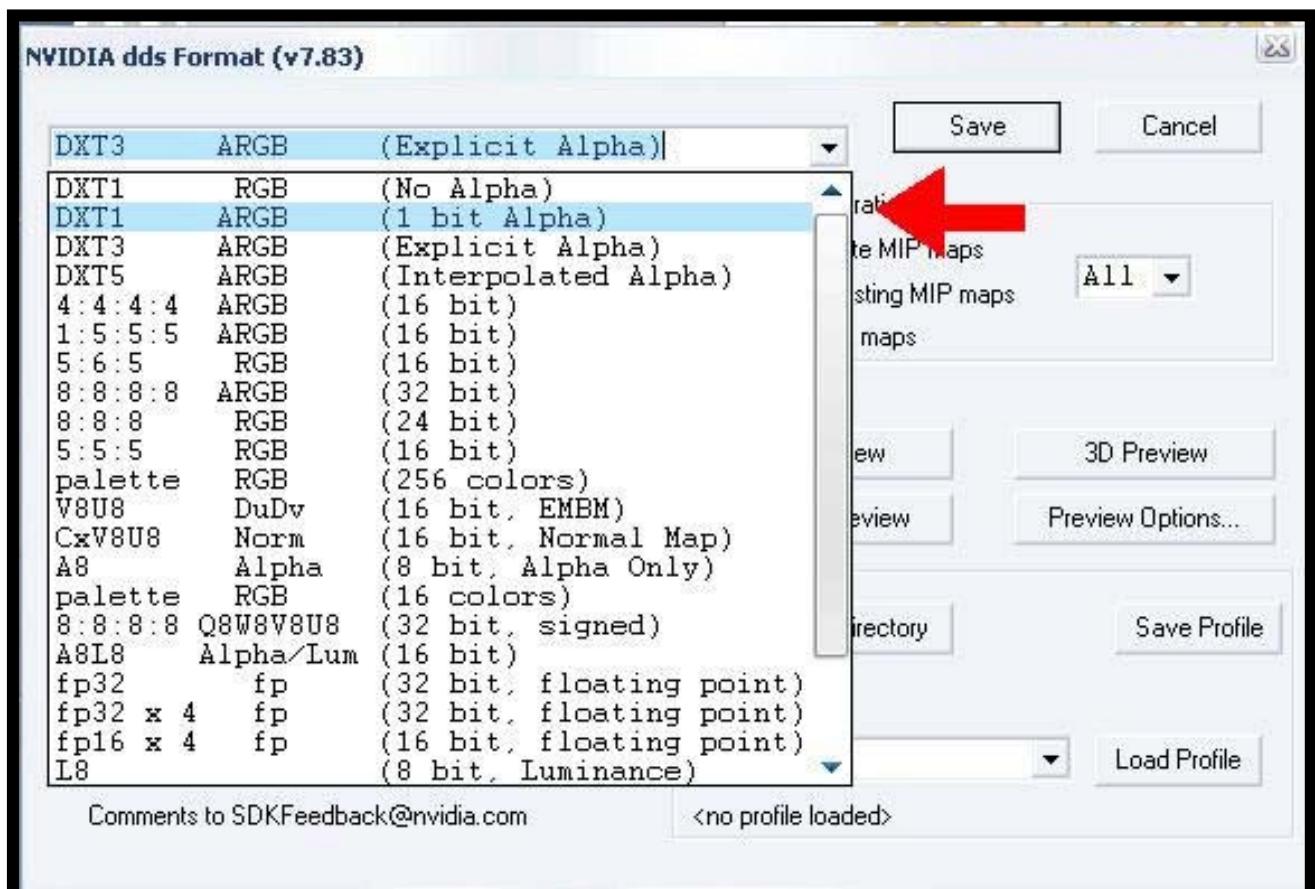
I normally use the “DXT1 with alpha” option. That’ll keep it nice and not too large.

Remember “DXT1 no alpha” is low quality.

DXT5 is high quality, but makes the skin file large.

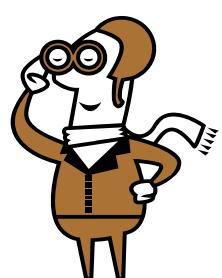
Larger means more video-card memory use and more rendering time.

(*For my cloud skin files I used DXT5*).



Now press "Save" and the skin file is ready for use. Congratulations...!!

Nobody is old to learn! 😊😊😊



Red1's Advanced Techniques

Panel Lines, Highlights, & Rivets

Drawing panel lines and creating channels

These techniques can be used with any Photoshop version from P.S. 5.5, up to and including version CS3.

First, choose the Pen tool and set it to "Paths" in the Task bar. You need to be familiar with the Pen Tool, and should have the ability to create both straight and curve lines. If not, use Photoshop's help menu and practice until you are comfortable drawing any shape.

Next, draw an outline path with the Pen tool around the outside of the wireframe. Make the path about one or two pixels larger than the wireframe itself. The path **must be closed** by clicking on the first point you made when you started drawing the path. You'll see a small circle appear to the right of the Pen tool icon when closing. Then go to the *Paths Palette* and name the path. Click once on the "Load path as a selection" icon at the bottom of the Paths Palette (*third icon from the left*). This will turn the path into an active selection.

Now switch back to the *Layers Palette*; create a new blank layer, and fill the selection with whatever colour you choose (*Alt + Backspace keys*). Drop the selection, *Ctrl+D* and save the file. Get into the habit of saving your file often.

Next, create a new blank layer above the filled base layer. Then, begin drawing the panel lines in black with a one pixel pencil tool on the new layer. I also use the Rectangular Marquee tool and Line tool (*set to fill pixels with a one pixel width*). When the panels are finished, *Ctrl + Click* on the layer-thumbnail to turn the panels into an active selection (*marching ants*). Now - go to the *Select Menu* and choose "Save Selection."

The highlights Channel is created by duplicating the Panels Channel and shifting it one pixel down and one back, so it is off-set.

1. Duplicate the filled base layer and then load the Panels Channel as a selection (*Ctrl + Alt + 4*.)
2. Press *Ctrl + H* (*hide edges*), then *Ctrl + U* (*Hue/Saturation*), and enter '-15' or '-20' in the Lightness/Darkness field and press 'OK'. The intensity of the panel lines is a matter of personal taste, and the colour of the base layer.
3. With the selection still active, press *Ctrl + Shift + I* (*Inverse Selection*) then press delete. Drop selection, (*Ctrl + D*). You have now isolated the panel lines on their own layer.
4. Highlights and Rivets are created using the same procedure. To load the Highlights Channel, press *Ctrl + Alt + 5*. Each additional Channel would be '6', '7' etc.

The beauty of this system is the resulting panel lines mirror the surface they are being applied to. Take camouflage for instance, the lines have to have the same colours as the texture. You could not do this by stroking a path. The same holds true for weathering. The panels have to have the same dirt, and light & dark areas of the texture. Using Channels makes this easy.

Panel Line Blur

Make a copy of the Panel layer *Ctrl+J*, and apply a Gaussian Blur of 2 pixels. Press *Ctrl+U (Hue/Saturation)* and type '-5' in the Lightness/Darkness field. This action will darken the blur, and intensify the Panel Lines.

Now, drag the Blur layer to the bottom of the layer stack. (*Panels, Lights, Blur*).

Note: Remember, the panel lines you made are temporary.
You'll have to remake them as the final step after you get the base surface finished.

Rivets

Use the same procedure as the panels. Create a blank layer and use the Brush Tool (set to 'Pencil') with a one pixel thickness and black as your foreground colour.

Lay out the rivets with the proper spacing and this will vary. I generally make a master row and duplicate it horizontally and vertically when I have to create lots of them. Rivets on a diagonal (*like the Tornado tail*) require using the Control/T command to rotate them to the correct angle.

When all rivets are in place on your temporary Rivet layer, *Ctrl + Click* on the layer thumbnail to get a selection. Save the selection as a Channel. Switch to the *Channels Palette* and check the new Rivet Channel for any dark areas. Use the 'Dodge Tool' (set to 'Soft Brush') and '100%', to brighten them. (*Usually only happens with angled rivets.*)

Make a copy of the Rivets Channel and rename it "Rivet Lights". I nudge the lights one pixel up, so the highlight will sit above the rivet. Switch back to the Layers Palette; copy the base skin; load the Rivet Channel and make them 10% to 20% darker than the panel lines. Rivet Highlights are done the same way, only 10% brighter than the rivets. Place the Lights layer above the rivets layer.

If the rivets are in a really dirty area, I'll give them a slight blur layer underneath.



Weathering Tips

Note: Turn off the Lights and Blur layers and leave the Panels turned on as you weather the base texture.

I use the 'Burn Tool' at low exposures (5% to 15%), and vary brush sizes to add dirt on the base around some of the panels, rivets, etc. I also take advantage of the additional brush libraries to add different textures. **Exposure and Brush size are the keys here.**

Getting the right combination takes some experimentation.

What I rely on a great deal, is creating a "wash" with the lasso tool. For instance, an external fuel tank gets repeated exposure to the elements. After awhile, the paint starts to fade where precipitation runs off vertical surfaces and "washes" start to show. A darker wash occurs when dirt is added to the process.

I have automated this procedure with a series of actions, which will either lighten or darken the base after I make a selection with the Lasso Tool. If I were to do it manually, here is how it would work:

Use the Lasso Tool to outline an area of "wash" along the bottom of a panel. The shape of the resulting selection should have drips or rivulets (*like melting candle wax*).

→ Go to *Select/Modify/Feather* and use a one or two pixel setting.

→ Press *Ctrl+U* and use “-2” or “+2” in the Lightness/Darkness field. I vary those settings depending on the effect I want. The Actions allow me to apply this quickly because I repeat this many times and vary the shape of each selection, to gradually build up the weathering.

I can't possibly cover all the tricks that I use in this short tutorial, but I've given you the important ones and hope they help you create some beautiful art.

Happy Skinning!



FF TEXTURES – 512 vs 1024

*It's all about the Size, and - MORE importantly - the **NUMBER** of textures.*

So – you wanna' make a 3rd Party Add-On skin...? Listen Up...

After much research and experimentation, it has been surmised that poorly optimized textures are one of the main causes for stutters in Falcon4.0.

Some skinners are offering skins to the community, that – perhaps unknowingly – are doing a dis-service to the end-user; making their sim-experience less than it should be.

These rogue skins not only affect FPS and create stutters, they can also lead to the simulation itself getting an undeserved reputation for FPS-issues.

Based on much experimentation and research by the FF Coding Team, and the FF Development Team, the following guidelines are recommended for creating 3rd Party skins for FreeFalcon.

Remember – anybody can make a nice skin. Only the true artist can make a nice skin within the limitations of what the sim can manage. Take the challenge... ;)

- i. Forget about your 2048 mega-skin. Most skins should not exceed 512 x 512. In fact, 128 x 128 is acceptable for most “secondary” skins. MOST aircraft can go to 512 x 512, and PREMIER, front-line aircraft can stretch to 1024 x 1024. Again – it is easier to make a detailed skin in larger sizes, but – this is what separates true artists. Skinners like Red1 who are able to make such detailed art whilst sticking within the size limitations. Bigger skins mean more stutters.
- ii. Stop spreading your textures around. The most important finding involves the habit of spreading skins over multiple textures. Use as MUCH of the texture as you can. When mapping a texture, try and get as much as possible; ALL, if possible onto ONE texture. Skins spread across textures mean more stutters.

So, then - in terms of what is more efficient, which takes precedence - Size or Number of Textures...? What has our research shown to be more practical → 1 x 1028 texture OR 4 x 512 textures....?

The answer is: 1 x 1028 texture.

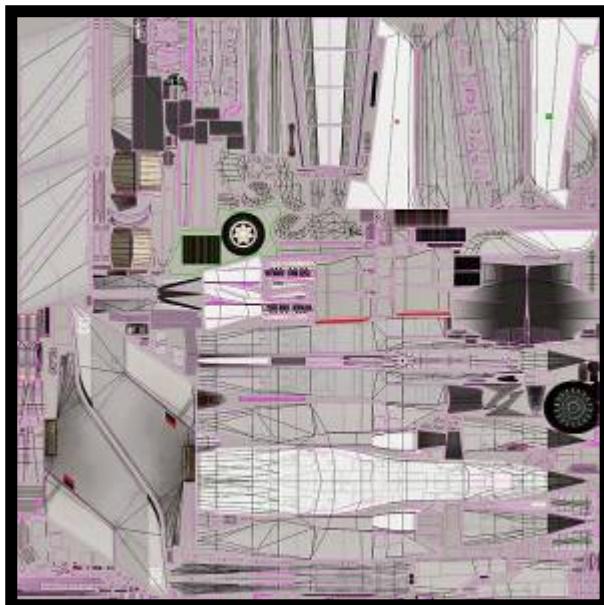
The NUMBER of textures has been found to have a far more detrimental effect than the SIZE of the texture.

Naturally, practical concerns must be balanced with graphical quality.

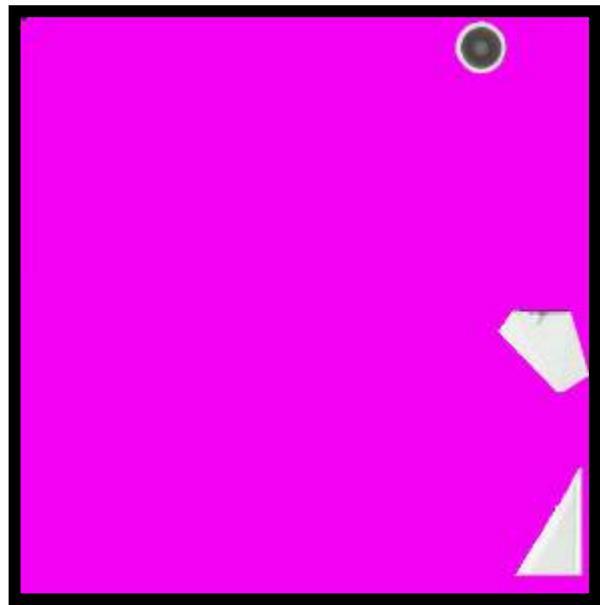
With regards graphics, nobody wants to regress. For this reason, it is suggested that a rule of thumb for an important/popular object – such as a FRONT-LINE fighter (eg. F-16) - would be 2 x 1024 textures.

When saving, use DXT-1. This can aid in texture and compression size.

Most importantly – fit as MUCH as possible onto the texture. Reduction of the NUMBER of textures is the most important thing to streamline the operation of Falcon4.0™.



GOOD



BAD

WaveyDave says →

From a texture mapping point of view one is better than four IMHO. Especially when it comes to ensuring there are no aspect issues.

I also think it's easier to fit more onto a texture when it is one versus four.

I also think that one 1024 is too small for the showcase jets.

One of the reasons there is so much detail in – for example - the new Tornado isn't just because its using a big texture. Rather, it's because it is a very full texture.

I would guess there is less than 5% slack space.

Red1 says →

Apart from two jets, all the skins I've done for FF have been in 512.

Larger sizes DEMAND more research, more detail and the expenditure of many more hours to make a skin worthy of the increased real estate. I'm speaking of 1024 and 2048 res. I've spent just as much time FINDING small parts on the Tornado and learning where and how they fit as I've spent skinning them. They are a lot easier to locate on a 512.

512 is the magic number, IMHO. If four 512's are placed on one 1024 without any rescaling of parts, then it's more efficient than four separate textures.

512 forces the artist to make crucial decisions as to the amount of detail that can be achieved on any given part and a quick, acceptable compromise is the result.

You only have so many pixels to make it work or you simplify it....

Finally – **to MIPMAP or not to MIPMAP.**

What do we recommend...? Should a skinner be saving with Mipmaps...?

The answer is: YES. As FF supports it, one SHOULD save textures with Mipmaps.

Mipmaps can both reduce shimmering and increase render speed. Mipmaps are also used by anisotropic filtering. Incidentally, in order to reduce file-sizes, some people recommend creating the mipmaps before converting to DDS.

FreeFalcon is happy to be involved with hosting your skins on the FreeFalcon WebSite. We want to act as a conduit for you to share your work with the community.

We would be reluctant, however, to host skins which are going to be problematic for the community; skins which will cause issues with the smooth operation of the sim.

Common sense would dictate that any mod or add-on should ENHANCE the product; not damage it, or render it less flyable.





FreeFalcon5.0 – Home of STEALTH

DEWDOG'S TE WAR COLLEGE

AIRMOBILE II

The Airmobile Section updates & replaces the Airmobile Section in the FF4.0 Manual.

TAC ENGAGEMENTS PAST DAY 1

Creating Tactical Engagements with the TE Editor in Falcon can be accomplished very simply if you follow some basic rules. You can even have a TE with some flights starting on one day; other flights on the next.



AIRMOBILE II

Subject: *Creating AirMobile missions in FreeFalcon*

Mission: *Create C-130 and AN-72 AirMobile missions in the Tactical Engagement Editor.*

Objectives: *Several. First - a bit advanced. Remainder - easier, but with attention to detail.*

Author: *Dave "DewDog_2" Wagner*

REQUIREMENTS:

- FF Config Editor update to select easier map when in the TE Editor.
- This PDF Tutorial.
- A Tactical Engagement placed in your Falcon4/campaign/SAVE directory –
- AirMobile Techniques.tac

PRE-DISCUSSION:

This training manual updates the AirMobileTrainer I did back in February of 2004. It applies to missions to be created in FreeFalcon. If any changes in future, will update.

Hopefully you have some familiarity with creating TE's. This is not intended to be a basic TE instruction manual. A good TE is all about timing. In AirMobile creation, we make exact placement of objects, and make critical adjustments to timing and distances.

DEFINITIONS:

Grid Point → Places on a map that ground units travel from one place to another. Grid Points are Towns, Bridges, Airbases, Factories and other fixed objects on the map.

Bubble → The distance between units that an Object ‘de-aggregates’ or becomes visible. We are concerned with the Bubble of Aircraft, which is about 30 miles.

STPx → Steerpoints in a Flight Plan, where ‘x’ is the number of the Steerpoint.

AirMobile (Amob) → The role of the aircraft we will use to pickup (PU) units.

OBJECTIVE → ‘Capture the Flag’: We will make a C-130 Amob flight to move a Combat Unit to Capture and Defend an Objective. It also applies to the DPRK’s AN-72 – their equivalent aircraft. You can also use the AN-2 and AN-12 if you choose

Some helicopters - both enemy and friendly are now able to have Amob roles. You use the same rules as the fixed wing aircraft. It is delightful to watch them takeoff, fly to PU STPT where they will land to retrieve their cargo, depart again to the Drop STPT where they will land again to deliver their goods. Then they depart and RTB. However to get them to land at Pickup and Drop steerpoint as well as land when RTB **you must edit the Flight Plan and set the elevations to 300'.**

CREATION:

To Capture and Defend an objective (airbase in this case) we must paint the map where the Objective is located using the Teams Tab. In this mission we paint the area around Kwangju AB to be DPRK territory. Using the “Add Battalion” button in the editor we place a M1A2 Armored on a city close to our C130 departure AB. Then click on the tank unit and drag its circle to Kwangju AB. The right-click on the unit and select ‘Status’. the Objective Kwangju AB. Right-click on the unit and select ‘Status’. In *Figure 1* below you can see that the Status is to ‘Capture Kwangju Airbase’. These pics are taken directly from the AirMobile Techniques TE included. The map used in the picture is the TEeditor map that can be enabled in the FF Viper Config Editor. It is very useful to determine exact road locations.



Figure 1

97th Armored Battalion ordered to Capture Kwangju AB

Next, using the “Add Package” button we are going to make an Amob flight, along with an F16 escort, to pick up the cavalry unit and drop it on Kwangju. Click on the cavalry unit and the ADD PACKAGE screen will open. It is best to use Take Off time so change to that. You can always change your times later. Then click on the NEW tab. Your ADD FLIGHT window will open. Select the C-130H for Aircraft, Air Mobile for Role and adjust number 1-4 that you want in the flight.

When you have done this then click the OK tab. Since we are creating a package, we want to leave the ADD PACKAGE window open for a moment so do not click on its OK yet. Now you will see a pre-planned flight for the C-130s. We want to click on the blue triangle (STP4) of the flight plan and drag it over Kwangju. Zoom in if necessary, as the drop point must exactly cover the center of the Airbase’s icon. STP2 is the PickUp STP and STP4 is the AirDrop STP. STP3 is where the flight calls out ‘Nearing Drop Zone’, so slide STP3 nearer to STP4. *See Figure 2.*

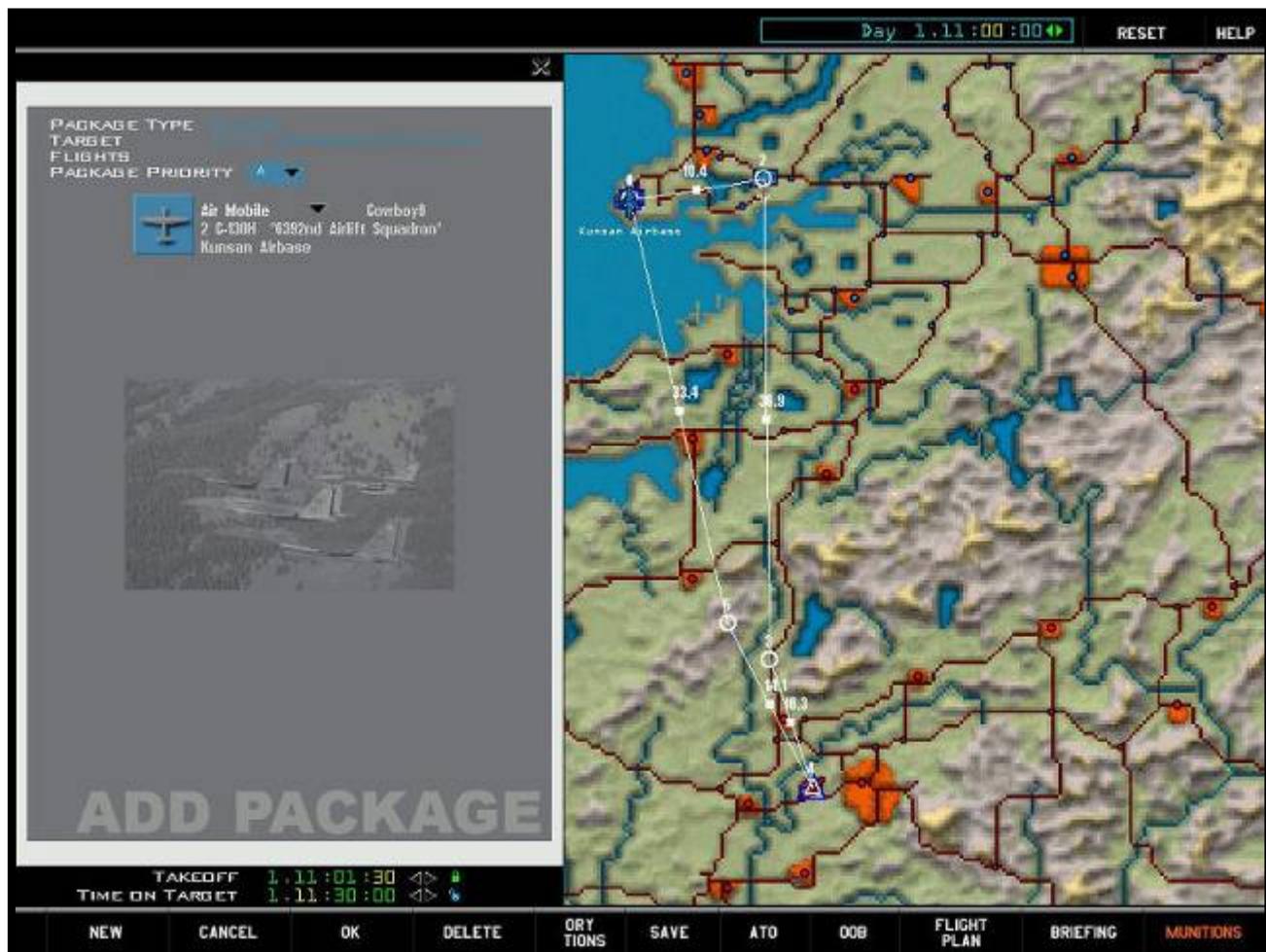


Figure 2 → C-130 tasked to pick up tanks at “2” and drop at “4”.

Note that “3” was moved closer to “4”, as “3” is where they call out “Nearing Drop Point”

Now we want to go back to the ADD PACKAGE window and select NEW again. This time we will select F16s as the aircraft and Escort as the role. Again a pre-planned route will be made and you will want to drag the target STP to the same area that you moved the C130 STP4.

Click OK on the ADD PACKAGE window and you are done.

Some of the STP's may show red. This is usually because Speed for that STP was calculated too low. Just edit those in the Flight Plan for that flight.

In this particular mission we edit the Flight Plan of F16 to add few minutes CAP and then land at Kwangju after the tanks capture it.

See Figure 3.

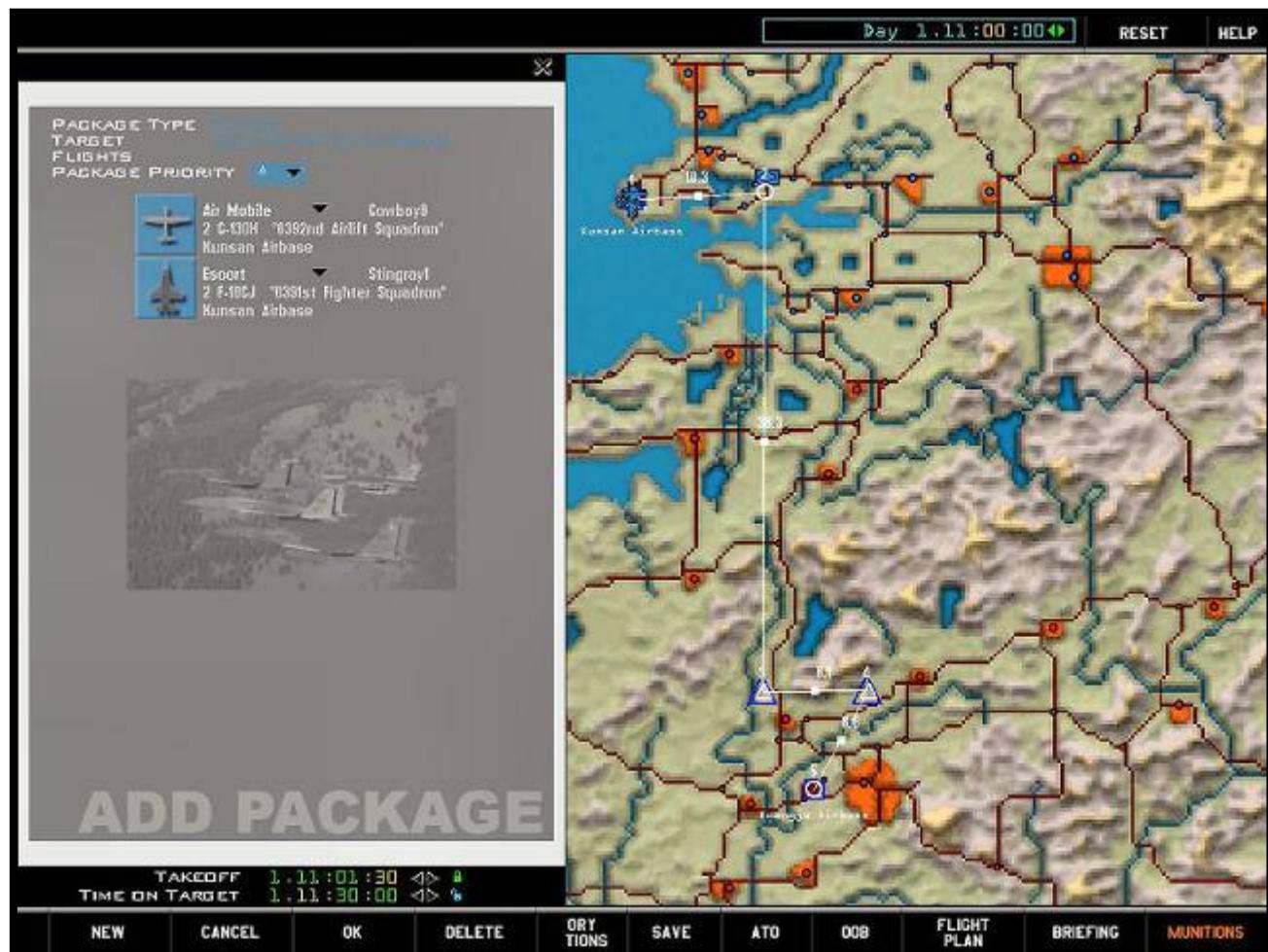


Figure 3 → F-16 Escort added, and WP's changed so it has a CAP section as well as landing at Kwangju after the airbase is captured.

Note – IF the capture is not completed, then aircraft will return to their alternate landing field.

The C-130 STP's after AirDrop were added to extend flight time and edited to land at Kwangju.

See Figure 4.



Figure 4 C-130 Flight Plan adjusted for landing after capture.

Figure 4 shows where you change the Role for C-130 from AirMobile to Air Lift.

A few theatraclals added, and the mission is finished. In FF5.0, go to Tactical Engagements/Saved and select AirMobile Techniques. Take the first flight in the Mission Statement: '*11:00 Fly Escort to C130 and CAP prior to land Kwangju*'. Caution! There are bogies stationed at Kwangju.

Objective: Relocate a moving Target via Amob → This is easier to make, but one must pay attention. We create an F16 flight to attack Armored Column near Pohang. We place the enemy Armored Unit on a GridPoint near Pohang and place an AN-72 squadron at Pohang. Do NOT have the Unit move. When it is Air Dropped it will move back to its start anyway. One of the weird things about Falcon is that in the Editor - if you created a Unit to move - it would not move until the time you placed it on the map. But when you go fly the mission, the Units start moving as soon as the clock does. So, depending on what time the Amob flight is, the Unit could be far away from where it was to be picked up.

Click on the tank Unit and create a new package as per above instructions, using the AN-72 as the aircraft. Adjust the Drop Point STP4 as desired, but again **exactly** on a GridPoint.

The secret to making a good TE of this type is all in timing of the Pickup and Drop plus distance spacing. When the player gets into his UI screen to Recon his mission you want the tanks to be sitting where they started. It is only after one commits to the 3D world that one times the AN-72 to Pickup and move the unit. Of course the Drop has to be within reason so it reappears to AWACS (and you) for you to find and do your run-in.

See Figure 5.

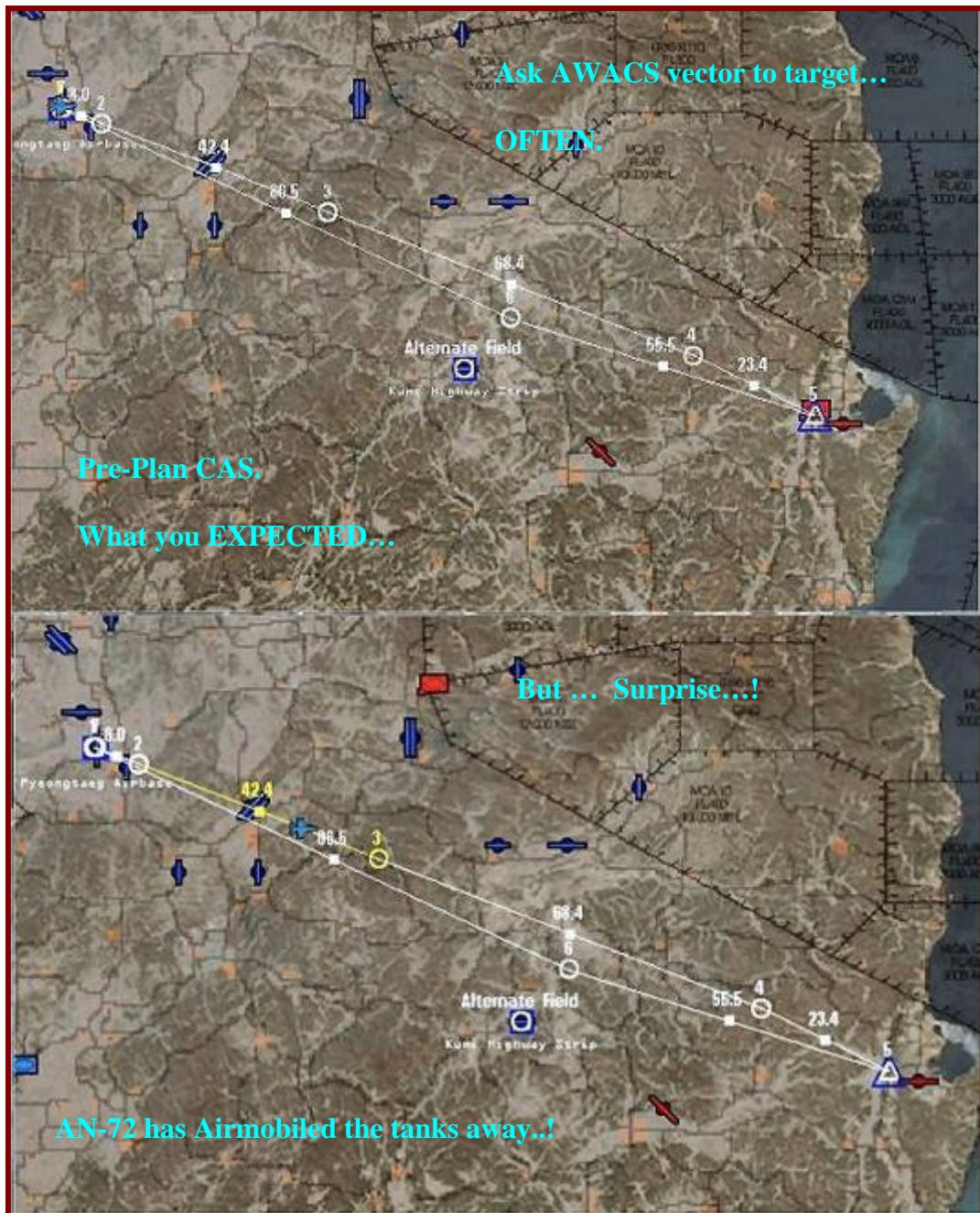


Figure 5

This is the second mission in Air Mobile Techniques: 12:00 Fly Pre-Plan CAS.

Ask Vector to Target from AWACS often.

Objective: Enable Amob to move Air Defense Unit → While this document has focused on Air Mobile movement of Combat Units, we have not begun to discuss the wide versatility you can have moving Air Defense Units. My favorite is to have an SA2 dropped somewhere in the path of a scheduled flight for some surprise elements to a mission. In order for this to work effectively, the author of the TE must plan carefully so that when his flight members initially join the mission, perhaps in MP, they will see the original SAM threat circles en-route even though one is being moved. The way to do this is to put a second SA2 on top of the one to be picked up.

To prevent complete surprise it is only fair to add a JSTAR's (E-8) to your TE as well as an AWACS (E-3). The JSTAR will update your SEAD information on your Nav MFD every 30 seconds. (*See FF manual or Section 1 for more details*).

Again, creating this mission involves the timing of the AN-72 flight to the F16 SEAD flight. You want the AirDrop to occur in front of the F16s of course, but at a point so as when the SAM gets dropped, it has time to setup it's radar and become functional. If you keep your distance separated from the Air Drop 35-40 miles to stay out of its Bubble, the time should be enough. *See Figure 6.*

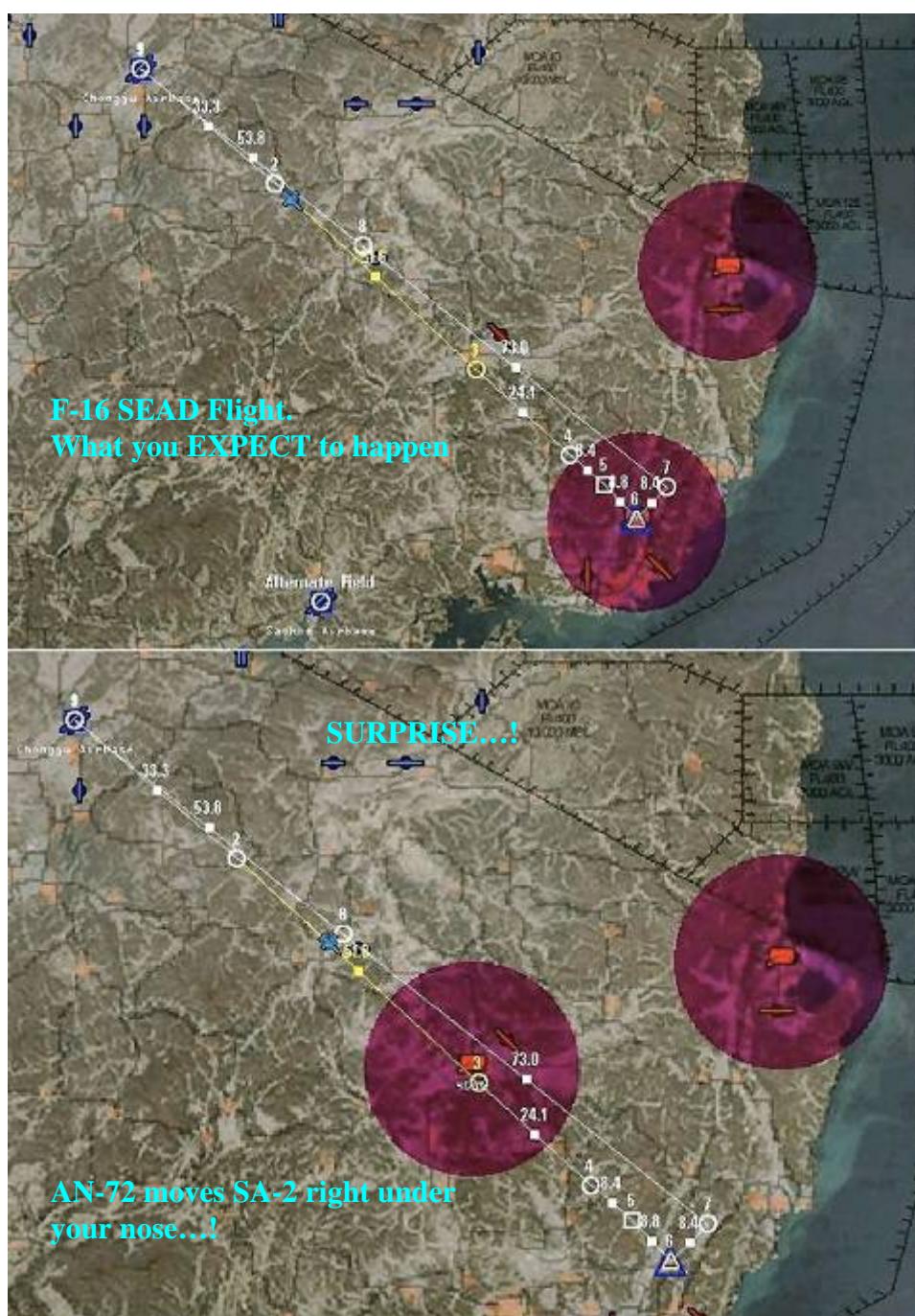


Figure 6

Objective: Move AirDefenses to assist Air to Air battle → Mission is set similarly to our first one as far as Take-Off time, and role remains Amob. Again a CAP section was added to the Escort F16s. Need help while on Cap? See Figure 8. Fly the 14:00 Escort with CAP. You will be a single F16 against possible 3 or more Mig-29's. Have no fear.... ☺

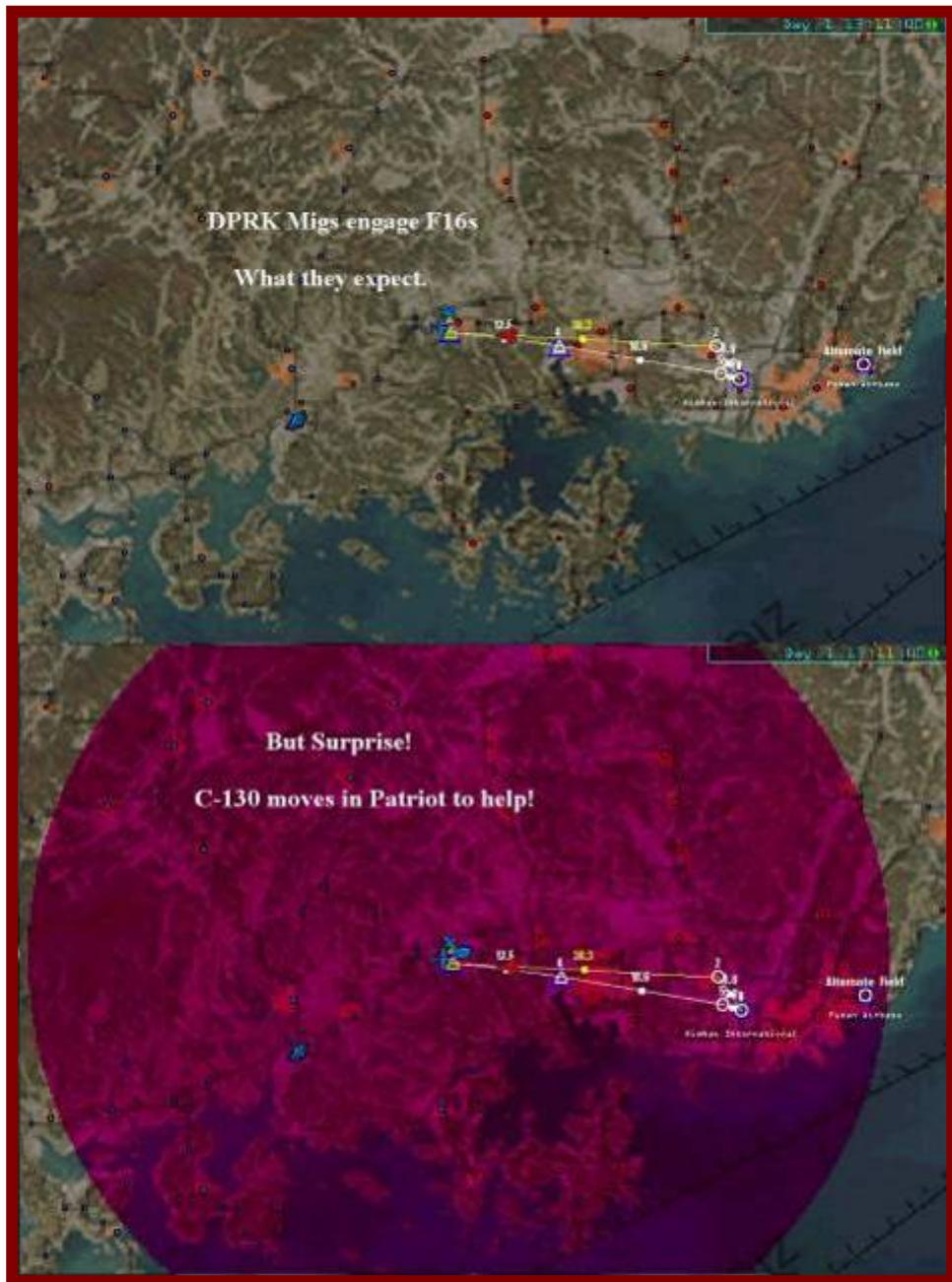


Figure 7

You may have to do a lot of tweaking, all good TE makers STPend a lot of time doing that...!

Final Points:

You can fly as #2 in an AirMobile flight and enjoy the show. You can also fly Lead. You can do this if your UI Setup is for Combat Autopilot.

If so, when at the Pickup and Drop WP's, enable Combat Autopilot. Timing will not be same as Mission was created but close enough. I would not recommend flying Combat Autopilot in the 3rd mission however. For some reason when the Tanks are moved and you are on Autopilot you flight will engage the nearby SA-2. I guess its more like 'target of opportunity'.

Also to have the best results, you and your guests should fly the assigned flight times, STPs and Assigned Speeds, or things may get whacky....

Unfortunately the TE maker already knows exactly what is going to happen. Well there are exceptions though. The "Havin Fun" TE in the FF install is one in which there are so many choices for the AI in A/A attacks that it never plays the same. And of course with the popularity of MP, having surprise TE's is a lot more fun than simply point and shoot.

In my opinion, it's what keeps Falcon alive...!

DAVE



CREATING TACTICAL ENGAGEMENTS BEYOND DAY ONE

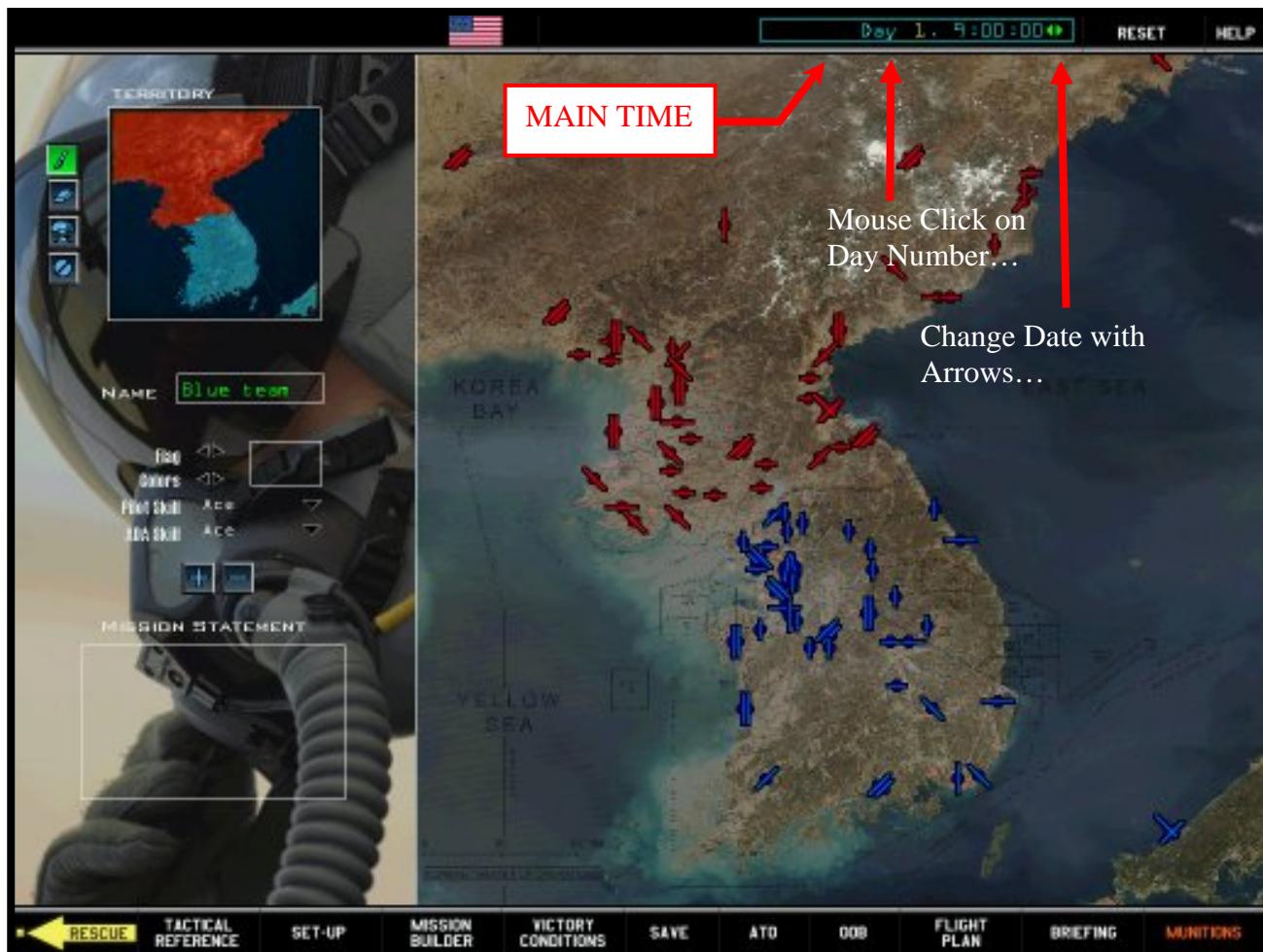
Creating Tactical Engagements with the TE Editor in Falcon can be accomplished very simply if you follow some basic rules. You can even have a TE with some flights starting on one day; other flights on the next.

Placing Combat or Air Defense units that will travel is not an issue. However when you do that you must realize they will begin to move at the time you run the TE and enter the UI (*User Interface*).

Very often when trying to make TE's past Day 1, the creator will make the flights and then change Flight Plans for one or more of his Package Units, only to find the TE is simply corrupted. Not so if you follow these rules...!

RULE 1:

The very first item you want to change is the Main Time. Selecting New opens the TE Editor page. Main Time is at the top of the page in your editor. You want to click on the Day number and then move the Arrow Keys to the Day you want to use. Choose any Day between 1 and 48. You can also highlight the time period if you so desire, either forward or backward. This will control the settings in the hour when you Add a New Package.



RULE 2:

After you have placed Squadrons on the Airbase(s) you want to use, you normally click on an area or an Objective or Unit you have placed on the map, and create a flight Package. When you do that, the **Add Package** will open. The default time is set for creating a Time On Target, with the Padlock to the right of the time shown in green. You want to click on the Takeoff padlock and turn it green so your flight will be created using **departure time** instead. You could of course leave it at Time On Target but I find that only creates problems in editing flights later.



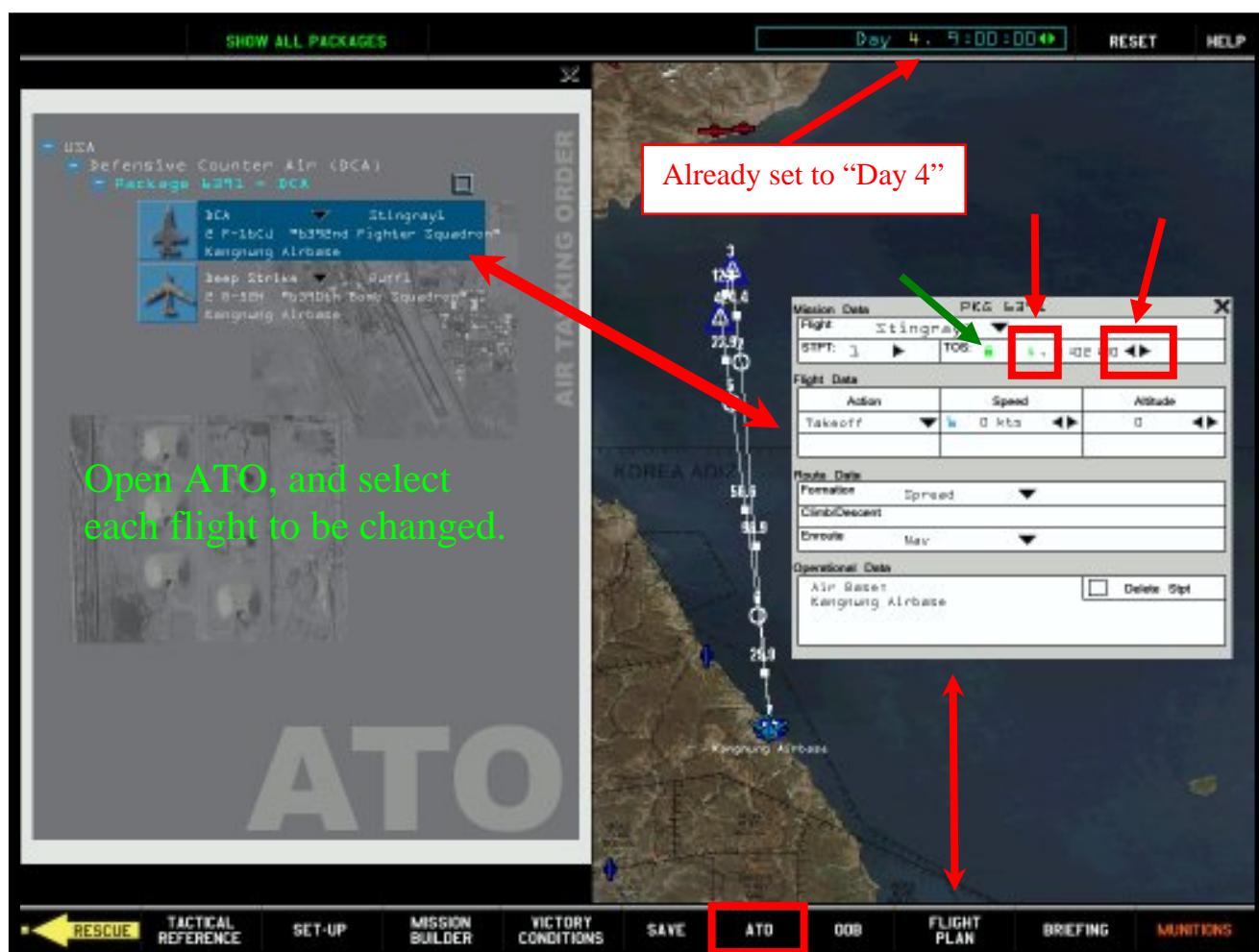
It is not necessary to change the Day on the Add Package window.

We will do that next, for each flight created...

RULE 3:

You will now create your Flight(s) or Package of Flights as desired. *Rule 3 must be followed explicitly* or you definitely will have problems later. As each flight is created you must edit its Flight Plan. You can click on the Flight Plan tab if you created a single flight. If you created a Package with multiple flights, you can open your Package by clicking on the ATO tab, and selecting the flights one by one to edit each Flight Plan.

The following example shows a Package of two flights, with the first flight's Flight Plan opened.



What you want to do on each Flight Plan is to change the Date to agree with your Main Time. In the above example, I have changed it to Day 4. Once you have done this you are free to change any Time, Steerpoint, and Actions you wish. As you advance your Flight Plan from Steerpoint 1 to other Steerpoints, you will see that each has the correct Day. If you now choose to change any Steerpoint for time, it will be first necessary to Unlock the time by clicking on the Padlock to turn it off from being Gr Again - once this is done, all periods will change automatically. Let's say for example that you created a Flight to Takeoff at 23:50:00 and reach its target at 00:15:00 the next day. You will see the correct Days are shown for TakeOff and Target Steerpoints.

It is not necessary that it be Day 4, it could be any Day following the Main Time Day up to Day 48. If you wanted to create flights starting one day, and have more flights the next day, it will be no problem if you follow the rules presented in this Tutorial.

THE RULES IN ACTION:

Why would you want to make TE's in this manner? Well, for one, you could create your own mini campaigns. Make as many flights as you want over several days. You will, of course, have a problem with moving Units, as they begin to move when you start your mission. Initially making them stationary, could be a workaround for this. Then - when you are in the UI and running the mission, you could then click on the Unit, and have it begin to move toward its Objective. However, you could only do this for the Team you have joined. So, it does have limitations.

Another use is to create TE's that have the Moon in a certain phase or position as your flight progresses. To do this you will need to refer to the Appendix first presented in the FF Weather Section. For your convenience, it is reproduced below.

The Appendix shows the time each day that the moon is first visible. For example - on Day 1, the moon begins to rise at a heading of 90 degrees at 03:01:00. On Day 6, the moon is first seen at the Sunset time of 19:03:10; at a heading of 291 degrees. It will be at an Inclination of about 15 degrees above the horizon.

Each time the moon rises it takes roughly 9 hours to travel a 90 degree arc through the sky to the point the moon will set. So for a rule of thumb use 10 degrees of moon movement for any hour you create your flight, within the times listed in the Appendix.

For example, we want to create a Flight for the moon to be up about 40-45 degrees East and be in a Full Moon phase. Looking at the table we see the moon begins to rise at 20:08:20 on Day 20. Adding 4 hours it should be at an Inclination of 40 degrees 4 hours later or 00:08:20.¹ It rises at 125 degrees to the horizon, so - four hours later, it should be at a heading of about 160 degrees.

So we create a Flight on Day 21...the next day...at 00:08:20 and see how it comes out.



It appears in the photo above that - indeed - the moon *is* full and *is* at a heading of approx. 170 degrees; 40 degrees above the horizon...



¹ This is an approximation. You will – of course – need to experiment.

APPENDIX → Moon Position, Time and Phases

Day	Time	Phase	Compass heading (deg)	Inclination (deg)
1	03:01:00		90	0 Rising
2	03:23:10		83	0 Rising
3	03:44:10		76	0 Rising
4	04:09:50		69	0 Rising
5	04:38:20	New	64	0 Rising
6	Sunset 19:03:10		291	15
7	Sunset 19:04:22		286	30
8	Sunset 19:05:25		279	45
9	Sunset 19:06:15		273	60
10	Sunset 19:07:07		262	60
11	Sunset 19:07:12		248	70
12	Sunset 19:08:05	1 st Qtr	226	70
13	Sunset 19:08:35		200	70
14	Sunset 19:09:38		176	70
15	Sunset 19:10:30		159	70
16	Sunset 19:10:44		148	60
17	Sunset 19:12:00		139	45
18	Sunset 19:12:35		131	30
19	Sunset 19:12:55		124	10
20	20:08:20	Full	125	0 Rising
21	21:18:00		127	0 Rising
22	22:18:00		125	0 Rising
23	23:07:00		122	0 Rising
24	00:00:01		130	15
25	00:00:01		118	5
26	00:20:26		107	0 Rising
27	00:44:34	Last Qtr	99	0 Rising
28	01:09:36		92	0 Rising
29	01:30:24		84	0 Rising
30	01:52:25		77	0 Rising
31	02:21:40		72	0 Rising
32	02:44:55		65	0 Rising
33	03:15:20		60	0 Rising
34	03:52:20	New	57	0 Rising
35	04:36:30		55	0 Rising
36	Sunset 19:20:40		290	30
37	Sunset 19:21:00		282	45
38	Sunset 19:21:15		272	60
39	Sunset 19:22:00		262	60
40	Sunset 19:22:05		246	70
41	Sunset 19:22:10	1 st Qtr	231	70
42	Sunset 19:22:20		213	70
43	Sunset 19:22:22		194	70
44	Sunset 19:22:22		178	60
45	Sunset 19:22:22		163	50
46	Sunset 19:22:22		152	45
47	Sunset 19:22:22		140	30
48	Sunset 19:22:22	Full	130	5





CAMPAIGNS

FreeFalcon has undergone a fundamental shift in its approach to developing Falcon4.0. Acknowledging the ‘Dynamic Campaign’ as the core of Falcon4.0, the FreeFalcon Development Group has shifted focus toward ensuring that – perhaps for the first time ever – these campaigns are fully functional. The restoration and renovation of the three CORE Korean campaigns (*Iron Fortress; Rolling Fire; Tiger Spirit*) will ensure that the revolutionary VU.v2 engine can begin to deliver at full potential.

For too many years, Falcon4.0 has been a Ferrari, driven like a golf-cart. The FreeFalcon Team is now focused on tuning and unleashing the VU.v2 engine, and giving the community that which has been missing for so long: functional campaigns, which utilize the full potential of the AI with regards load-out, tasking, troop movements, and successful conclusions to campaigns.

What of the Eurowar and Korea2012 theatres? Lessons learned from Korea are currently being put to use in these theatres.



There are many talented individuals and groups, who have spent much time in the development of 3rd Party theatres. Unfortunately, none of these theatres have ever worked. Indeed – due to years of hacking and modding – no Falcon4.0 theatre currently works. Thus – the FreeFalcon Team has switched its primary focus to the elimination of these problems.

Once the three CORE campaigns are in place - and working as Gilman Louie intended – the road will be open for 3rd Party developers to begin the creation of fully functional theatres. Already – and in addition to the great successes experienced with the core Korean campaigns - the FreeFalcon Team is conducting research, development and testing of an Israeli, Taiwan, and Panamanian theatre. Drawing on the knowledge, tools, skills, guidance, and cooperation of the FreeFalcon Development Group, 3rd Party developers will now have free rein to produce working theatres and campaigns. Thus, it is envisioned that - insofar as community development is concerned - a “European Theatre” will be one of the first projects to leave the blocks.

So – when were the Campaigns “broken”, and will they work as well as they were originally intended? “When” they were broken is impossible to say; that they ARE broken is demonstrable, and without question. Did they work in the 1.08 release? Perhaps. But – we do not have concrete evidence of that. We do have anecdotal evidence in that many of the ‘old-timers’ have finished campaigns. However – neither the tools nor the knowledge existed at that time to objectively determine whether or not the campaigns were working.

So – after the attention of the FreeFalcon Development Team, will the campaigns function as well as the original 1.08 release? Most certainly. Will they function better? They most certainly may.

Either way – it is what every Falcon4.0 pilot has hoped for since 1.08.

Perhaps one way to demonstrate what is being achieved, would be to look at some parallel situations, from ‘before’ and ‘after’ development. **Let’s examine a typical Tester’s Report**, from before and after the FF team’s Campaign Focus.

BEFORE:

(Campaign Team - Test Report; submitted - x.3 Cycle)

Mission 4: Seoul AB. Tasking: 2x F-4EK – BAI - north of Songchong.

Loadout: 3xAIM-7, 4xAIM-9, 6xCBUs T/O: 1204

Bug Report - jamming pod has wrong model.

Bug Report - CBU-58 has wrong model.

Form up and climb out uneventful. Did a low pass over the armored battalion stalled near Paechon Bridge. Seems they’re in line formation, stopped just short of the bridge. Confirm no movement in 2D World. Took the flight north. AWACS called bogeys 330 at 60.

Picked up that SA-2 still sitting off the DMZ.

Bug Report - wingman ‘disappeared’ enroute.

Got SA-2 launch. Broke down into it.

Bug Report - SA-2 missile has wrong model.

Checked friendly view.

Bug Report - AH-64 weapons have wrong model.

Went to CCIP to drop on SA-2 site.

Bug Report - CTD cycling through ground radar modes. Crashlog posted.

AFTER:

(Campaign Team - Test Report; submitted - x.3 Cycle)

Mission 6: Seoul AB. Tasking: 4x F-4EK – BAI - north of Songchong.

Loadout: 3xAIM-7, 4xAIM-9, 6xCBUs T/O: 1350

Checked 2D planning map before takeoff. Armored units across Paechon Bridge and moving on Songchong! Moved SPt_3 west of friendlies approx. 10nm to deconflict.

Form up normal. Picked up SA-2 near DMZ. Wingman engaged with CBUs for a kill.

Ordered rejoin. At SPt_3, picked up flak and enemy GVs on road. Ordered weapons free. Flight cycled through the target twice. Dropped in CCIP single pass on column.

RTB: 1440.

Result: Success. Me: 4xGround kills, Wing: 6xGround kills, -3: 2xGround kills, -4: no kills.

Bug Report - no bugs noted.

It may be difficult to fully appreciate the ramifications by simply reading a Tester's Report. Toonces now takes the above reports, and presents them in a way, which more accurately reflects the view from the Virtual Pilot, immersed in the simulation →

BEFORE: Tiger Spirit 160th Armored Battalion, Paechon Bridge, North Korea

Major Smith knew it was going to be a long day.

He looked down, reading his orders from Commander Vu2 again: "Immediately deploy forces to attack and capture Songchong junction. Secure objective and advance to Haeju. Expect enemy ground forces in the vicinity of Haeju Factory. Reserves are available. Air support will be provided. –Vu2 sends."

Smith looked up and surveyed his forces. They had deployed from their positions south of the DMZ two days before. And everything seemed to be going so well. And...now everything seemed to be going so wrong.

It started simply enough. The 'Norks' got frisky, crossed the DMZ in force, and began the Korean War where it left off 50 years before. The initial assault was hastily beaten back and the combined US and ROK forces rapidly progressed from their peacetime bivouacs across the DMZ and into North Korea. Smith's own battalion, the 160th, progressed unopposed from the woods north of Seoul's suburbs, moving through the last friendly junctions enroute to Haeju. But, then... something extraordinary occurred.

Two days out of Seoul, deployed into line formation, the 160th approached the Paechon Bridge. Seeing it in the distance through his binoculars, it appeared undefended and intact. Inwardly, he sighed in relief. He had secretly worried that the crossing would be heavily opposed, choking the rapid advance towards Haeju, and from there- Pyongyang.

As the battalion approached, though, Smith saw the lead vehicles stop. Soon the entire battalion stopped, yards from the bridge onramp.

WTF?

Smith dismounted from his APC and ran to the head vehicle. A bewildered Sergeant looked from the hatch of his M1A1, eyes wide and uncomprehending.

"Sergeant, what's the hold up? WHAT THE HELL IS GOING ON?"

"I'm not sure, sir..." Sergeant Wilson replied. "Everything was going fine...and then we just... stopped..."

"What do you mean you *just stopped*!?" the Major exclaimed.

"Just that, sir. We just stopped!"

"Well, did you check your fuel? Did you check your supply?"

"Yes sir." Wilson replied. "Checked the fuel and supply - everything's normal. Checked the battalion's morale - normal. Checked our posture - still 'capture Haeju'. I just don't understand what's going on. We can't move forward. We've just stopped!"

Smith took a deep breath, his lungs expanding as he prepared to unleash a tirade onto the hapless Sergeant. Just as he prepared to unload, the scream of a pair of Phantoms caught their attention, the growl of their afterburners drowning out all conversation or even conscious thought. He looked up, thought he could see the pilot looking down at him...

Rooster Flight, Paechon Bridge, North Korea

Lieutenant Cho returned his gaze back to his instruments, his practiced eye taking in heading, altitude, airspeed, and a handful of other significant data in an instant. He keyed his radio: "Those tankers look pissed! Wonder what the hold-up is at the bridge? We're never going to get to Pyongyang if those chumps are taking smoke breaks every 10 miles..." "Yup," replied his wingman, Lt. Lee.

Cho looked over at his wingman, another practiced gesture. His eyes moved to the weapons hanging under Lee's jet. AIM-7s...? Check. AIM-9s...? Check. But - it was the air to ground ordnance that had him bewildered. Typically - on a BAI mission - they'd carry some cluster bombs; maybe some Mk-82s. On this mission though...well - they were carrying a pair of jeeps on the outboard pylons, and what looked like a piece of fence, or something-of-the-sort, on the centerline. *WTF?* Well, Cho had been around the block long enough to know better than to question orders, but even he had to admit to himself that this was the most unusual loadout he'd ever seen. Still...orders were orders.

"Picking up some activity on the RWR, Cho," Lee hollered out.

Cho looked right, saw the '2' symbol for an SA-2 on his warning receiver.

"Roger, keep your eyes open."

Cho looked left, then right again, unconsciously checking his wingman's six.

As he looked over, Lee just... *disappeared*...!

"What the fu...?!" Cho exclaimed.

One second Lee was there... then he just... wasn't. No jet; no smoke; no Lee.

A rattling, blaring sound in his helmet snapped his attention back to the cockpit in time to see the launch warning going off.

"Shit!"

He looked down and right, saw the launch plume on the ground arcing up towards his Phantom. He hit the chaff button three times, rolled inverted and pulled hard into the upcoming... centerline fuel tank...?!?

"What in the hell is going on today?!"

The fuel tank passed harmlessly over his canopy, detonating safely behind his rapidly descending jet. He rolled wings level just above the trees, saw the flash of an Apache flight passing to his left, Kilo class submarines slung under their stubby wings...

Cho felt woozy. Nothing made sense!

AFTER:

160th Armored Battalion, Paechon Bridge, North Korea

“Sergeant Wilson! Get these friggin' tanks moving RIGHT NOW or I am going to stick my boot so far up your ass, you'll be...”

Suddenly, mid-sentence, just before the punchline to end all punchlines, Wilson's tank lurched forward with a start.

“YES! GO, GO, GO!!!” Smith shouted.

His battalion rapidly began passing in formation, and moving over the Paechon Bridge. As his APC passed, Smith hopped up and into his vehicle. He checked his netted tactical display. All along the FLOT, vehicles were rapidly advancing into North Korea, capturing objectives all over the place. Songchong lay just beyond the bridge, visible on the horizon.

The familiar growl of a lone Phantom brought his gaze upwards briefly, as the jet roared forward towards the FLOT...

Rooster Flight, Paechon Bridge, North Korea

“Cho, where are you?”

“Lee?! Where'd you come from?”

“I... I don't know! But I've got an SA-2 on my right, two miles!”

“Hit it! Drop on it!” Cho yelled into his oxygen mask.

“Roger. I'm on it.”

Lee rolled the jet ninety degrees right, saw the missiles sitting on their launchers. He selected Master Arm ‘on’, put the pipper on the target, pickled a pair of bombs onto the closest launcher and trailer. He pulled off, dropping chaff; glanced over his shoulder, saw the secondaries.

“HELLFIRE!”

Suddenly, a pair of Apaches popped up over the ridgeline, Hellfire missiles popping off their wings and into the air defense battalion near the SA-2 site.

“YES!” Lee shouted.

Lee formed back up on Cho, pulled into tight echelon right formation.

Cho looked Lee over, saw the remaining CBU-58's under Lee's jet.

Cho thought back to the night before...they called it an ‘Irish Car Bomb’. Friggin' thing tasted just like a milkshake; so smooth; so tasty; and, those two hotties at the end of the bar, all those rounds...

“Oh man...was that it...?” Cho muttered to himself.

“What was that lead?” Lee asked.

“Nothing.” Cho replied. Let's get back into the war!

Toonees

CORE KOREA CAMPAIGNS:

Featuring a close to Real Life **Order Of Battle** (OOB) for ALL Air Forces.

Featuring many new aircraft , some NEVER BEFORE seen in a campaign.

Example aircraft, include:

US: F-117A, F-16DG, B-2A, RC-135W, AC-130, KC-130, KA-6D, C-2, CH-46

ROKAF: F-5A, RF-4C, CN-235, P-3, Lynx, Ka-27

The Ground War has been heavily modified and updated, and features improvements to Air Defense placement, and more balance and realism in the placement of ground units.

The “time-frame” of the three scenarios has been pushed forward to allow the deployment of modern aircraft and ordnance, that did not figure into the original Microprose vision. The basic theme of each scenario is – however – true to the original.

TIGER SPIRIT *(2001-2005) Easy Challenge Level*

North Korea is weakened from isolationist policies, and years of economic decay. It makes a swift and sudden – yet poorly-planned – attack on South Korea. The attack is quickly repulsed, and the DPRK forces are driven back to the North. The combined allied forces, however, decide to CONTINUE their push north; thus depriving the DPRK a chance to reorganize, and try again. Defense becomes offense, in a proactive push North.

ROLLING FIRE *(2001-2005) Medium Challenge Level*

Due to a failing economy, and no hope of diplomatic progress with the outside world, North Korea deploys its forces to a battle-ready state. With a million-man army massed on the border, tensions begin to bubble over. With both sides of the conflict having had time to prepare, forces are evenly matched, as war breaks out in Korea.

IRON FORTRESS *(2001-2005) Advanced Challenge Level*

North Korea makes a bold and lightning strike into South Korea. The surprise attack unbalances the South, and the allies are soon overwhelmed; forced south, and pushed into a defensive posture. It is only a matter of days until the DPRK pushes through the Pusan perimeter. It is a desperate situation, and the allied forces will need to hold the line, and slow the DPRK onslaught.

CHALLENGE SETTINGS IN CAMPAIGNS



Leave all Sliders and Settings as they appear by “**DEFAULT**”.

Air Forces
Naval Forces
Air Defences
Ground Forces

Campaigns have already been optimised using these extant settings.

A more experienced Falcon Pilot, who is finding a lack of challenge, may wish to experiment with the PILOT skill and ADA Skill (only).

Due to development, and modifications based upon that development, the most realistic Campaign Experience is based upon the **DEFAULT** settings.

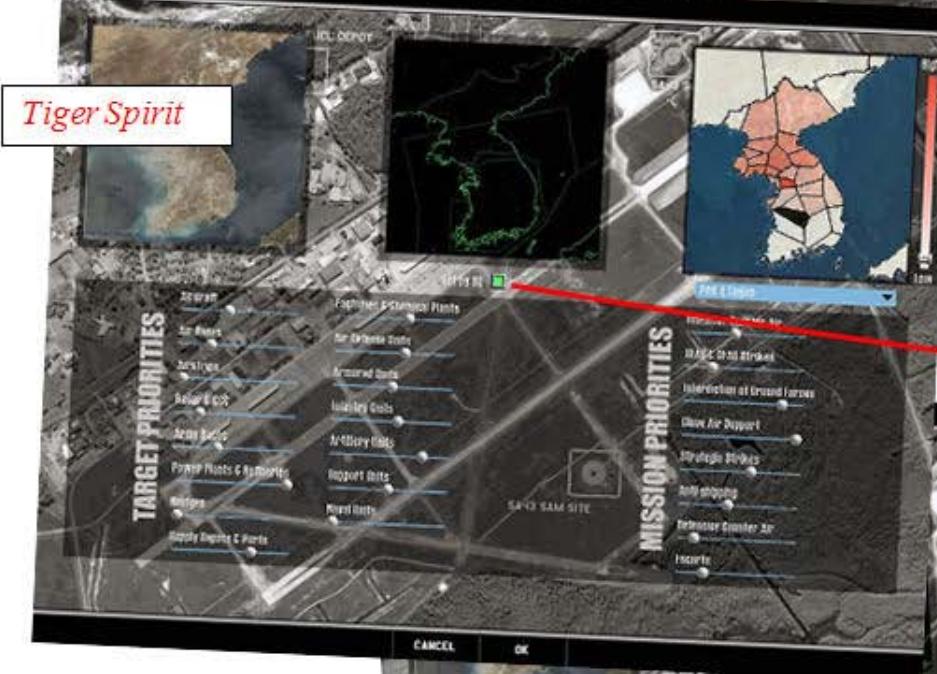
(As shown above.)

It is essential to performance that you do not touch these settings.

PRIORITY SLIDERS

Begin with all sliders in the “**DEFAULT**” position.

Check the “**Set by HQ**” box.



Rolling Fire

Tiger Spirit

Set by HQ

Adjusting these sliders IS - in fact - conducive to a successful campaign. However, incorrect adjustments may adversely affect game performance, and break the FreeFalcon5 ATO.

Do not adjust without guidance from the FreeFalcon Forums.



Iron Fortress

DEVELOPER CAMPAIGN NOTES

In a nutshell, *FreeFalcon5* now features the most realistic DataBase and Load-out DataBase, that have ever existed in a non-classified Flight Simulator.

And – for the first time – the Campaigns WORK.

Be advised – this is still a Work In Progress. But – it DOES progress.

You'll notice working Lines-of-Sight. You'll notice Ground Troops which actually MOVE, and achieve objectives. ATO which generates appropriate weapons and support.

Are there still problems? Yes, there are.

But, there is no other version which does – or ever has – offered the degree of functionality now evident in the *FreeFalcon* Campaigns.

You may notice that some ordnance is no longer tasked to some A/C

You may notice that some A/C is not tasked with the type of mission you want or expect.

You should know that – for the first time in Falcon Development – the *FreeFalcon* Group has identified some of the fundamental ATO problems inherent in every other version of Falcon; past and present.

There is nothing “random” in these developments. If you are not seeing choices you have previously “enjoyed”, it is because your previous “enjoyment” was heavily bugged.

What has been changed, and what has been discovered about the limitations of certain data and code? This is something which may be discussed at some time in the future. For now, we are happy to have the End-User enjoy the End-product. What has been done, and what continues to be done, is currently in the domain of our Coding and Data Development Teams.

Now – with a *FreeFalcon* installation – the Virtual Pilot finally has the opportunity to complete a campaign; Air Forces acting in tandem with ground forces. Terrain meshes allowing troop activity and movement; SAMs reflecting real-life threat levels; Strategy and Tactics more closely aligned with Real World experience.

We hope you enjoy the results. Our testers have; our Team has.

We look forward to future releases, in which the issues which are still evident continue to be addressed.

Enjoy.

“...amazingly diverse action going on in this campaign. The F4 pilot who knows his stuff will relish this like never before. I am happier than a pig in shit!” - cptmtge

CAMPAIGN TIPS 'N' HINTS *(with Tom)*

Before you enter the campaign UI, make a decision about the kind of war scenario you wish to participate in. Would you prefer to fly for the Red, or the Blue side? What aircraft would you like to experience? What kinds of missions to concentrate on?

By choosing airbases and squadrons in different scenarios, you access different kinds of aircraft; different roles, and different focus.

The F-16CJ – for example - will have a primary air-to-ground role; SEAD or SEAD Escort missions, in addition to other mission types such as Sweeps or Escorts.

A-10s – naturally - will fly a lot of CAS, or On-Call CAS missions.

F-15Cs - on the other hand – are tasked solely with Air-to-Air missions.

Having a huge number of flyable aircraft in FF5's three Core Korean campaigns provides a variety of mission allocations, with subsequent varying campaign experiences.

Furthermore, the Harriers in the Iron Fortress campaign operate from a carrier, which makes these flights a very unique, and enjoyable experience.

How to LEARN to fly a non-F-16 aircraft...? Check out the ***Flight Companion***, in your *_the_MANUAL/Flight Manuals* Folder. It has everything you need to get started in your chosen jet. It even has a manual for the new F-16A 'Pit.

CAMPAIGN CHOICES →

Tiger Spirit: The initial advantage favours the Allied Forces; having them already positioned within DPRK territory.

Rolling Fire: Generally speaking, the initial state between ROK/Allied forces and the DPRK units is relatively balanced.

Iron Fortress: As opposed to *Tiger Spirit*, the opposite situation is apparent. The DPRK forces have occupied a large sector of South Korea. The allied military machine is forced onto the defensive. But they have a clear technological advantage over North Korea, which makes this campaign accessible.

Once you have made your decision and enter a specific campaign, you should leave your sliders as set by default (see the Section above). The campaigns have been optimized for these settings, and any 'tweaking' may have adverse consequences, or – indeed – render the campaign fundamentally inoperative.

Now that you have chosen a campaign, entered the fray, and have a Frag Order listing all available flights (over the next few hours), from which to choose, it is time to move on to some more general tips, before you take off into the wild blue virtual yonder.

Before starting the mission chosen from the Frag Order, it is important that you always obtain a good overview of the situation,. A Frag is the "fragment" of the "Air Tasking Order" (or ATO), which plans and structures all flights during the campaign.

For a relaxed briefing time, you might want to stop the campaign clock in the upper right corner of the schedule UI. The "Briefing" screen - accessed via a button at the bottom of the UI - provides essential information, on the kind of flight awaiting you in the 3D world.

Check which packages belong to your flight; how many wingmen you have; and, whether you have an element. Also check what action is required for each waypoint; station times; which STP is the attack waypoint; and, whether there are more than one set of pre-planned attack coordinates.

If targets are tasked, check out which ones are tasked. Take notes if necessary. In Real Life, they do...! Also – make sure you note the TACAN information for your strip; your alternate, and other strips in the area. Makes it easy to dial in TACAN, should you find yourself unable to make it to your field. Even on a standard RTB, your radio will not always be tuned to the correct TACAN station.

That covers the “text” part of the briefing. It may be even more important to check the UI Map, to SEE where the action is taking place, and what the ground beneath your planned flight route will look like. In the Frag list, left click on your chosen flight and take some time to identify important waypoints. The ones marked with a triangle are the ones indicating a special task for the waypoint like “attack target” or “protect package from enemy fighters”. A last word on the Frag order: You can prioritize flights according to their importance.

Be sure to make an informed decision on your chosen engagement. A Deep Strike into SAM valleys without SEAD Escort might be a bad idea...! But – ultimately – it’s your choice. Every decision you make will have a dynamic effect on the entire war.

Furthermore, you should right click on the map. This will open a menu with various options as to what is “visible” on the map. Check which item-types, you wish to have shown on the UI map. “Fighters” is a must, as you’ll want to know which friendly or enemy fighters you will be encountering in the 3D world. Remember, not ALL aircraft are guaranteed to be showing on the UI Map. “Fog of War” is an issue, and Map-Intel changes from minute to minute.

The more info, the better to maintain a good situational overview.

“Packages” will give you the option to right-click (hit: Status) on each package symbol in the map that you want to investigate further.

You might also want to view some of the “Installations”. “Infrastructure”, may be an important feature to check, as units may often be found choked at bridge crossings. This may either present targets of opportunity, or elicit caution from MANPADS. Under “Ground Units”, you should mark “Battalions”, and check what kind of troops you’ll be flying over.

An extremely important viewing option is the “Threat Circles”. It is crucial for mission success to know which zones provide SAM danger during ingress and egress, or which areas must be avoided on station. If possible, adjust flight paths to stay out of the danger zones...! Note the LINE-OF-SIGHT blockages caused by elevated terrain. By noting “High Altitude” and “Low Altitude” threats, it is also possible to adjust altitude accordingly, in the 3D world.

Be sure to check the "High Altitude" threat circles option if you plan to fly high. If you are planning a N.O.E. ingress/egress, the "Low Altitude" option will help your situational awareness, as you try to avoid those SAMS which can be defeated by extremely low flight envelopes. Be aware that MANPADS will not show "threat circles" on the Map.

A further, easily accessible reference is the ATO. This acronym stands for "Air Tasking Order". Once clicked upon, this feature provides information on what aircraft, and how many aircraft, your package or flight consists of.

Again, it is crucial for mission success to have a good and thorough overview, prior to pushing the "Takeoff" button.

If you are concerned about specific ground units blocking the ingress, use the "Recon" function of the schedule map (right-click on any chosen object, to find that option). You can – for example - see which vehicles an AAA unit is composed of. Another very useful way of getting further intel is to 'right click' on a battalion's symbol, and check the "Status" to determine whether this unit is set to "reserve" posture; to "defend"; to "capture", etc. Left clicking shows its path to the assigned objective.

Munitions & the Loadout Screen:

Do not change your given loadout unless you feel it is absolutely necessary. It may have an adverse effect upon the campaign engine.

Flying in the 3D World:

First: The flight route, the "danger zones", your overall goal and the sortie's goal should affect your tactics regarding altitude, the use of radar and jammers, flight formation and weapon's deployment.

Regarding weapon's deployment: It is a good idea to spend all of the ordnance, both AA and AG, on targets. For example - if you just performed an OCA Strike, and have some Slammers left, ask AWACS to vector you to a bogey on your egress route. This is an opportunity to score some extra points. If you succeed in both, Air to Air and Air to Ground, you are almost assured of an excellent rating (if your package didn't fubar) or - even better - a medal for your simulated egos and logbooks.

If you are concerned about your wingmen getting shot down - guide them to an alternate base or your home-base; hot-pit refuel, and have some extra fun...!

Regarding SAMs: When flying through a high-threat environment, it can be very helpful to order the wingmen to override ("radar to standby") their radars and activate the jammers. Also - stay as high as possible. This way you can avoid manpads and a number of SAMs.

On the other hand, if you fly through SAM-2 belts, it might save your virtual butts to hit the deck and stay low; very low...!

Beware of hills and fly as fast as possible, without burning all of your fuel.

In FreeFalcon, manpads (SA-7, SA-8, SA-13 etc.) pose a threat up to altitudes as high as 10,000 – 12,000ft...! So - if you want to drop CBUs on a dangerous enemy ground battalion - stay above 15,000ft and vector in a loss of altitude whilst pickling bombs...!

When you go for an Air to Air fight, use your radar only when you need it (AWACS can give you valuable targeting information, and keep you advised of the general “picture”). Avoid jamming whilst in close range (< 30 Nm) to enemy fighters. They may be equipped with "Home On Jam" functionality (e.g. Mig-29, SU-27). Almost all modern fighters have this feature, meaning their Air-Air missiles can lock onto your jamming signal.

Choose your countermeasures according to the threats you are facing. A jammer is effective against radar guided SAMs, but is modeled within certain limitations in FreeFalcon5. Try to bring an incoming missile onto your beam (3 / 9 'o clock position) or outrun it in the opposite direction with full burners. Change altitude and heading whilst egressing. Chaff works most effectively against radar homing missiles; flares are effective against heat seeking missiles, and manpads.

Remember - AWACS is your friend. Call regularly for updates, and information; to increase your overall situational awareness. AWACS is a good way to avoid the use of “labels”, which are both unrealistic, and can kill immersion.

Most importantly: Know your aircraft; know its flight model; know its physical behavior within different flight envelopes. Know your weapons, and which targets they are most, (and least) effective against. Be aware that this simulation provides you with a huge number of options to enjoy, plan, and win a fight; enough realism to ensure you risk loss, through either bad luck, bad planning, or bad moves.

Regarding wingmen:

Use them effectively. They may be dumb at times, but they CAN be very effective when properly ordered and organized. Before you command them to attack a ground target, make sure that you have “identified” the target, and are in the correct radar and weapons mode. To have them correctly identify the target, you can designate (“lock”) that target. You can also place your radar cursors over the target, or simply “padlock” the target, prior to giving the “Attack my target” command. By doing this before ordering each wingie, you may split targets between your wingman and the elements.

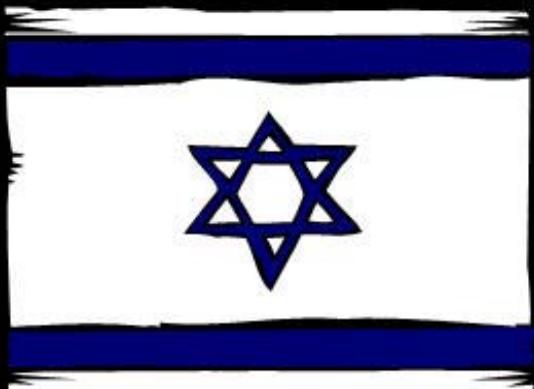
If they won't attack, or if they reply "Unable", order them to rejoin formation and repeat the command. Switch waypoints, if necessary.

If you fly an On-Call CAS mission, contact AWACS to **check in before ordering the wingmen to attack**. This has worked flawlessly with A-10s, during campaign testing.

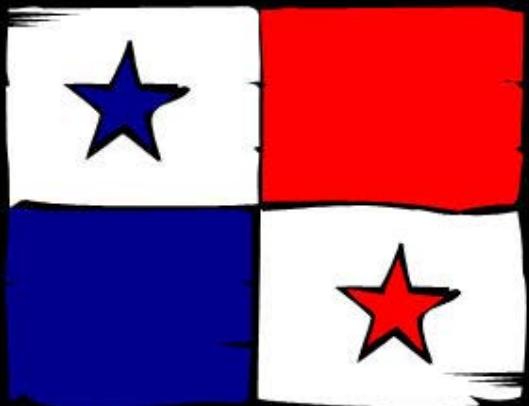
Post-mission, the “Debrief” can be enlightening, with regards target hit ratios, and possible pilot errors. You may even receive a promotion or medal...! Also – after reading the debrief, and returning to the UI - remember to save the campaign.

Good Luck!!



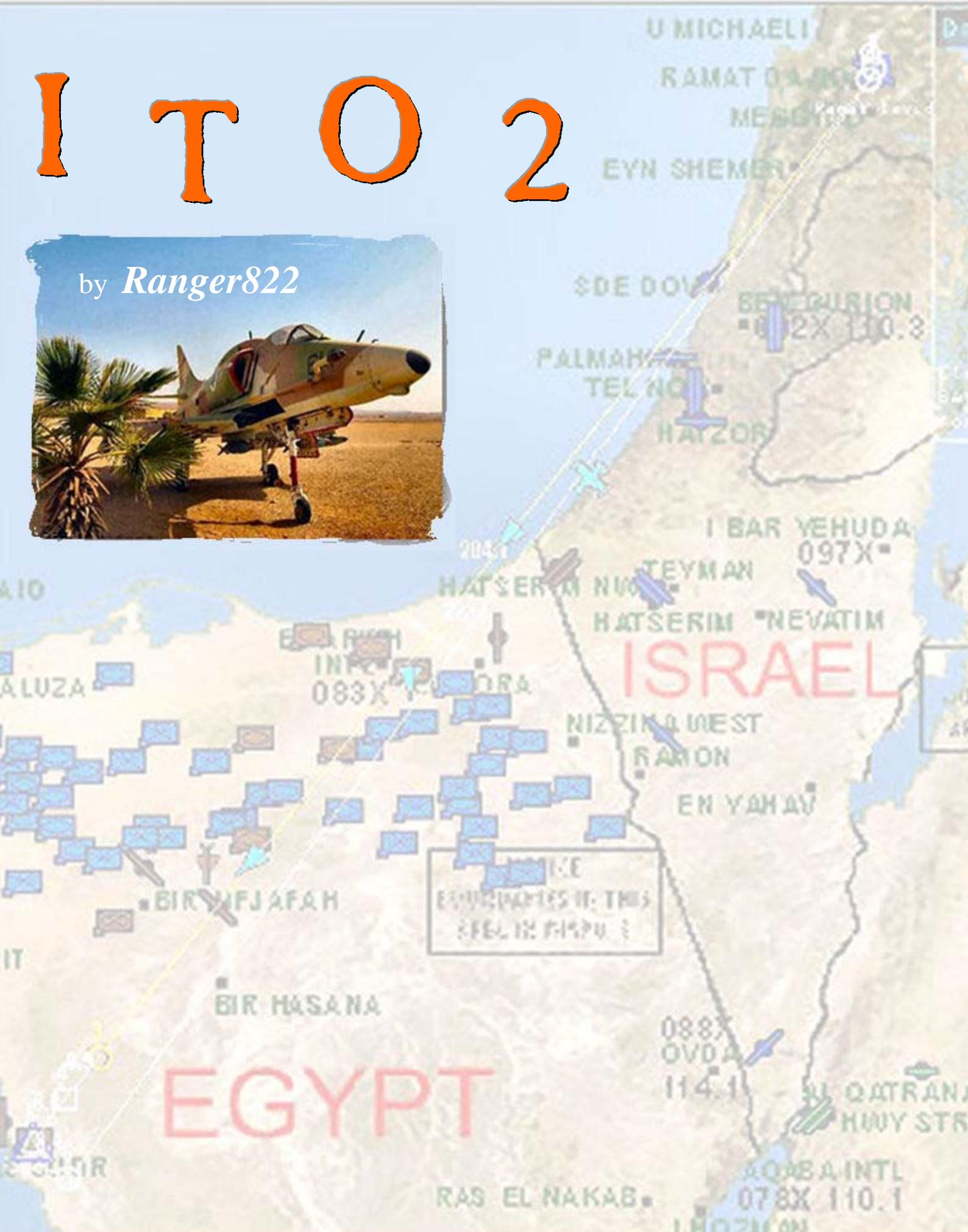


FF Approved Theaters



I T O 2

by *Ranger822*

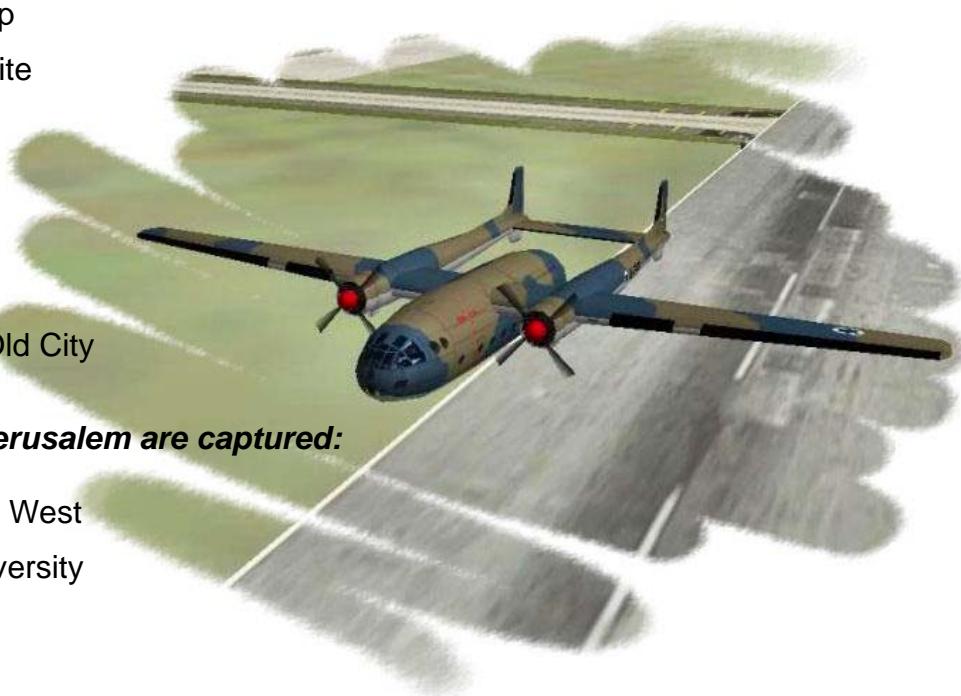


Six Days War - 1967

In general, expect to see a lot of activity in the sky. When compared to the other two historical campaigns, it is the most dynamic and busy...! In the first day you should see support troops in Jericho, while a Jordanian M48 Tank Brigade attacks Israeli armored and mechanized forces. Jordanian troops will move towards Kalkilia, Jerusalem, and Jenin. Israeli helicopters begin to transfer air-mobile units to the area around Sharm-a-Sheich for support of Israeli armored units. Some Egyptian T-55's will engage Israeli Sherman AMX units on the third day, whilst other Israeli armored vehicles move towards Port Said. Israeli infantry units will attempt to capture Tel-Phaher in the North (Golan Heights), and will likely require an urgent re-supply of helicopters due to aggressive patrolling by Syrian Mig's in that area. The area around the Hermon and Tel-Hafir is also very busy, with Syrian tanks moving towards Kineret. Jordanian armored tanks are all around Jenin, and a large number of Patton tanks are fighting in Jerusalem. Jordanian troops are moving towards Natanya, and IDF troops are tasked with the defense of the Israeli settlements. Some Iraqi Infantry units begin crossing the bridges towards Jerusalem. Arab countries join the war as the campaign starts. Finally, Mirage aircraft are involved in attacking the H3 Airbase.

Israel Win the War if the following Objectives are captured:

- Obj - 1908 - Ha'Hermon Camp*
- Obj - 1980 - Tel Phaer Hart Site*
- Obj - 683 - Sharm-a-Sheich*
- Obj - 262 - Jenin West*
- Obj - 109 - Jericho West*
- Obj - 70 - Jerusalem S.E*
- Obj - 79 - Jerusalem The Old City*



Arabs Win IF these parts of Jerusalem are captured:

- Obj - 69 - Jerusalem South West*
- Obj - 71 - The Hebrew University*
- Obj - 74 - Jerusalem West*

Recommended Pak at start of campaign: *Jerusalem West*

Yom Kippur War - 1973

Israeli troops are moving west toward the Suez Canal. New Israeli armor units have been positioned in Shar'em-A-Sheich, Baluza and Suez Canal, with the Shermans & Centurions. Many air assault & infantry units are fighting along the east side of the Suez Canal, and helicopters on both sides are active. Egyptian bombers are flying towards all parts of Israel. Jordan & Iraq will join the war on Day Two. Armored battles rage around Baluza, and especially in the area on the east side of the Suez Canal. Meanwhile, the Israeli's are trying to capture control of the Suez. IDF plan and execute deep strikes into Egypt by the F-4E Phantoms and Mirages. F4-E Phantoms are also flying SEAD, since there are many SAM sites in the Egyptian Delta Area. This is the second most challenging campaign.

To win the war, Israel needs to capture and hold these Key Objectives in Egypt:

- Suez Center - Obj ID 1008
- Ismailia Center - Obj ID 1137
- El-Mansura Center - Obj ID 1204
- Faid AB - Obj ID 690
- Abu-Rudies AB - Obj ID 670
- (Hold the) Hermon Camp - Obj ID 1908

To win the war, the Arabs need to capture and hold these three objectives:

- Hermon Camp - Obj ID 1908
- Baluza AB - Obj ID 687
- Bir-Jif-Jaffar AB - Obj ID 667

Jordan & Iraq Will Join the War on Day Two.

Developer's Note → These Victory Conditions do not conflict with any of the Yom Kippur War real-life war conditions...!

Recommended Pak at start of campaign:

Suez Center



Shlom-Hagalil war - 1982

Israel gets into the war very quickly. On the second day, the Israeli Air Force is converging on the frontline. On the first night there is some consolidation for several hours. Ground troops start moving toward the frontline on the second day. Red forces take to the offensive by the third day. Engineering troops are very effective here, so it is important to attempt to destroy these forces, or else expect to suffer A-A Strikes by the 4th day. There's a large Syrian force around Zur. The dynamic in this campaign really starts with sweep missions usually in the earlier hours of the day. The F-4E Kurnass are used to attack the north. SEAD missions are generated mostly for the Kfir squadrons. F15 Baz are used mostly for Air-superiority missions. When the campaign engine generates BARCAP missions it usually means that a large amount of ground activity is underway.

A tip on flying BARCAPs → You can fly the BARCAP with CBU's. Simply select your munitions; set the BARCAP time to zero, and watch the missions get generated. CBU's will almost guarantee success.

A short list of some actual scenarios within the campaign → 1) The Battle in Marjayun involving an Israeli armored division versus PLO units after after 6 hours. 2) The battle in Jezin between Israeli tanks and Syrian troops. 3) The battles in Beal'abeck which involved a large number of tanks; including about 200 Syrian T-72s. 4) The battle in Zahla which occurs after 4 Days.

Players should note that Syrian SA-5 & SA-6 were located in the Beal'abeck Valley, so one can expect a lot of noise in the cockpit. Israeli infantry should arrive in Sayda at the end of the 1st day, and some battles occur around Beirut in days 3 - 4. Israeli artillery surrounds Beirut on day 4. The battle in Eyn-Sufer ensues after 12 Hours.

History buffs should appreciate the accuracy of this campaign...!

To win the Campaign, one need capture some " Key Cities " in Lebanon.

Jezin	- 545
Bea'labeck East	- 523
Zur South	- 501
Sayda North	- 509
Zahla North	- 515
Marj Anjun	- 543
Beit-E-Din	- 550
Beirut	- 617
Bahabda	- 554

Note: All Cities Need to be Captured

Recommended Pak at start of campaign: *Zur East*

Developer's Note → In the actual 1982 war, the Israeli objective was to capture cities under Christian control, before capturing the "Key" cities. Shlom Hagali translates as *Operation - 'Peace for Galilee'*.

2007 - Modern Times

Israeli's intelligence reports about the large activity of Syrian troops over the Golan & the Hermon mountains. Israeli F16's are dispatched to reconnoitre the area. They were intercepted by Syrian MiG's, and... the campaign begins with a lot of action in the sky...!

A US Carrier is on a standby near Israeli territorial waters, and a squadron of F18E's is ready to support Israel in the war effort . Syrian armoured units are moving toward the North-East of the Israeli border, while some units attempt to capture the Golan heights from the Hermon mountains . Israeli MLRS units are located in the north along the border with Lebanon, and begin firing on some BM-24's units that are attacking the northern Israeli settlements.

Israeli F16's are pursuing "Deep Strike" missions in Syria, and airmobile units are moving towards Damascus . Virtual Pilots will see a lot of SAM's; lots of "beeps" inside the cockpit; jammer always at the ready. The Israelis hope that another front will NOT be opened in the south of Lebanon, since some militia units are moving towards the northern Israeli settlements...

This fictional 2007 Campaign is both an advanced & challenging undertaking.

To win the war, Israel needs to capture and hold these Key Objectives:

- | | |
|----------|---------------|
| Sur West | - Obj ID 504 |
| Damascus | - Obj ID 1472 |

To win the war, Syria needs to capture and hold these three objectives:

- | | |
|----------------------|---------------|
| Hermon Hart Site | - Obj ID 391 |
| Ha'Hermon Camp | - Obj ID 1908 |
| Hermon Radar Station | - Obj ID 2145 |

**Recommended Pak at start
of campaign: Zur East**





DEVELOPER NOTES

Flight Models, Pits, Models, Terrain and skins have been brought up to FF5 standards. FM's were tweaked on some aircraft, and these models will more closely represent proper flight characteristics of their respective aircraft. Other unique A/C employ flight models of similar A/C, re-engineered in a few categories. ITO2 features a unique User Interface, dedicated Intro, Video, and some beautiful Terrain work by Polak.

The high altitude UAV is integrated into ITO2. It acts like hi-flying Recon aircraft - an uses a derivative flight model . This work continues to progress, and there is much planned for the future of ITO2, including Middle-Eastern music, dedicated News Videos, and A/C specific 'Pits.

We hope you enjoy all that ITO2 has to offer.



TT2

Taiwan Theatre II



by derStef

← RESCUE COMMS COMMIT

- A beautiful new, dedicated UI
- Brand new kneemap
- F-5E Widescreen 2D pit (*by Staggolee*)
- A great storyline by Toonces (*see below for excerpt*)
- Includes a huge amount of cool TEs
- Dedicated Database and OOB...!
- Three fully functional campaigns

Derived from the PMC Taiwan Theatre, TT2 features an all new and fully functional Taiwan experience. Original Theatre by Snakeman at PMC.

DATABASE:

- TT 2 profits heavily from the use of the Legacy DB, as it's foundation. Many aircraft which are not featured in the Core Korea Campaigns, are fully utilised in this conflict. Japanese aircraft are present in this theatre...!
- Some new A/C and A/C variants are featured.
- Updated + customized weapons, plus updated loadouts & mission role scores for all aircraft featured in the theatre.
- Many new high-quality skins for a variety of aircraft.
- Some new, theatre-specific 'Pits.

CAMPAIGNS:

- Three (3) new campaigns. Built completely from scratch.
- Long time period covered: 1970s - 2010
- Very different warfare compared to the Core Korea Campaigns. The Pilot will note a heavy "maritime" theme to missions. The basic premise revolves about halting an invasion of Taiwan island. The pilot will also be required to deal with latest generation SAMs a la S-300 in 2 campaigns. The entire "feel" of the theatre takes the virtual pilot far from his previous "Korean" experience.
- A very close to real life OOB for Air defense units, and aircraft on all sides.
- Many flyable aircraft, never before seen in any Falcon campaign.
- An aggressor/red Flag scenario is also planned. (*Many aggressor skins included*)

TERRAIN:

- Completely reworked/adjusted Terrain mesh and tiles.
- Looks awesome with HiTiles. (dedicated tile set, perhaps a future project)
- Very impressive canyons, mountains & valleys.
Completely different "feel" to that of the Core Korean Campaigns.
- Added many ground objects; main areas more heavily populated.
- Feels VERY different to fly compared to Korea. (Island type scenario)



US	ROCAF	JASDF	CHINA
- 1 CH-53D	- 1 CH-47	- 1 UH-60L	- 2 UH-1N Civilian
- 1 UH-60L	- 1 UH-1D	- 3 C-1	- 2 Z-9W
- 1 C-30H	- 2 UH-1N Civilian	- 1 P-3	- 1 Ka-27
- 1 C-17	- 2 UH-60L	- 1 AH-1	- 5 Mi-8
- 1 C-5	- 3 C-130H	- 1 AH-64D	- 1 Mi-24
- 1 MV-22	- 2 S-2E	- 1 E-2C	- 4 An-2
- 2 AH-64D	- An-26	- 2 F-15J	- 7 Y-8
- 2 E-2C	- 5 AMX	- 1 F-4EJ SEA	- 3 A-50
- 1 E-3	- 2 AH-1	- 1 F-4EJ Grey	- 2 H-6T
- 1 B-1B	- 1 E-2C	- 1 Mitsubishi F-1	- 4 IL-78
- 2 B-2A	- 2 Mirage 2000-5Ei	- 1 KC-135	- 4 H-6A
- 2 EA-6B	- 1Mirage 2000-Di	- 1 KC-10	- 7 JH-7
- 1 RC-135W	- 4 F-16AM-B		- 4 Q-5D
- 1 F-15C	- 3 F-16AM-D		- 4 J-7B
- 1 F-22A	- 2 F-16B		- 7 J-7E
- 1 AV-8B	- 1 F-5A		- 15 J-8B
- 2 F/A-18C	- 3 F-5E		- 5 J-10
- 2 F/A-18E	- 2 MD-500 TOW		- 6 J-11
- 1 F/A-18D	- 2 OH-58D		- 5 SU-27
- 1 F/A-18F			- 3 SU-30MKK
- 1 KA-6D			- 4 SU-30MKK2
- 2 KC-135			- 2 J-6
			- 3 J-6A

THE CONFLICT BEGINS...

Taiwan_2 Campaign Storyline, by Toonces

It all started over a simple misunderstanding.

The year prior to the Taiwan 2009 elections saw the Taiwan Independence Party with a significant lead in the polls. The collapsing worldwide financial markets, combined with a strong independence movement developed and cultured within the young college crowds, encouraged more and more Taiwanese to finally declare their independence from the communist Chinese, and assert their rightful place in the emerging new world order.

However, China was not sitting idly by, watching this youth independence movement develop. For years, China had been quietly infiltrating units of its intelligence services. Their mission: sow discontent with the Taiwanese independence movement, finance and develop ties with pro-China candidates and political groups, and when necessary, eliminate those that were too persuasive for an independent Taiwan. When covert encouragement failed, military demonstrations had always served notice to the moderates in Taiwan to reign in the independence “fanatics” in and keep them in line. For example, consider 1995.

In 1995, the Taiwan president Lee Tung-hui went on a worldwide public relations tour, visiting countries with which Taiwan did not have diplomatic recognition. The purpose of this tour was to plead the case of Taiwanese independence, and to assert Taiwanese pride on the world stage. But, Lee failed to understand the depth of resolve China held in opposition to any Taiwan independence overtures. To illustrate their resolve, China scheduled a series of missile tests less than 100 miles from Taiwan’s ports and harbors in response to the tour.

In 1996, China again sought to use the threat of military force to assert its contention that Taiwan would not become independent. An amphibious exercise was moved up and conducted in conjunction with combined arms exercises on a Chinese island remarkably similar to Taiwan. The message was clear: vote for independence and suffer the consequences. The US response was to send two carrier battle groups to the area. Their message was equally clear: don’t mess with Taiwan.

However, the US failed to appreciate the gravity of the message it sent. China knew it couldn’t oppose the US naval forces. It “lost face” to the Americans. And while China quietly swallowed its humiliation, it did not forget. The humiliation sat, like a quietly smoldering ember, simply waiting for a breeze to fan it into an inferno.

Even in Asian cultures, the memory of youths can be fleeting. More than 10 long years had passed since that confrontation and the fears of their fathers were forgotten this time around. As the independence movement gained momentum and strength, China’s leaders saw no recourse but to once again demonstrate to Taiwan and the world that it would not suffer an independent Taiwan.

Operation *Raging Dragon* was scheduled for early 2009, in time to pre-empt the Taiwanese primaries and send the message that this intransigence would not stand. The exercise consisted of several parts. First, a surface to surface missile attack would soften up the island’s defenses (and island once again strikingly similar to Taiwan...). The bombardment would be followed by an amphibious assault with 3 divisions of crack Chinese infantry, backed by close air support and air superiority aircraft. Airborne paratroopers and special forces would be inserted to capture important intersections, communication nodes, and power grids. The exercise would once again demonstrate China’s resolve for a non-independent Taiwan.

But, there was a twist. China would not suffer another humiliation by the US Navy. A pair of Han class SSN's would also participate in the exercise. Their mission would be to interdict the sea lanes around the exercise area. If the US Navy intruded upon the area, the Hans would simulate an attack on the US carriers using flares and smokes. The US would be the one to suffer a humiliation this time!

USS Reagan, approaching the northeast coast of Taiwan

Admiral Richardson's orders were simple on their face:

“Conduct presence patrol off the coast of Taiwan. Take all actions necessary to assert freedom of seas navigation, including within Chinese exercise areas, but do not provoke a hostile response from Chinese forces.”

Richardson read that middle part again. “*...within Chinese exercise areas, but do not provoke a hostile response...*” So, he was supposed to put his force in the middle of a shooting exercise, but expected to be able to determine a warshot directed at an exercise target from one directed at his task force? That could be a bit tricky. Well, nobody ever said command was supposed to be easy. He turned to his aide and spoke.

“Have the CAG and XO report to my stateroom immediately.”

Richardson would figure out how to assert, but not provoke...

CS Fen-shui, off the north coast of Taiwan

Aboard the Chinese Han-class submarine *Fen-shui*, Commander Chiu's orders were easier to interpret than his American counterpart on the Reagan:*“Intercept and conduct simulated attack on the American aircraft carrier illegally approaching our sovereign territory of Taiwan. Use all appropriate measures to ensure the Americans know that their precious ship would have been sunk by a vessel of the People’s Beloved Chinese Navy.”*

Chiu smiled as he read the orders for the tenth time. He still remembered the humiliation suffered by his people by the Americans before. How dare they sail their ships within Chinese waters with such arrogance! Not this time. No, this time China would have recourse. Oh yes. The latitude given Chiu was unusual. Usually his orders were more restrictive. Clearly the beloved leadership wanted to send a strong message to the Americans. Well, he had many tools at his disposal to send this message, and he would take full advantage of all of them...

Eyeball 202, 200nm northwest of USS Reagan Task Force, north of Taiwan

Lieutenant Commander Stevens peered more closely at his scope, aboard the E-2C Hawkeye orbiting northwest of the carrier. Yep, those two contacts he'd been monitoring over the Chinese mainland were definitely picking up an intercept course. He keyed his mic and spoke to the CAP.

“Wolf 101, Eyeball 202. Two contacts, bullseye 350 for 120, angels 25. Fly heading 290, buster.”

“Wolf 101, copy 350, angels 25. Wolf 101 and flight are buster.”

Wolf 101, 250nm northwest of USS Reagan Task Force

Lieutenant Pfeiffer looked at his wingman's F/A-18 Hornet, callsign *Wolf 104*.

“Shit hot Flipper! We’re gonna get some sweet pics!”

“Yeah, ‘Dog, I’m all set. Those intel weenies are gonna be stoked!”

Lieutenant Mike “Moondog” Pfeiffer smiled beneath his oxygen mask. Thus far, his cruise, and his career, had been fairly disappointing. This was his second cruise, and his first as section leader. While most of the Hornet pilots that ‘Dog went through the Fleet Readiness Squadron with had flown sorties over Iraq and Afghanistan, ‘Dog just couldn’t seem to catch a break. First, there was that TAD assignment that took him off the ship last cruise just as they got onstation to fly strikes into Mosul and Najaf. Then, his luck seemed just as bad when “the boat” got diverted enroute to the Arabian Gulf to drill circles off Taiwan. It was enough to make a fighter pilot wish for helos or something. Well, maybe it wasn’t *that* bad, but the last several years had tried his patience.

The call for bogeys, though...that was something! Not only would he be the first on the ship to fly against the Chinese, but he would be one of the few fighter pilots in his group to actually see an enemy plane up close. Yeah!

Moondog continued his outside scan. He and Flipper were radar cold, relying on the Hawkeye to give him vectors to the bogeys, and he didn’t even know what type of jets he was looking for yet.

Star 26, approaching Wolf flight off Taiwan

The ground controller’s instructions came through quite clearly through Lieutenant Wang’s helmet. “Vector to American bandits is 100 degrees at 200 kilometers. Flight is two F-18 Hornets. Intent is unknown. You are clear to maneuver at your discretion. *Eagle Eye* out.”

Wang nudged the nose of his J-10 slightly to the right, correcting his intercept course a few degrees. Like his comrade Chiu, his orders were quite direct:

“Intercept American fighters. Demonstrate Chinese air superiority by achieving firing parameters on the intruders and activating fire-control radars.”

Wang felt confident he could beat the American fighters. His J-10 represented the epitome of his country’s aviation technology. His fighter was more agile and he was more highly skilled than the Americans. He looked at his right wing, double checking the AA-10 he was carrying on the inboard station. He knew he and his wingman wouldn’t need the weapons, (probably, he thought), but it was always good to have options, just in case. At any rate, he thought, the task ahead of him was simple enough. *Achieve firing parameters*. He would ensure he got the advantage right from the merge with the Americans by passing close aboard. His wingman would stay in trail, ready to engage or support as the situation dictated. Yes, this task was simple enough indeed.

Wolf flight, approaching Chinese fighters, west of Taiwan

“Alright Flipper, I’m going to take the lead guy left to left.”

“Roger ‘Dog,’ Flipper replied. “I’m kicking right and high now.”

Wolf 104 pitched up and right, taking station off his lead’s wing, 2,000 feet higher and 2 miles distant in spread formation. He’d let lead merge with the lead Chinese fighter, and then support ‘Dog’s move off the merge.

Star flight, 15 miles from Wolf flight

“Lieutenant Sing, go 5 miles trail and watch the high American fighter. I will take the low American fighter close aboard right to right.”

“Roger.”

Wang pushed his throttle up some. He would pass close to the American. Very close. Although very disciplined, the arrogance of the Americans angered him. They always felt they could do whatever they pleased. They thought their planes and pilots were the best at everything. Why? Because the defeated a third rate air force in Iraq? The fools. Yes, he would pass very close indeed and demonstrate the Chinese were quite the equal to the Americans. He corrected his course again slightly, putting his nose right on the American lead fighter. 18 kilometers to go now. He should have them in sight any second now.

Wolf 101

“Tally-ho! I’ve got a single bogey 12 o’clock. Looks like he’s nose on. I’m correcting right a bit...”

Star 26

Wang saw the American jet at the same time as his opponent. He saw the Hornet’s nose moving left. So, the American wanted to play, huh? Fine. He’d play too.

Wolf 101

Moondog saw the J-10’s nose come left a bit.

“Shit Flipper. He’s still on collision. What the hell is this guy doing? I’m correcting right again.”

Star 26

Wang saw the American’s nose moving again. Yes, this American was a true cowboy.

“Lieutenant Sing, this American is very aggressive. Keep a close eye on his comrade. I am going to give this American a very close pass.”

“Roger, lead. I have the imperialist bastard in sight.”

Northwest of Taiwan, 25,000 feet

The experience of both pilots was essentially the same. Both saw the other maneuver his jet, and sought to correct to keep the pass close. Unfortunately, their maneuvers continually corrected their flightpaths such that a collision was inevitable.

Star 27, 5 miles behind the collision

The last transmission Lieutenant Sing heard was an exclamation from his lead:
“DAMN AMERICAN!”

From his position 5 miles in trail, he could not see the collision. But, he could see the resultant fireball.

“Star 26, Star 26! What has happened?”

No answer.

Unlike Wang, Lieutenant Sing was a much more junior pilot. Brought up on propaganda, his conclusion that the aggressive Americans had shot his countryman down was understandable. His orders were very explicit how he was to respond to a hostile act against his country. He reached down and selected his master arm switch to on. Instinctively he selected the starboard AA-10. His action was immediately rewarded with a loud growl as the missile's seeker sought and found the remaining Hornet.

His thumb slid to the red button on his control stick.

Wolf 104

Flipper had a ringside seat to the collision. He watched as ‘Dog corrected right and the Chinese corrected left over and over. Only at the last second did it become apparent that the Chinese was trying to take ‘Dog down the opposite side as ‘Dog intended at the merge. As his mind processed the information and he keyed his mic to shout a warning, the two jets collided at a combined speed of over 1,000 miles per hour.

The resultant explosion stunned him. He struggled to comprehend what had just occurred. Then, years of training took over and the maze of confusion was pierced by one thought- *where is the other guy?* He looked away from the expanding ball of smoke and destruction that seconds previously had been his good friend. At the same moment he saw a bright flash followed by a white smoke trail that arced towards him, rapidly eating up the distance between the two jets.

Instinctively he rolled the jet over and down, thumbing the chaff and flare button. Even before he started the maneuver he knew he wouldn't make it. As clearly and calmly as he could, he keyed his radio.

“This is *Wolf 104, Wolf 104*, I'm being engaged by the second J-10. Holy shit! He's got me, he's got me! Ah f...!”

Star 27

Lieutenant Sing watched his missile track into the American fighter. He looked around the sky for signs of the second American fighter. The smoke and debris from his lead's destroyed J-10, obviously shot point blank by the first American, obscured his view of where he thought the American should be.

After a minute of looking, he felt he would not find the American. He considered the situation. The American probably bugged out for home like a coward when he saw his wingman meet his deserved end. Just like an American, afraid to fight without the advantage.

Sing turned his jet towards home, pleased despite the loss of Lieutenant Wang. He'd demonstrated his country's resolve to assert itself in response to the Americans' hostility. They'd think again before challenging Chinese authority.

And he had only 4 more kills to go to make ace. Secretly, he wondered (hoped?) if he'd have another chance to face off against the Americans.

USS Alexandria, west of the USS Reagan Task Group

Commander Johnston looked up from the navigation chart when the Petty Officer walked in and handed him the message. Although he had trained his entire career for a shooting war, the shocking thought *is this really happening* went through his head before he could stop it. He looked again at the message, and then handed it to his XO:

"At 2300Z, fighters of the PRC fired on and destroyed two US F/A-18s off the west coast of Taiwan in international airspace. PRC ultimate intentions unknown at this time. All PRC units should be treated as potentially hostile and monitored closely for hostile action against US forces. Do not take any action to provoke an attack. However, the use of force is authorized if hostile intent is indicated as determined by the on-scene commander."

PACFLEET SENDS"

"Shit, Skipper, it looks like this could be for real." XO Mallory handed the printout back to Johnston.

Johnston turned to the Chief heading his sonar team. "What's the status of our friend?"

"Sir," Chief Sonar Tech Brown said, "we still hold contact Sierra 6, *Han* class submarine, positively identified as Hull 4, bearing 291 true, 14,000 yards, speed 5 knots, depth 250 feet."

"Roger, Chief. I want to know immediately if there is any change in the contact's status."

"Aye aye, sir." Chief Brown replied.

Johnston glanced up at the weapons status board. Green lights indicated 3 warshot ready torpedo tubes, each holding a single Mk-48 ADCAP torpedo, as well as a fourth tube holding a Harpoon missile.

"XO, put the word out to the crew. Let 'em know the deal and make sure the Chiefs ensure the men are ready to go. This is probably going to get worse before it gets better."

"Roger that, sir."

PRC Han class submarine "Fen-Shui", 50 nm west of Reagan z Task Group

Unfortunately for the thousands of men and women of the armed forces around the world who would soon find themselves in mortal combat, the *Fen-Shui* had nowhere near the communication ability of the US submarines. While the *Alexandria* could receive message traffic via a floating wire antenna, transmitted thousands of miles away via satellite, the *Fen-Shui* had no similar capability. Therefore, Commander Chiu continued with his original orders, oblivious to the firestorm started by his countrymen a few hundred miles away in the blue skies above the Pacific.

"What is the status of the American Task Group?" Chiu asked his tracking party.

"Comrade Captain, we hold the *USS Reagan* bearing 098 degrees true, range approximately 80 kilometers, heading 265, speed 55 kilometers per hour."

Chiu spoke to his Officer of the Deck. "Turn to course 098, increase speed to 18 kilometers per hour. Make your depth 300 meters. I want to intercept the American carrier. We will get to 2,000 meters and launch our flares before they even know we are there!"

USS Alexandria

“Conn, sonar. I have a bearing and speed change on Sierra 6. It looks like he just turned towards the ***Reagan*** and sped up some...Stand by...Ok, we have hull noise too, looks like he’s going deep...”

“Sonar, conn, aye. Keep me updated. XO, get us in trail at 14,000 yards. Tracking party, I want the firing solution on this guy constantly updated.”

Fen-Shui

“What is range to the American carrier?”

“30,000 meters, bearing 094.”

“Steer 094, make your depth 100 meters.”

USS Alexandria

“Conn, sonar. Contact is turning left again...he’s definitely heading to intercept the ***Reagan***Sir, we have hull popping, looks like he’s coming up.”

“Conn aye. XO, get us to 10,000 yards off this guy.”

Fen-Shui

“Captain, sonar. Range to the American carrier is 20,000 meters, bearing 094.”

“Captain aye.”

“Captain, sonar! New contact, classify as American *Los Angeles* class submarine, bearing 273! Range close!”

Chiu swore under his breath. Damn Americans! Ah well, 20,000 meters was definitely close enough to put a killshot into the carrier. Now he’d give them something to think about!

“Fire party, Captain. Fire air charges on tubes 1 and 3, and launch 2 flares!”

USS Alexandria

“Conn, sonar! I have tube doors opening on Sierra 6!”

Johnston felt his blood run cold.

“Conn, sonar, transients! Transients on Sierra 6!”

“Fire control, conn! Match bearings on Sierra 6!”

“Conn, fire control, solution set on Sierra 6!”

“Fire control, conn, fire tubes 2 and 4 on Sierra 4 now, now, NOW!”

The submarine shuddered as compressed air ejected the two torpedoes on their way to the Chinese submarine.

“XO, punch the buoy!”

The *Alexandria* ejected a SLOT buoy from its top ejection port. The SLOT buoy would go to the surface and broadcast to anyone within range that the *Alexandria* held a hostile submerged contact on which she had just fired two torpedoes. Besides letting the ***Reagan*** and the rest of the chain of command know that warshots were in the water, it would also give notice to every friendly ship around to get the hell out of the way. The Mk-48s wouldn’t care if they hit a friend or foe.

Fen-Shui

“Caption, sonar! Transients on the US submarine! Captain, I have torpedoes in the water bearing 273! The American has shot at us!”

“Fire control, Captain! Snapshot, tube 2! SHOOT THE AMERICAN SUBMARINE!...XO, launch the emergency buoy, tell them we have been attacked!”

Three hundred feet beneath the Pacific Ocean, off the coast of Taiwan

The three torpedoes, oblivious to the carnage they would cause, sped towards their respective targets at more than 40 miles per hour. The American submarine had the advantage of a better fire control solution and the first shot. Both torpedoes ran true. The *Fen-Shui* maneuvered evasively and deployed decoys, but the Mk-48 is the most advanced torpedo in the world and easily saw through the deceptive techniques. The first Mk-48 hit the *Fen-Shui* port amidships and broke it in half. The second destroyed the pieces.

The *Alexandria* had a more unlucky fate- unlucky in the sense that she believed she had escaped. Like *Fen-Shui*, she deployed noisemakers and decoys. Unlike *Fen-Shui*, hers actually worked...for a time. However, the Chinese torpedo took an unlucky (for the *Alexandria*) turn and resumed a heading that allowed it to reacquire the *Alexandria* on its circle maneuver. Perhaps things would have turned out differently if *Alexandria* had evaded the torpedo. Maybe a chance to tell what provoked her to fire would have cleared things up. Maybe war could have been avoided. Or maybe not. Unfortunately, we will never know. The Chinese torpedo ran true and hit the *Alexandria* in the stern, blowing off the rear third of the American submarine.

Politburo, People's Republic of China

The President looked at the brief his Defense Minister had just handed him. His normally stern face took on an even more grim expression has the words sunk in.

“The Americans have attacked us twice? They have sunk one of our submarines?”

“It appears so, Comrade President,” the Defense Minister replied. “First they fired on one of our Air Force comrades. His wingman shot the other American fighter down in self-defense. Then they apparently shot two torpedoes on our submarine *Fen-Shui*, also an unprovoked first shot. And again, our comrades only shot in self-defense.”

The President bowed his head in thought. If the Americans wanted an excuse for war, he would give it to them. Perhaps this was destiny.

The President looked his Defense Minister in the eye. His gaze was unflinching. “Contact all of our commanders. Operation *Raging Dragon* is no longer an exercise. Immediately redeploy our forces to invade Taiwan. Immediately.”

The Defense Minister smiled to himself, despite the gravity of the President’s words. “As you wish, Comrade President. It is but a small matter to redeploy the troops. The exercise plans are very much like what the actual invasion plans would be like. Yes sir, it is no problem at all to change our destination slightly.”

The Defense Minister bowed, turned, and rapidly left the room. He had many calls to make.

The President turned and looked out the window at the mountains, and the leaves blowing in the wind. Then he turned away and picked up the phone...

The war for Taiwan had begun...



PANAMA



Originally created by Homer (aka Malc), the Panamanian Theatre has been adopted by Demer and Toonces, and made fully compatible with FreeFalcon5.



There are six campaigns included with the Panamanian Theatre.

The original Campaigns have been updated, and are included as the "Legacy" Panama Campaigns.

These Legacy Campaigns are as follows:

1. ***Operation Just Cause 2:*** CALA Forces invade Panama in an attempt to finally remove US Forces from Central America. US and PDF Forces must hold them off until reinforcements arrive.
2. ***Operation Hell's Fury:*** In a bold and daring move, US Forces have invaded Panama in an attempt to regain control of the area from CALA Forces.
3. ***Operation Heavy Metal:*** In a lightning assault, CALA Forces wrest control of the Canal from US/PDF Forces. The enemy must be driven back to their borders.

In addition to the “Legacy Campaigns”, three additional scenarios are introduced by Toonces, .

Campaign 1 - **Exercise Cooperative Cope Thunder.**

Briefing:

Historically, Cooperative Cope Thunder runs during the last two weeks of June in the vast exercise ranges of the Alaska wildlands. However - due to pressure from environmental groups - the DoD was forced to seek a new venue for this yearly event. Fortunately, the Panamanian government graciously offered to host the exercise, marking a first for what is widely regarded the largest multilateral military exercise in the Pacific.

The exercise highlights multinational operations combined with interdiction, suppression and destruction of enemy air defenses, and counter-air missions.

Panama’s vast training area includes three weapons ranges and offers participants more than 66,000 square miles of airspace for range and exercise operations. However, the opportunity to operate in a combined environment and foster relationships among all the nations involved is an aspect of the exercise that participants find very useful.

Colonel Toonces was quoted as saying: “Cooperative Cope Thunder allows us to hone our air combat skills, exchange air operations tactics and promote our relationships among other nations and their air forces,”

Countries participating in the exercise include Greece, Belgium, Australia, Japan, Italy, and the United Kingdom. Representatives from Bangladesh, India, Mongolia and Sri Lanka are observing the exercise.

Units are divided into friendly “Blue” and opposition “Red” forces. The red force simulates enemy combat tactics, and provides a realistic threat array. Utilizing a variety of aircraft, the blue force flies air-to-air and air-to-ground combat, and combat-support missions.

Although having participated before, this is the first time the Japanese have brought their F-15 and E-767 airborne warning and control system aircraft.

Other aircraft deployed include NATO airborne warning and control system aircraft from Royal Air Force Waddington, England; Marine AV-8B Harriers from Marine Corps Air Station Cherry Point, N.C.; Navy EA-6B Prowlers from Naval Air Station Whidbey Island, Wash.; F-16 Fighting Falcons from the Texas Air National Guard’s 182nd Fighter Squadron; and KC-135 Stratotankers from the 909th Air Refueling Squadron at Kadena Air Base, Japan.

Opfor forces represent the cream of both the US Air Force Aggressor squadrons as well as the US Navy and Marine Corps Adversary squadrons, flying various models of the F-16, F-18, F-5, and F-14. Ex-Soviet Mi-24 attack helicopters and an Indian An-50 ELINT aircraft round out the “Red” team.

More than 1,000 people are taking part in the exercise, including more than 700 U.S. and 300 coalition service members.

Initiated in 1976, Cope Thunder was devised as a way to give aircrews their first taste of warfare and quickly grew into PACAF's premier simulated combat airpower employment exercise. After the eruption of Mount Pinatubo in 1991 forced operations there to end, it was moved from Clark Air Base in the Philippines, to Alaska in 1992. Cooperative Cope Thunder followed in 1998. This year's event represents the first hosted in Panama.

In this year's scenario, Country Red has asserted control of a strait in the Pacific Ocean, vital for the unrestricted flow of commercial and military naval traffic. Country Blue refuses to recognize Red's illegal proclamation of territorial waters beyond the legal 12 mile limit. Blue deploys a coalition of air and ground forces to regain control of the contested area. Red sinks a Country Blue naval vessel to "send a message" to the world that it controls the area. Blue and Red begin hostilities against each other over the contested area.

Victory conditions:

OPFOR victory conditions:

Capture Panama City and Chitre

BLUEFOR victory conditions:

Capture David and Santiago OR Wannukandi

Scenario Design Philosophy: Create as accurate a campaign as possible, based on a real life exercise. Utilize/capitalize on existing Korea DB. Integrate aircraft that are not currently used in campaigns so the player can fly a variety of aircraft. Create an OPFOR from existing or new skins, keeping as close to realistic as possible, within Falcon constraints. Use a non-Korea theater. Have a "working" ground war to create a reason for the air war. Be flyable from either side.

Aircraft:

OPFOR

F-16A
F-16B
F-16C+
F-16CG
F-16CJ
F-16DJ/DG
F-16AM-D
F-5E
F-14A
F-18A
F-18C
F-18D
Cargo, AWACS, Helos

BLUEFOR

F-16AM-B
Tornado GR.1, Tornado GR.4
F-15C, F-15J
Jaguar
AV-8B
F-16D HAF
F-111F (Australia)
F-18E
F-18F
F-14D
EA-6B,
Cargo, AWACS, Helos

The second Campaign is a "Carrier Workups" type scenario, set in the early 1970's, with a US Carrier Battle group - presumably deploying to Vietnam - doing its workup cycle in a "Red Flag" type environment in Panama. This campaign primarily entails US Navy jets flying against Navy adversaries.

This will be a very small scenario, using a light force ratio.

Campaign 2 - *Navy Carrier Battle Group Workup Cruise*

Background: The *USS America* Carrier Battle Group and Air Wing is preparing to deploy to Vietnam in June, 1974. As part of its pre-deployment training, the Air Wing will engage in simulated strikes against OPFOR air and ground forces in Panama. The duration of the workups is 5 days.

Design philosophy: Utilize Vietnam-era aircraft is a semi-realistic campaign. Create a very small scale, light unit-density environment in which to fly to enable the player to fly focused engagements with greater situational awareness, compared to the "wall of MiGs and SAMs" frequently found in Korea and other Theaters.

Order of Battle & Victory Conditions:

BLUEFOR: F-4B/J/N; A-6; A-7; E-2C; EA-6B

OPFOR: A-4B/C/E; F-5E in Adversary colors

OPFOR victory condition: Capture La Candeleria

BLUEFOR victory condition: Capture Panama City



Campaign 3 - CRUZEX Panama

The "CRUZEX" scenario - based on the actual exercise of the same name - is set in the present day. CRUZEX is a nice scenario because it incorporates a variety of non-US aircraft, thus allowing the Virtual Pilot to exploit some of the great content in FF5, which is not present in Korea.

Background: Held bi-annually, and alternating with one its neighboring air arms, planning for the fourth Cruzex began almost a year ago. 'Cruzex' is designed to evaluate military forces operating within a realistic framework of fictitious nations at war - in this case Blue Forces (Coalition) attempting to counter the aggressive actions of the Red Forces (Opponents) based upon a conflict of low intensity. The scenario was an ethnically based situation, with Redland wishing to re-unite Yellowland, which had been partitioned some years earlier. The invasion of Yellowland by Redland forces resulted in the United Nations Security Council issuing a resolution to enable a coalition of forces from Blueland to force the belligerents to withdraw back to their own territory. Redland was located in the area south of Fortaleza, while Yellowland was to the east centered upon the Mossoro region. Blueland occupied the region further east, including the cities of Natal and Recife. In effect, Cruzex is based upon a scenario similar to the United States Red Flag exercise.

The multilateral air exercise included participation from Chile, France Uruguay and Venezuela, as well as the host nation Brazil. Argentina was to have participated, but was forced to cancel shortly before the exercise began. Observers from Bolivia, Columbia, Paraguay, Peru, Spain, and the USA were also in attendance - the latter from US Southern Command, with headquarters at Davis-Monthan AFB, Arizona. 'Cruzex IV' was designed as a simulated low intensity air campaign within the constraints imposed by peacetime regulations and safety issues.

Victory Conditions:

OPFOR victory conditions:

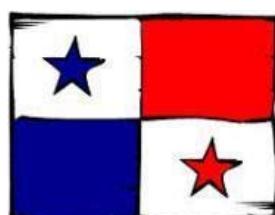
Capture David and Dolega

BLUEFOR victory conditions:

Capture Wannukandi , Chigorodo Bridge, and Santa Fe



Thus - Panama comprises six (6) Campaigns. If the Virtual Pilot wishes to engage MiGs, the "Legacy" campaigns are recommended. For a variety of A/C and challenges, the F.o.F campaigns present some new challenges.



Women Vs Fighter Jets

- i. Fighter Jets can be turned on by a flick of a switch.
- ii. Fighter Jets don't get mad if you do a "touch and go".
- iii. Fighter Jets can be flown at any time of the month.
- iv. Fighter Jets and pilots both arrive at the same time.
- v. Fighter Jets expect to be tied down.
- vi. Fighter Jets don't whine unless something is really wrong.
- vii. Fighter Jets don't mind if you look at other fighter jets.



Captain Bravado

There was a bomber pilot during WWII named Captain Bravado, who showed no fear when facing his enemies. One day, while flying over Germany, the tail gunner spotted two FW-190's approaching, and the crew became frantic. Captain Bravado ordered his co-pilot to bring him his red shirt.

The co-pilot quickly got the red shirt to the captain, who put it on and turned toward the fighters to give his gunners a better field of fire. His crew shot down the enemy planes and went on to lead the formation on a successful bombing run.

That evening, all the men sat around the hangar recounting the earlier triumph. One of them asked the Captain: "Sir, why did you call for your red shirt before battle?"

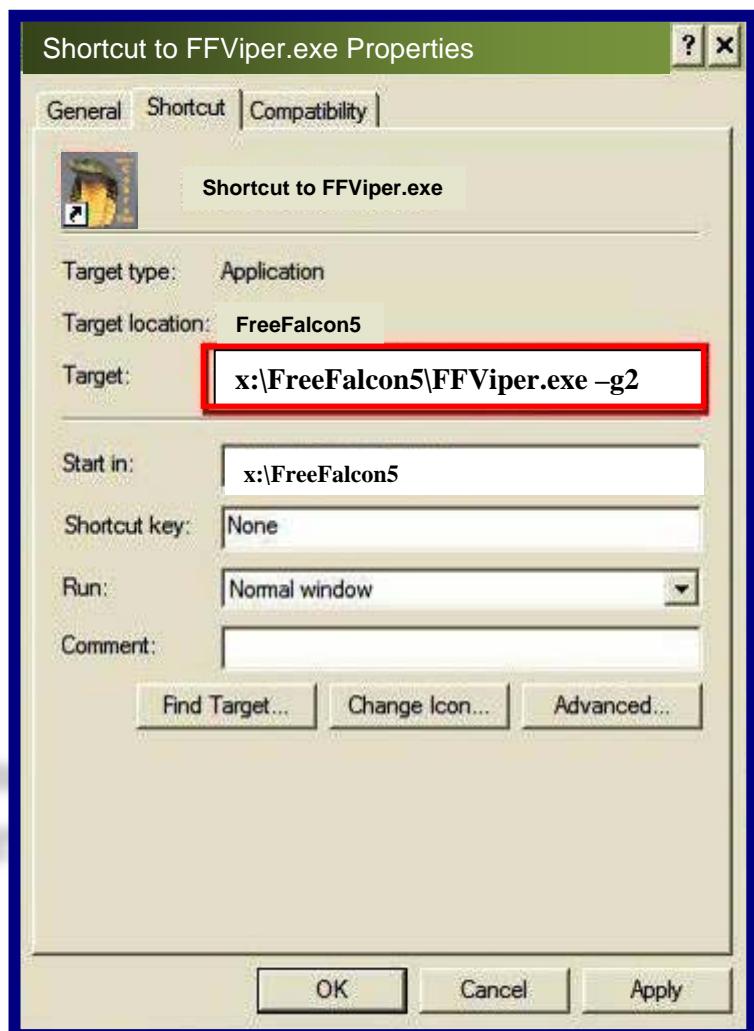
The Captain replied: "If I were to be wounded in the attack, the shirt would not show my blood. Thus, you men would continue to fight, unafraid." All of the men sat and marveled at the courage of such a manly, man's man.

The next day, they took off for a mission deeper into the heart of the Third Reich. Once over German territory, the top gunner spotted an entire squadron of German fighters above them, while the belly gunner saw another squadron below.

The crew stared in worshipful silence at the Captain and waited for his usual orders.

Captain Bravado gazed with steely eyes upon the vast horde arrayed against his craft, and without fear, turned and calmly said, "Get me my brown pants."

The How To Section



How to use the **-g2** switch to increase Terrain Detail →

The Terrain Detail slider has a maximum value of "7".

This can be increased (at the cost of FPS). Create an FFViper.exe shortcut on the desktop. Right-click the shortcut. Choose "*Properties*".

In the "Target" box, you will see <x:\FreeFalcon5\FFViper.exe>

After this line, you must leave a "space", then type in **-g2**.

The target box will now read → <x:\FreeFalcon5\FFViper.exe -g2>

Hit "*Apply*" and "*Okay*". When you start the Sim with this shortcut, your *Terrain slider* will now have a maximum value of 13. The same will be true of your *Object Detail* slider.

This WILL affect your FPS. A fast rig will drop 10 ~ 15 frames. Also, the general feel may be a little "sluggish". On a blazing rig, with a good card, however – terrain "popping" can be greatly reduced.

How to switch Between Viper Pit Variants →

FF5 features Viper Pits by Rufus Parson.

Paul “SOW” Wilson’s ‘Pit is also available for the F-16CJ.

A WIDESCREEN version of the SOW CJ is included in FF5.5...!

The Default MicroProse ‘Pit is also available for the F-16CJ.

AFTER installation of the *FreeFalcon ‘Pit Add-On...*

In your *FreeFalcon5/art/ckptart* Folder, you will find the following Folders:

F-16CJ_PaulWilson

F-16CJ_PaulWilson_Widescreen

F-16CJ_MicroProse

To fly the Rufus Parson ‘Pit - do nothing. It is the default ‘Pit for FF5.

To fly the Paul Wilson ‘Pit - Rename the **F-16CJ_PaulWilson** Folder to **F-16CJ**

To fly the Widescreen - Rename the **F-16CJ_PaulWilson_Widescreen** Folder to **F-16CJ**

To fly the Microprose ‘Pit - Rename the **F-16CJ_MicroProse** Folder to **F-16CJ**

Only ONE ‘Pit may be active at any given time.

Obviously, you cannot have TWO folders sharing the same name.

By renaming these folders, one may switch between the ‘Pit variants available in FF5.

To RETURN to the Rufus Parson (*default*) CJ ‘Pit, simply return the “CJ” folder BACK to its original name (i.e. either *F-16CJ_PaulWilson* or *F-16CJ_MicroProse*)

F-16XL Note →

The Paul Wilson Blk60 ‘Pit may be enjoyed in the F-16XL. In a “hypothetical”, the XL has been returned to the Front Line, and upgraded with the Block 60 ‘Pit. In this way, the Virtual Pilot can enjoy a ‘TE fantasy flight’ in the (beautiful) XL, and also have an opportunity to fly the Blk60 ‘Pit. Enjoy...!

How to use the **-hires** switch to increase Resolution →

In order to make widescreen resolutions available, one must invoke the “-hires” switch.

Create an *FFViper.exe* shortcut on the desktop. Right-click the shortcut. Choose “Properties”.

In the “Target” box, you will see *x:\FreeFalcon5\FFViper.exe*

After this line, you must leave a “space”, then type in **-hires**

The target box will now read → *x:\FreeFalcon5\FFViper.exe -hires*

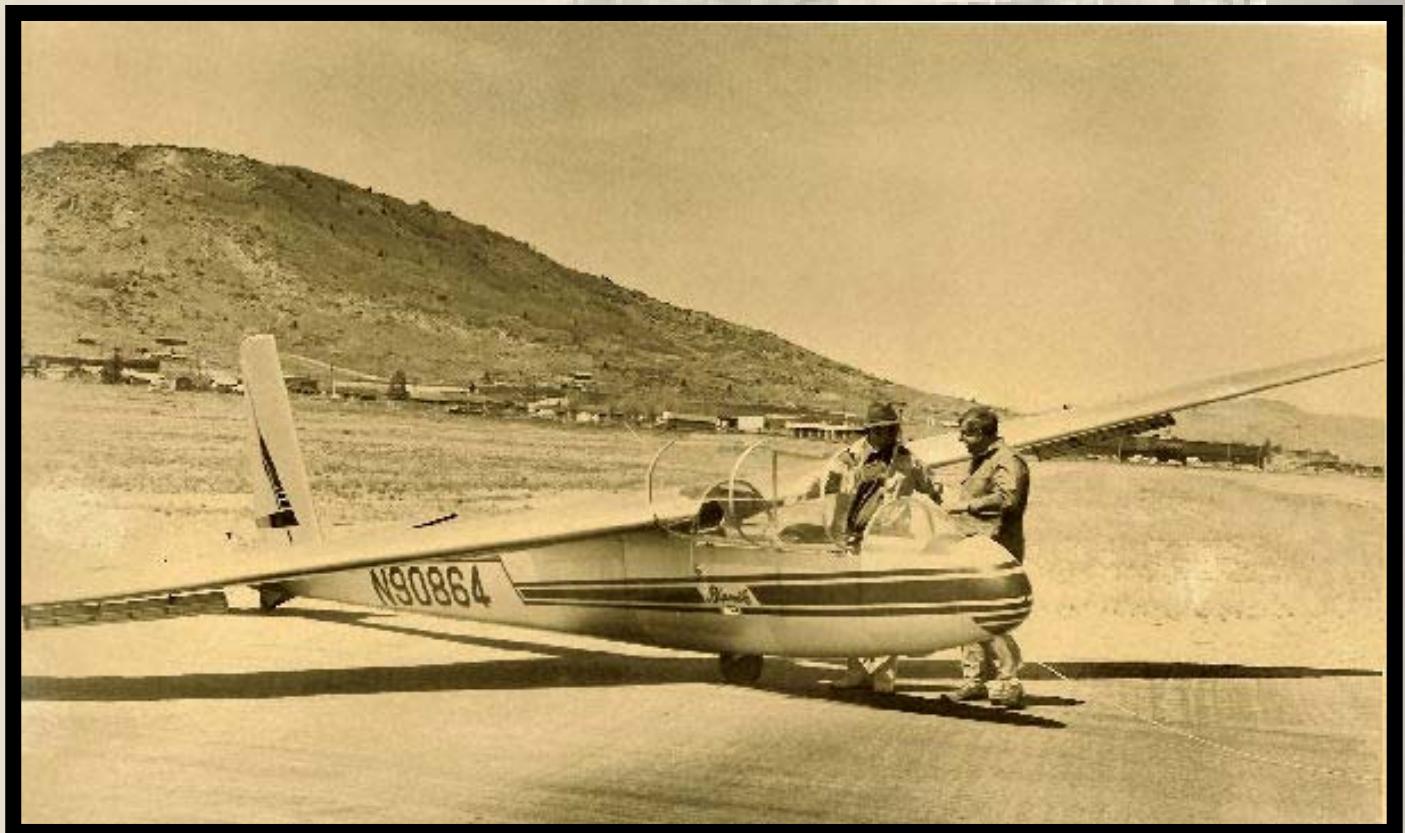
Hit “Apply” and “Okay”.

When you start the Sim with this shortcut, your resolution choices have increased.

Using **Vista/Win7** when installed to “Program Files”, use the following command:

x:\Program Files\FreeFalcon5\FFViper.exe -hires





Falcon stalwart, Dave "DewDog" Wagner (*left*) and his very dear friend, John Jardine (*right*)
John Jardine was tragically lost in a Mid-Air collision.

STILL devoted to simming....?

STILL don't have a life....?

STILL too much free time on your hands....?

Gorny's

Arts & Crafts



III

- * The Materials
- * Manufacturing the A/C
- * The Mig-29 + Template
- * The F-16 + Template
- * How to Fly



THE MATERIALS

Paper:

To make these paper airplanes, you should use the thick smooth paper which is used for drafting, business cards and Christmas cards etc. (*It is called "card stock" in North America.*)

Recommended thickness (weight) of that paper is 200 - 260 gram / square meter.

This thickness is equivalent to 9 - 11 point stock (*in North America*).

IF you only fly your planes INDOORS, you could choose to make your airplanes with thick letter paper (100-150g/m²). A4 (297 x 210 mm) sized paper is best (for printing the templates in this document). If you live in USA, use legal size paper (8 1/2" x 14") or letter size paper (8 1/2" x 11").

The direction of the paper fiber (pulp) in the paper, which is called "grain", is an important point...! The stiffness of the paper is not equal in all directions. Paper is hard to bend in the direction of the fiber; easy to bend at right angles to the fiber direction.

Use the stiff direction of the paper along the wing span and long axis of airplane body. The direction of the paper fiber should be along the SHORT side of the paper (short-grain paper) for the drawings of paper aircraft in this document.

Adhesive:

Please use non-water adhesive.

Water glue softens and crumples the paper, so the strength of the airplane will decrease.

Coating, Painting:

If you fly the paper airplane outdoors in an area of high humidity, you should coat the plane with a very THIN paint spray.

Your Aircraft Factory Tools:

- ✓ Scissors
- ✓ Ruler (to fold the paper accurately)
- ✓ Clothes-pins (to hold the paper until the adhesive harden)
- ✓ Computer connected to a printer.

MANUFACTURING THE AIRCRAFT

1. Choose your aircraft aircraft.
2. Set up your printer for “Thick” paper.
3. Print the template on thick paper.
4. Cut the paper according to the thick solid line.
5. Fold UP the **dash and dot lines** [_ _ _ _]
As a result, the line will be concealed in the fold, or located inside a corner.
6. Fold DOWN the **dash lines** [- - -]
As a result, the line will appear in the fold.
7. GLUE the paper and clamp with a clothes-pin(s).
8. Wait for the glue to dry.
9. Spray paint (LIGHTLY) if needed.
10. No balance weight is needed to adjust the Center of Gravity (*lead free policy*)
11. Adjust your aircraft for flight. (Refer to the “HOW TO FLY” Section)



THE MIG-29

How to manufacture your MiG-29

- Print the Template on thick paper. (*Refer to The Materials above*)
- Set up your printer for thick paper.
- Cut on solid lines. (*Don't forget the line between the wing and cockpit!*)
- Start with the body of the jet.
- Fold UP the “dash and dot line” (lines are concealed in folds or located inside the corner)
- Fold DOWN the “dash line”.
- The cockpit is partly contained in the body.
- After folding, open the back side of the jet and cover in paste or glue.
- After applying glue, RE-FOLD.
- Paste horizontal tail plane under vertical tailfin as thinly printed engine marker.
(Vertical tail plane is inclined out slightly from vertical line.)
- Attach wings to top of jet body
- Fold nose-piece (shaped like a propeller) over nose of jet and attach to jet with glue.
- Cut out the catapulting hook.
- Wait for glue or paste to dry.

No balance weight is needed...!

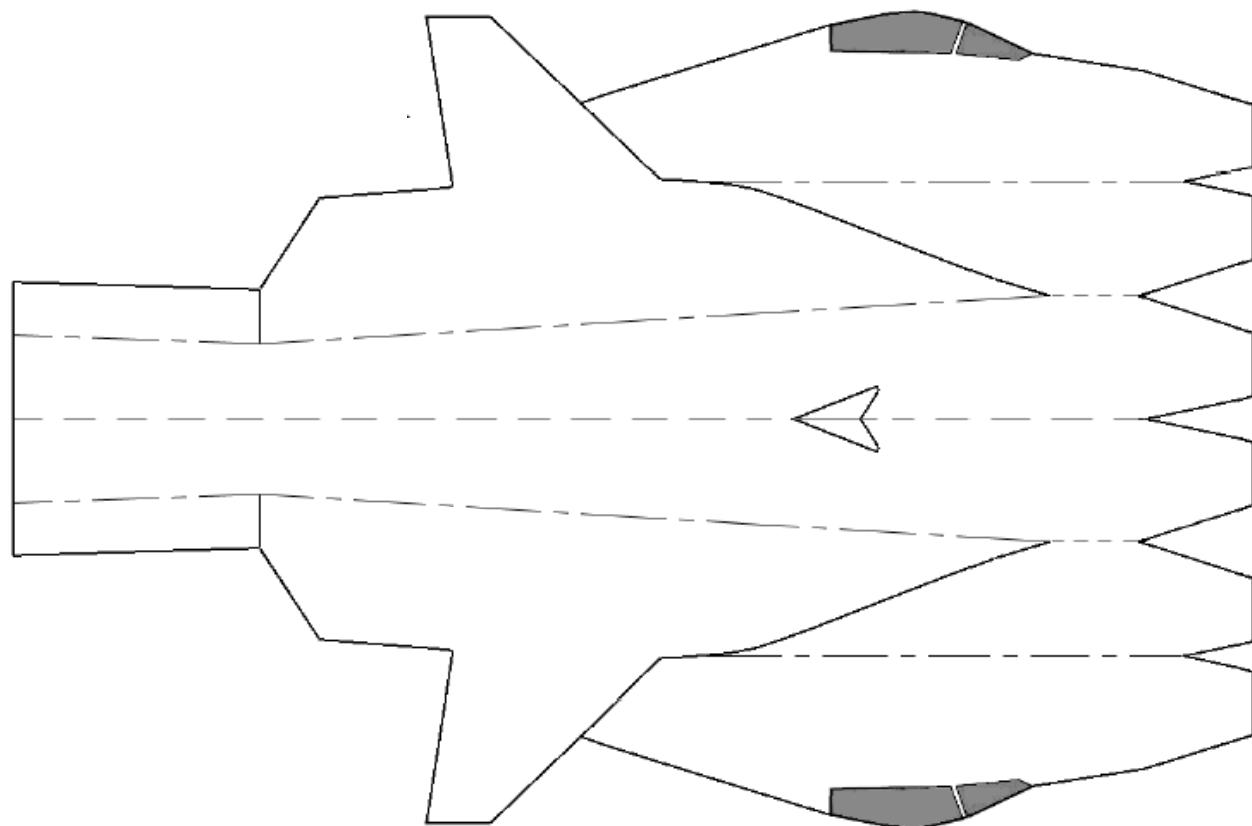
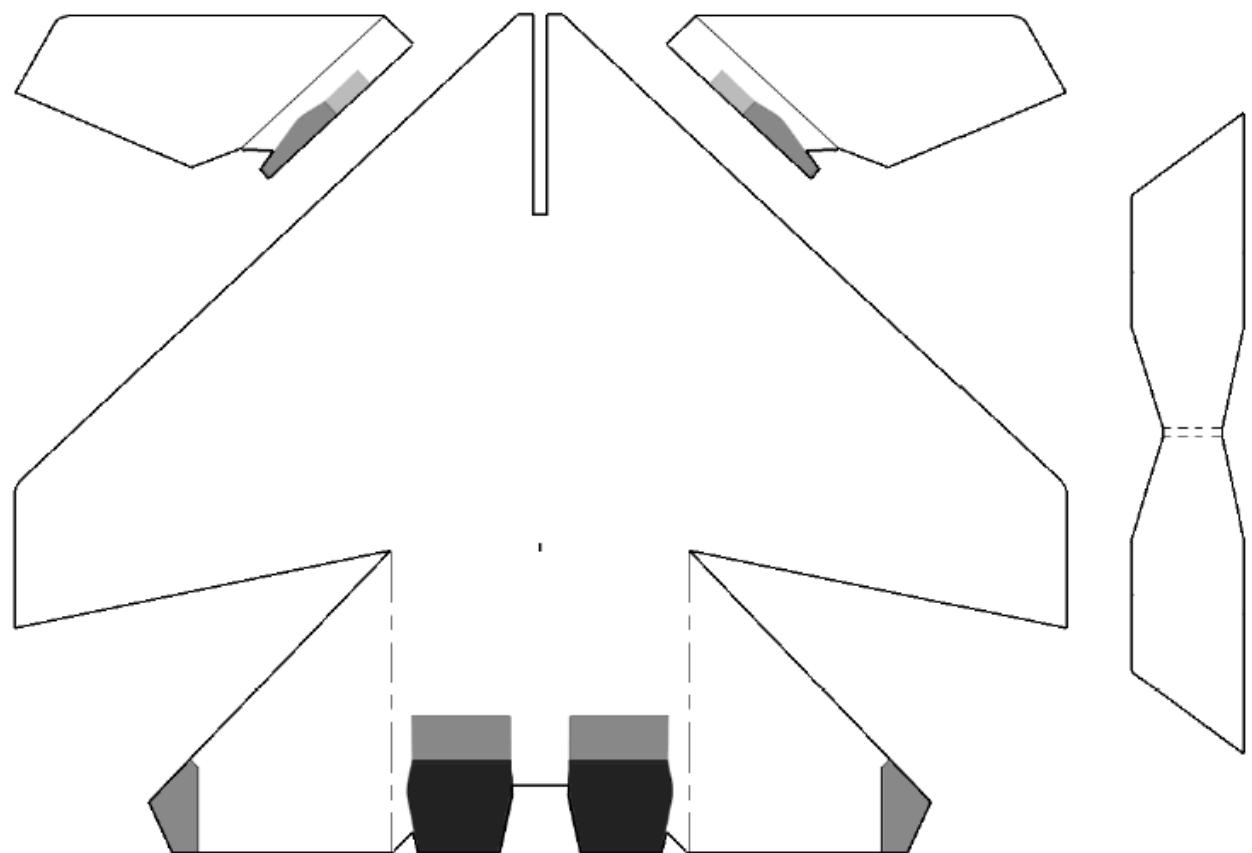
Adjustment:

Bend down wings slightly (as a bow shape) to make camber. Dihedral angle of main wings is zero degrees. Form washout (decrease angle of incidence at wing tip) at the tip of main wings to avoid tip stall and to increase stability.

Spray paint thinly if flying outdoors.



See “How To Fly” Section for tips on flying the MiG-29.



THE F-16

How to manufacture your F-16

→ Print the template on thick paper.

(Refer to The Materials above)

→ Set up your printer for thick paper.

→ Cut the paper, following the solid lines.

(Start with the body of the jet.)



→ Fold UP the “dash and dot line” (*lines are concealed in folds or located inside the corner*)

→ Fold DOWN the “dash line”.

→ First make **Cockpit 1**.

→ After folding the forepart of **Body 2**, paste **Cockpit 1** inside **Body 2** and re-fold.

→ After folding the **Body 3**, re-open, and paste the forepart of **Body 2** inside the **Body**.

→ Re-fold **Body 3**.

→ Paste nose **cover 7** to the “nose” of the body.

→ Bend down horizontal stabilizers at thin line to 10 degrees from the horizontal (*see fig.1*)

(*Horizontal stabilizers have an anhedral angle of 10 degrees*)

(*Dihedral angle of main wings is 0 degrees*)

→ Paste **main wings 4** onto the body.

→ Paste **vertical tail fin 5** in basal parts of **vertical fin 6** and attach to **wings 4**.

→ Bend up the rear edge of horizontal stabilizers slightly.

No balance weight is needed...!

Adjustment:

Bend down wings slightly (as a bow shape) to make camber. Dihedral angle of main wings is zero degrees. Form washout (decrease angle of incidence at wing tip) at the tip of main wings to avoid tip stall and to increase stability.

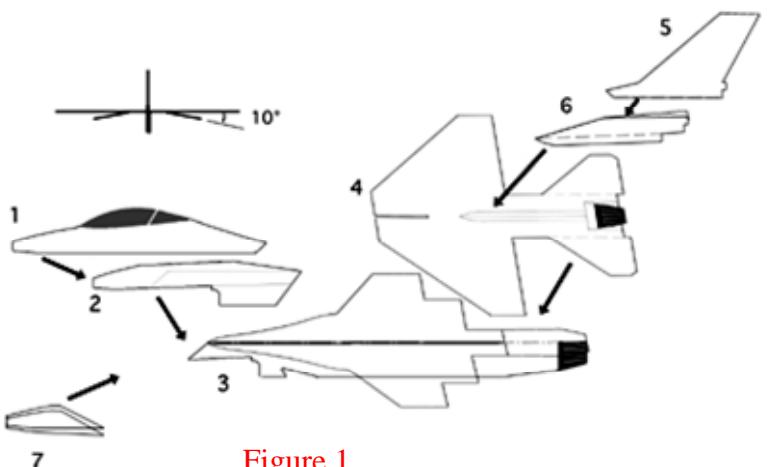
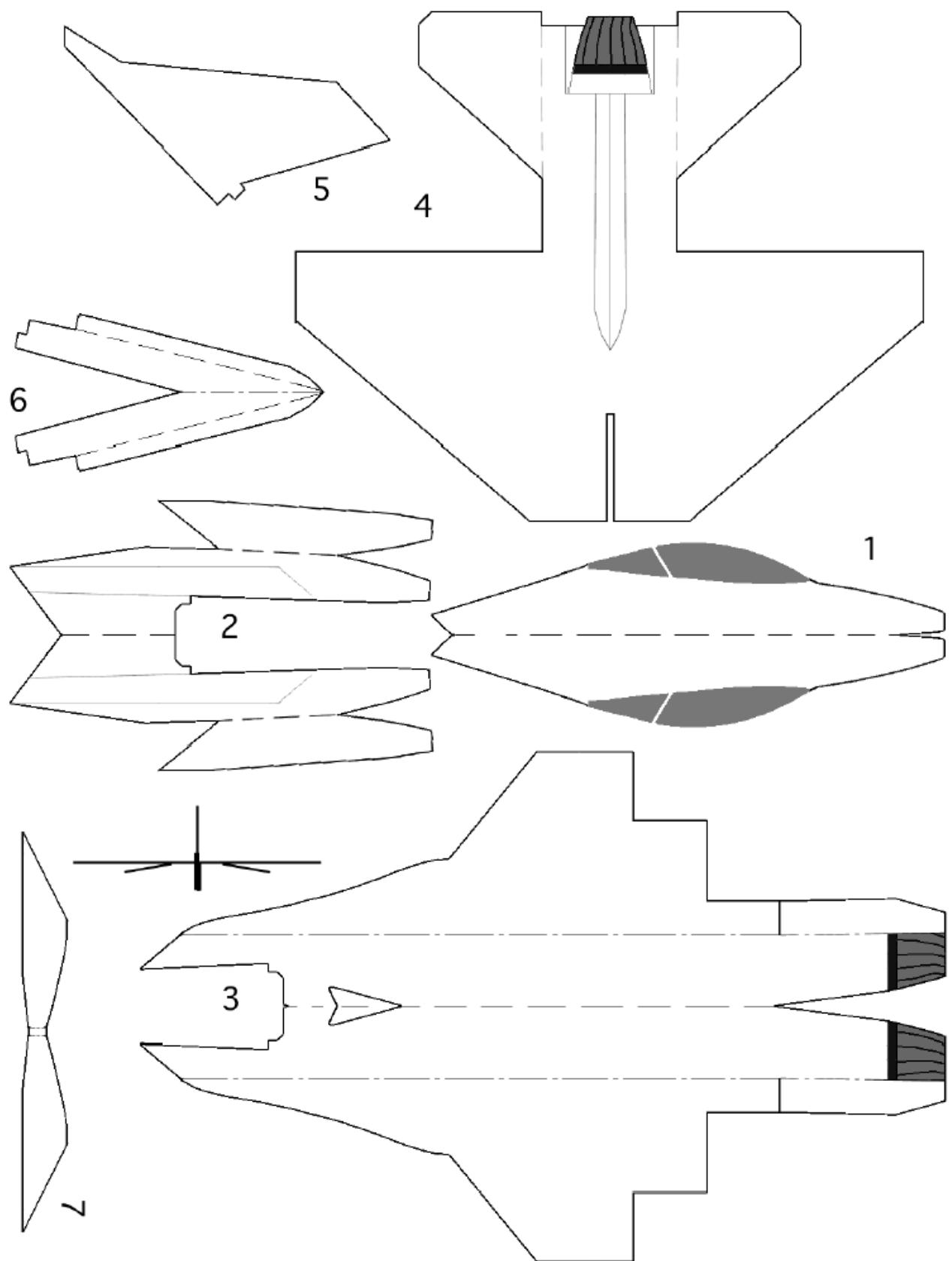


Figure 1

Spray paint thinly if flying outdoors.

See “How To Fly” Section for tips on flying the F-16.



HOW TO FLY

Test flight

Hold the paper airplane under the main wings and toss - like darts.

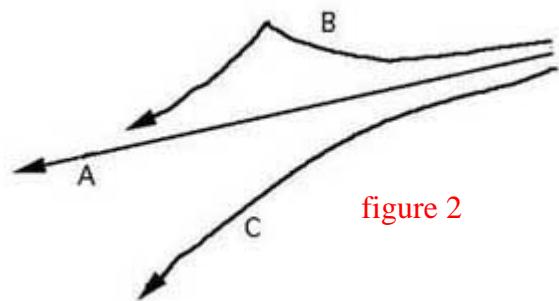


figure 2

Pitch adjustment: (refer Figure 2)

Flight as "A" is our objective.

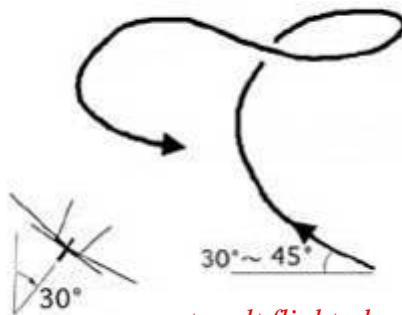
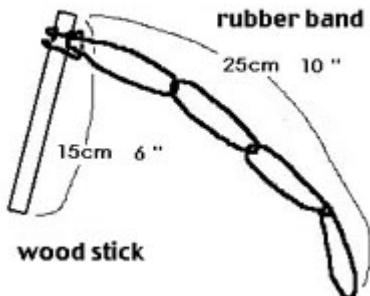
If as "B" → Bend down the rear of horizontal stabilizers (Elevators) slightly.

If as "C" → Bend up the rear of horizontal stabilizers (Elevators) slightly.

Horizontal turn:

If airplane does not fly straight, check the distortion of body or wings, and correct them symmetrically. In order to turn to the left, bend down the rear edge of the (outside) right of the main wings (Ailerons) and bend left the rear of vertical tail wing (Rudder) slightly. Reverse this order to turn right.

rubber band catapult



catapult flight plan of spiral climb

Outdoor flight plan with Spiral climb

If you launch the A/C strongly, it will make a short vertical turn and immediately lose altitude. To get high altitude and glide for long time, the paper airplane would be launched as follows: This method is called the "Spiral climb" or "Immelmann turn climb".

1. Repeat test flight and adjust the airplane to fly stable and turn to the left slightly.
2. Bank the plane to the right and launch strongly upward with rubber band catapult (*You would do well to hold the catapult with the left hand; the aircraft with the right*).
3. The airplane will climb with right turn and glide with left turn.
4. These aircraft will fly more than 15 seconds if carefully adjusted.

Paper airplanes are originally designed by Akihiko Suzuki.



Where Eagles Dare...



FREEFALCON



A DAY IN THE LIFE



A DAY IN THE LIFE

of a Viper Ground Technician...

Ever wondered what it would be like to work with Vipers; to be surrounded by the jets everyday as part of your normal routine; to keep them safe and operational...?

Let's join Dannycoh for a day in the life of an F-16 Ground Crew Technician.

We ground crew technicians, have a key role in the daily operational status of a combat ready F-16 squadron. Technicians are expected to be available for duty twenty-four hours a day; seven days a week for the jets to be fully operational at all times. Technicians are divided to 2 major classes. We call them *Class A* and *Class B*.

“Class A” technicians are those who are responsible for the daily maintenance of the jet while it is positioned in the flight line or sub-pen¹. This is commonly known as *Organizational Level Maintenance*. These technicians usually fix malfunctions in the various aircraft systems by replacing a faulty assembly. This assembly can be as simple as a burnt out light-bulb, or as complex as a highly sophisticated avionics computer. Class A technicians are expected to be proficient in all aircraft systems, but there are some other highly trained technicians who are specialists in complex systems. All Class A technicians are not expected to understand how a faulty assembly works internally.

“Class B” technicians are those who are responsible for the maintenance of the faulty assemblies which are received from Class A technicians. This is commonly known as *Intermediate Level Maintenance*. This kind of job requires a different working environment - usually a lab, equipped with various testing equipment, and automated test stations. Technicians are expected to be experts in the internal functionality of each assembly, but are not expected to know how it operates in the aircraft (*i.e. to see the big picture...*). Diagnostics of a failed assembly is done up to the sub-assembly level which are usually circuit card assemblies. Technicians are not allowed to fix the sub-assemblies which are done by “Class D” (*depot*) technicians.

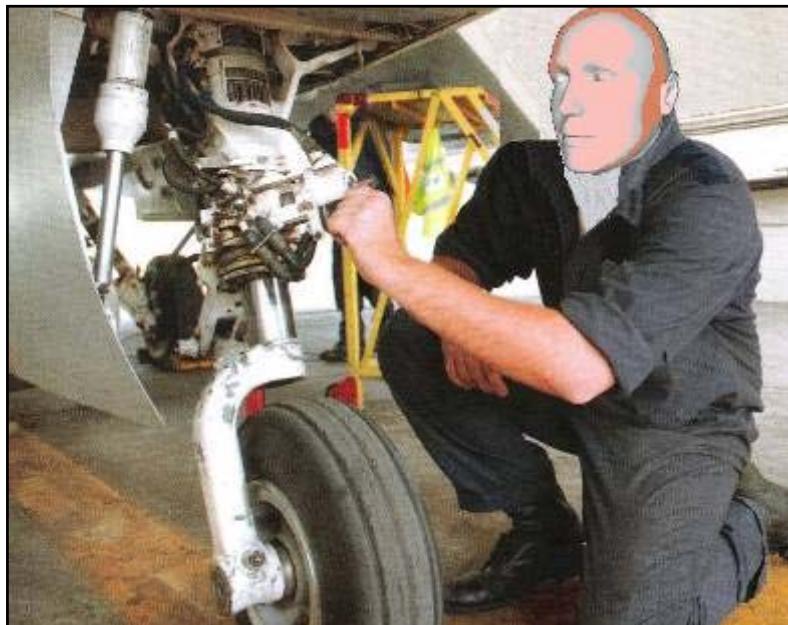
Most technicians are either Class A or Class B.

Only rarely is a technician expert in both classes “A” and “B”.

I am one of those technicians.

Feel free to post any questions you may have in the Forums, or drop me a PM.

If it’s non-classified, I’ll be happy to help... ☺



¹ A “sub-pen” is a hardened concrete, dome-shaped structure where A/C are parked for protection against bombing. Sub-pens are usually grouped in 6 – 8 domes, with one open space for A/C to run their engines. A commander of such a group is called a “Pen-Chief”. In IAF, all pen-chiefs are NCO’s. Whereas the USAF rarely uses sub-pens (preferring the use of “lines”), they are widely used in Israel, due to the strategic situation.

A typical day looks like this:

A typical day begins at 7:30am, or a few hours before the first sortie of that day.

All aircraft that are supposed to fly today for training or for combat are already fueled, armed and ready due to the work performed yesterday.

Each aircraft undergoes its DI (*Daily inspection*) and PF (*Pre Flight*) checks are performed; lists are signed. A pilot arrives from the squadron's operations room, and receives his assigned aircraft from its respective crew chief. The pilot performs quick inspections of the aircraft exterior panels, and checks for the various stores which he expects to see. Technicians help the pilot to strap himself into the cockpit, and give him the "all green" sign for JFS engine start. After the pilot completes his before takeoff checklists, the technicians perform another "last-chance" exterior inspection of the aircraft. Following this, they clear the pilot for taxi.

After the sortie, the crew chief debriefs the pilot for any malfunctions that occurred during the sortie. The crew chief notifies the relevant systems experts who decide how to fix the malfunction. A typical scenario for fixing a malfunction involves checking the aircraft's relevant history for similar occurrences. A crew is assigned to work on this malfunction.

A crew is composed of a veteran crew chief and one or more junior technicians. A fundamental principle in working on a malfunction is to duplicate what the pilot complained about. After this process is accomplished, a series of diagnostics procedures are used to isolate the malfunction to the assembly or wire harness.

When an assembly is suspected of being the probable cause of failure, it is replaced, and the procedure to duplicate the malfunction is repeated, to see if the problem has thus been eliminated. If the original symptoms disappear, the failed assembly is once again installed, in order to ensure that the old assembly was the one which caused the malfunction. This is called "double duplication".

Now the assembly is replaced and all relevant tests are performed to return the aircraft to service.

The failed assembly is shipped to a Class B facility for further maintenance by other technicians who follow the same principles as their Class A counterparts.

In addition to fixing malfunctions, technicians perform a variety of other tasks. Examples include - replacing due-date items, cleaning the aircraft, servicing it with oil, LOX², hydraulic fluid, etc.

During their spare time, technicians are expected to attend seminars to maintain and update their technical knowledge; order spare parts; teach new technicians; and perform other military tasks.

For those who go home, a typical day ends at 17:30. Duty personnel keep working on aircraft that fly at night until all aircraft are ready for the following day.

My Falcon4.0™ knowledge was put to use, when I was offered some flight-time on a real F-16 simulator. I landed almost perfectly...!

That was THE most amazing professional thing I ever experienced!!!

I am sure I've worked on each and every tail number F-16 that the IAF has, so – I'm lucky to have a lot of knowledge and experience on all F-16 blocks.

² LOX refers to Liquid Oxygen

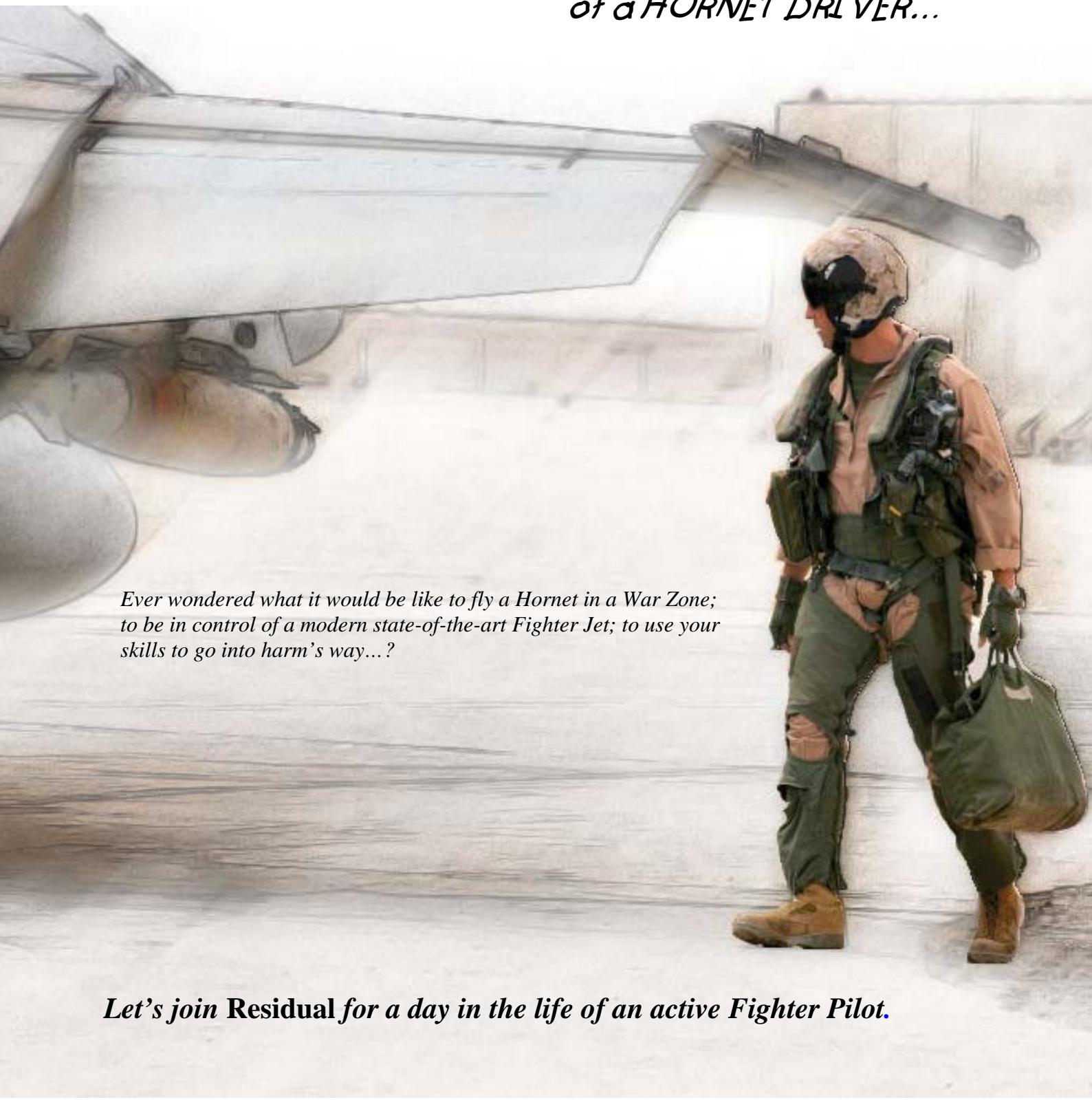


Dannycoho – working his arse off; hard on the job....!

Dannycoho is a Senior F-16 Flight Technician for the Israeli Air force. Security protocols dictate that – as such - his face and/or any identifying features of either himself or the aircraft are unable to be shown in this publication.

A DAY IN THE LIFE

of a HORNET DRIVER...



Ever wondered what it would be like to fly a Hornet in a War Zone; to be in control of a modern state-of-the-art Fighter Jet; to use your skills to go into harm's way...?

Let's join Residual for a day in the life of an active Fighter Pilot.

Buzz buzz buzz buzz...

On days like this, my alarm is the greatest sound in the world. I'm on the flight schedule today! Finally - after some much needed R&R; a lot of ridiculous paperwork; and, one nasty sand storm - I'm going to get back in the air. I quickly shower and throw on my flight suit, and attach the patches showing off my squadron and name. Dawn and tie my boots; grab my shoulder holster w/ beretta M9 sidearm and gear bag, and head for the door.

The trip from the cans to HQ takes less than 5 minutes, walking. Upon entering, I get the greeting of the day from the armed-and-ready duty sentry, to which I reply with a 'good morning' and a nod. I arrive in the briefing room to see that I'm the first to arrive. I'm fifteen minutes prior to the fifteen minutes prior we're required to make (*Marine Corps standard → 'Early' is on time; 'on time' is late... and don't even think about being late.*)

So the brief starts in thirty minutes. I have time for a cup of coffee. I return to my chair - coffee in hand - and start looking over maps; I have an idea of the AO for the day, but want to brush up on the areas that have been considered 'hot' over the past week. About 100 miles north, some Marines on the ground have been getting relatively heavy resistance from an area just to the east, which is separated from them by a river.¹

The XO walks in, along with my Section Lead. I stand and say 'good morning', and we all catch up for a moment. The XO goes into detail about our mission, and we are told our target will be a bridge, about a hundred miles to the north. Along with the bridge, we are to recon any traffic to or from the bridge. Of course - as always - we have the secondary mission of CAS which takes priority if the call comes, since - in this area, and just north - we are supporting Marines on the ground, as well as a few units of special forces who have been requesting us by name since our squadron trained with them in the months before our deployment to Iraq.

"Ok guys, time to saddle up..."

We leave HQ and head for the Blazer² which we will take to Maint Control to check the aircraft logs, and sign the safe for flight log.³ I then head through the Airframes Division Haz⁴ into Flight E (*Flight Equipment*) whose job it is, to make sure our safety gear (*g-suits, helmets, night vision, etc*) is all working properly, and not damaged. We don our gear, which takes about fifteen minutes. Then we hear over the maintenance radios: "All shops, All Shops, Pilots walking for Event Two... Troubleshooters to the line..!"

It is always an amazing thing to watch as between forty and fifty maintainers from all workshops exit their respective shops from every haz on the flight line. Carrying their respective troubleshooting gear, they all head to the jets that are about to be firing up and heading out.

We make our little hike from Flight E out to our respective jets. Today I will be in aircraft '205', which is on the other side of the flight line of my Section Lead who will be in '212'. (*The aircraft are spaced out over a 2 mile squared area and surrounded on 2 sides by concrete to keep them safer from mortars, and attack.*) Upon arriving at my jet, I'm greeted by the Plane Captain who gives me a quick rundown on everything he has done to prepare the jet, before I begin my walk around inspection.

¹ For Security-related purposes, specific locations need to be omitted.

² "Blazer" refers to the – *and I'm not making this up* – Chevy Trailblazer. – Ara'

³ Maintenance has a binder of all important aircraft data, downing discrepancies, and all maintenance done to correct the problem, in the front of the book is a sheet that shows the fuel load, ordinance loadout, lox load, and signatures from all the maintainers that are saying the jet is "safe for flight". Once reviewed, the pilot signs accepting the jet as safe for flight

⁴ Haz refers to "Hardened Shelter". Apparently, Residual thinks we should all "RTFM". – Ara'

Once my walk-around is complete, I head up to The Office by climbing the boarding ladder and making sure the ejection seat is in the safe position (*because I want to take a ride in the air, but it's much more fun when you're in the cockpit, not 100 feet above it...!*)

I hop in, strap myself to the Seat, and plug in my Com, Mask, and G-suit to the respective receptacles. I follow with a check of the switches, and make sure everything is in the proper positions, and turn master power on to start my fire light tests. Once completed, I give the Plane Capt' the "Fire in the Hole" hand signal, and fire the APU. Then the Right side engine; then the left... Setting INS; TACAN; Entering waypoints; Testing weapons; Setting Com Channels; Checking Radar; Flight Controls... it gets rather busy.

Once all my flight data is inputted and ready, the Plane Captain has completed his final checks for safety, and has given me the "all go" signal. I give him the 'thumbs up', 'pull chocks' hand signals. He then guides me out of the protective shelter, and sends me on my way with a salute. I return his salute, and return my attention to the 'Pit.

At this point, I taxi to the arm/de-arm area to get all my weapons "armed". This entails removing the safety devices that are put on to make sure nothing goes 'boom' during maintenance. Once clear, I continue the taxi to the runway, which is only another few hundred feet. I radio ATC and am told to 'hold short'. Makes sense - my section lead is currently on the runway, awaiting the clearance for takeoff. I hear ATC clear him for takeoff; he acknowledges and almost instantly my teeth start to chatter from the noise of his afterburners directly in front of my jet. Even through the thick windscreens and canopy it's a loud aircraft to follow...! About this time, ATC clears me onto the runway; awaiting final takeoff clearance. This comes as Lead gets about three-quarters down the runway, and starts to lift off the ground.

I pause for a breath, then throw the throttles to full AB, and feel the thrust force me back into my seat...! The aircraft launches forward; speed escalating rapidly, until the jet feels as if it wants to come off the ground itself...! I ease back on the stick, and we are airborne.

Reaching left, I chunk the landing gear handle up to retract the gear. Continuing my climb whilst banking 45 degrees right, I pull on the stick to turn hard right to my designated heading. I can see the altitude climbing at a steady pace and at 14,500', I start to level out to an even 15,000 and throw the sucker into A/P, to allow the aircraft to follow my current heading, speed and altitude. Now to relax a bit, and mentally go over the mission at hand.

The radar is quiet, and time goes quickly with my mind racing to keep up with all the data being constantly thrown in my face by instruments. I take a moment to flip a few pages on my kneeboard to bring up tactical information on what is to come. About 150 miles north west, there is a bridge in the middle of nowhere that is being used by insurgents to travel from wherever it is they live, to the points where they menace US ground forces. Our mission - Destroy the bridge, and see what crawls out from nearby. We should arrive on station in another 30 minutes.

I press the paddle on my stick which disables the Auto pilot; designate my FLIR pod on the left DDI, and start scanning below. Wow. I STILL find it amazing that – at 15000 feet - I can zoom in and read a license plate on a car...!

Not that they have license plates in Iraq. My mind drifts back to Yuma, Arizona, where I'm reminded about a training incident...

About half a year prior, we trained with our ground troops doing much of the same thing we are currently doing in Iraq. From around 20,000 feet I was able to watch the troops write us a message on the ground, by dragging their feet through the sand.

Slowly the letters began to form...

'F' – 'U' – 'C' – and then... "Oh, and here comes the 'K'..." I say over the radio to base...! The ground guys that were pretending to be the 'bad guys' that week decided to tell us they didn't appreciate losing. We all got a good laugh from it. However now it's the real deal and I am 5 minutes to target. My mind snaps back to the present...

Time to arm the weapons, and get this under way. Today we're loaded with a Mav missile and a MK-style laser guided bomb. I select the Laser guided from my weapon control computer, and slew my FLIR onto the bridge which I'm now able to see clearly.

What is this...? There is a truck coming into view. At the same time, I hear my Section Lead comment: "We have a truck inbound to the target". With a quick radio call to base for confirmation, I am 'Weapons Free'. I switch the master arm to the 'On' position. I watch the HUD for release cues; just mosey on my merry way... slowly, slowly... Pickle...!

Bomb is away...!!

I bank 45 degrees, and begin a gentle turn to the left; watching the FLIR as I watch for the "boom" that I know is coming. Completely ignoring the countdown, I push buttons and keep a controlled bank. Then - there it is...! My FLIR goes black like a cloud just erupted directly where I was aiming the crosshairs. A moment later, and all I can see is what little is left of a bridge, and a truck about 200 feet short of the - now a crater, that was once his route...!

We continue to watch, and two male figures leap from the truck, and run to the edge of the crater where the bridge had stood just moments before. I can only imagine what was going on inside their heads at this point. But – by my reckoning - the first thing I would want to do is get the heck out of there...! What are these guys doing...? It seems they have decided to hang out and wait for lemonade or something...!

We knew prior to the mission, that the only vehicles known to use this bridge were hostile, so I call base and ask for a status on what they would like done with our 'visitors'.

"Base, Blade One..."

"Blade One, Base; Go ahead..."

"Base; I have two males in a truck that arrived on scene the same time as our delivery. How should we proceed...?"

"Blade One; Circle and identify. Let's see what they are up to..."

"Roger base..."

Section lead comes over the radio: "Ok, let's scout and see what we have going on here"

We circle for about 3 - 4 minutes as the two men on the ground appear rather frantic. They run to the truck and remove what appear to be an Ak-47, and some type of "tube" - about 4 feet long - which appears to us like an RPG..!

At this moment I don't feel like they know we are here. They appear to be searching the area surrounding the bridge, and nearby areas. We radio it in, with a description of the truck, and weapons.

Base replies: "Blade One; Base..."

"Base, Blade One. Go ahead..."

"Your contacts fit a description reported, that was leaving the scene of an armed conflict about 10 miles from that point. You are cleared hot. Take them out..."

"Roger Base; Cleared Hot".

In this situation I'm not going to waste a 500lb bomb, or a maverick missile on a truck.

Time to use pure lead...

On my right DDI, I quickly select the weapons page, and with one more button-click my HUD icons change to give me a nice gun sight. I bank left; roll the nose, and pull back hard to bring myself into a diving turn. Just moments later, I'm at 3000 feet and 400 knots.

Straight and level; watching my instruments, and FLIR. Here is the target - two men, and a truck... closing fast... HUD... instruments... closing...

Perfect. They scamper behind the tailgate of the truck. I open up with my cannon...

My F-18 vibrates softly as molten rounds stream from the nose of the beast.

In only moments, Pass one is complete.

Lead pipes in with a: "DAaaaaMN...! You just about cut that truck in two...!!!"

I circle around to take a look, and - sure enough - on the FLIR, along with what appears to be a lot of blood and parts, I see a truck that is pretty messed up. I chuckle to myself, and say: "I guess playtime is over".⁵ Back comes: "Roger that; let's go home".

After a quick tanker hop, we are RTB. As we get close to base, Lead decides he wants to have a little fun, Reports have indicated that 20 miles south of our airbase, hostiles have been sighted with mortars, and Rpg's. One of the things we do regularly is announce our "presence" in the area...

Ten miles from the city (*thirty miles from base*), we dive aggressively to 2,000 feet, and bring it up to 500 knots...! As anyone knows, this is quite a thunderous racket, and – for the pilot – a rather exciting experience. We blow over the city like an angry hive, then a few moments later we are thundering over our own airfield at 500 knots...!

Hey - we might as well celebrate a little right?

We slow 'em up to 250 knots; enter the downwind leg of the pattern; and, radio the tower.

Moments later, I'm cleared to land.

Within 20 minutes, I'm shaking the hand of my Plane Captain, and hopping out of this bird. Nice timing, too - I have to use the bathroom, and I really don't like using the piss bags...!

And that is a typical day in Operation Iraqi Freedom

Residual

⁵ I'd just like to add at this point, that Residual is really a Sensitive and Gentle young boy. No – really... - Ara'



Residual walks to the office



Looking for a Parking Space

Hornet Driver - Interview

"Residual" – an F-18 Aviator with the United States Marines - is currently flying combat missions in Iraq. He has agreed to devote a little of his R&R to answer some questions from our Flight Sim Community.

Chris C: What type of F-18 do you fly, and HOW did you earn your callsign?

Residual: Currently I'm flying the F/A-18A+ which is a modified F-18A that adds structural support and upgraded avionics to extend the original life of the aircraft. I earned my call sign by making short videos of the guys in Flight School, and used the name "Residual Effects Studios" and "Residual" stuck

RogueBlade: What has been your most intense/worrying moment whilst on tour in Iraq?

Residual: This would have to be blowing a right main landing gear tire on landing, and having to stand on the left brake to keep the jet from crashing into the burn on the side of the runway

Aragorn: Crashing into a BUM on the side of the runway? Who's bum...?

Residual: Next...

Scarface: What kinds of weapons have you fired in Iraq; what is your favourite?

Residual: I've have fired the 20 Mike Mike; dropped JDAM, GBU-12s GBU-10s; and, Launched Maverick Missiles while on station in Iraq. My favourite is the GBU-10. You watch the whole thing from the LPOD and it makes quite a boom!

T-Rex: Have you ever flown a CAS strafing run?

Residual: Yes, in training and in theatre. More about this in A Day in the Life Of Section

Aragorn: How does FreeFalcon5.0 compare to the Real Deal...? Favourably?

Residual: Free Falcon 5.0 took a little getting used to, but - as far as a Consumer-based sim that was never govt funded - it is absolutely the most realistic as far as any combat flight sim I have played. Though not perfect, all systems come extremely close to the real deal.

Aragorn: What is the most realistic thing about Falcon™...?

Residual: The most realistic aspect of Falcon is CCIP bombing with laser guided weapons, the FLIR symbology isn't exact, but man its close..!

RogueBlade: Have you ever used the HADES bomb?

Residual: Negative. After Vietnam the DOD determined that jellied gas bombs are inhumane. Besides, they just wouldn't fit the bill for "minimal collateral damage" here in Iraq.

Scorecard: For the *CAS* Role, do the Marines on the ground have a PREFERENCE between the Harrier and the F-18. Which is better and why...?

Residual: I'm not going to be disrespectful to the Harrier folks, but I can say we are the number one requested CAS squadron currently employed in Iraq.

Chris C: Is it true that Hornets suffer from low internal fuel loadings, and – if so – is this problematic to mission design and operations?

Residual: *The F/A-18A+ carries approx 14900 lbs of fuel with 2 wing external tanks. Yes - that fuel goes fast. In a typical start-up, you burn approx 400-500lbs, then taxi, arm/de-arm, and line-up for the runway you knock off another 200-300lbs. Takeoff with full AB and you're down about 1500lbs. So, by the time your airborne, you're at approx 12600lbs remaining. I suppose I'm used to it. I know other aircraft have better fuel economy, but our jets make up for it in manoeuvrability, survivability, and payload abilities. While in Iraq there are constantly tankers orbiting, and regardless of whether we are land-based or ship-based, tankers are typically available while on mission. So, yeah - when we fly from coast to coast in the US and have to re-fuel three times before we get there, it can get old. But, for the most part, it's just a normal part of the day.*

RedSmurf: Is it mostly CAS missions you fly? What is a typical loadout and RoE for such?

Residual: *In Iraq – yes - most missions are CAS. After all - as Marines, our primary function is to support the troops on the ground, whether that be Marines, Army, or Special Forces calling for CAS. Typical Loadouts = 1 Aim-9M, 1 Aim-120, 1 GBU-12, and 1 Maverick Missile*

RedSmurf: Typically - how are target coordinates relayed on a CAS sortie? Radio? Datalink? Who is ultimately in charge of making the decision to attack - the guy in the jet or the FAC/ ground commander?

Residual: *All initial communication is through AWACS, then all radio is routed through AWACS, but at that point we are speaking directly to the troops on the ground. Once we are cleared hot from the ground, and from control - at that point it's my decision whether or not to take a shot that is considered "Danger Close"*

Big Mac: Residual - is it true that you guys get higher heart-rates during landing than in actual combat?

Residual: *haha - I don't know about that, but it can definitely be the most stressful part of a mission, that's for sure. One wrong move, and you're a smear*

Chris C: Have you ever flown “Janes F-18”? If so, how realistic is it?

Residual: *I have not had the opportunity to fly Janes F-18, however I have enjoyed many others in the line of James combat simulators. My personal favourite was "Longbow".*

Verana_SS: Residual - can a pilot actually HEAR from the 'Pit, the sound of chaff and flares being released...?

Residual: *Yes. Chaff and flare are primed with an explosive charge that is heard (and slightly felt) in the aircraft.*

Big Mac: Residual, what's so darn hard about landing on a carrier?
You have four f*ckin' wires! How could you miss?

Residual: *You're aiming for a postage stamp in the ocean...! If that's not bad enough, the "Runway" you're landing on is actually at an angle to the direction the ship is travelling. So imagine lining up crooked with the runway; have it move away from you; and, now stay on a perfect glideslope, whilst hitting the deck at around 190-200 knots...! It's the hardest thing about flying - but the most peaceful. It's the only time flying a Fighter that you're focused on only three things at one time - AoA, Alignment, Meatball...! However - if you do miss? They probably won't find all of your body, or aircraft...*

Aragorn: I don't understand why you would be trying to land on a "postage stamp", when there's a huge freakin' Carrier next to it...!

Residual: Intelligent questions...?

Aragorn: er... How do they make the stamp, float...?

Residual:

RedSmurf: In a combat environment, how does one maintain good situational awareness?

Residual: Well, as you know in flying a sim, distractions are everywhere...! Good situational awareness starts from the ground level.. "Training" in OCS (Officer Candidate School), one of the very first things you are taught is attention to detail, which - in my opinion - is the foundation of situational awareness. If you're keeping track of the small details, you will notice that MiG flying in high from your 3 o'clock...

Aragorn: Do you still vomit when you fly? Can I have some?

Residual: haha - its been a while - a couple years at least. The first time I was in a tandem flight and I experienced 8g's - I puked all over the HUD and windscreen

Big Mac: In Iraq, how do the aircraft, weapons and training fare against a technically primitive but hidden enemy? Would you rather columns of tanks in the open?

Residual: Wait...! You mean give up complete air superiority, have an enemy that shoots back with something bigger than a AK-47, and knows where I am? No thanks. I'll stick with bombing the people who are shooting at my ground troops, and have no idea what's about to hit them.

Chris C: I noticed that most former VF-Squadrons transitioned to the F-model. Do the GIBs fulfill the same tasks as in the Tomcat ?

Residual: Well - the "WSO" (weapon systems officer) does do the same thing as the Tomcat's RIO. He handles the radar and weapons, whilst you fly the jet. However, I fly the F/A-18A+ which is a single seat aircraft..

Aragorn: Is that because they couldn't find anybody who wanted to fly with you...?

Residual: Should I just insert laughter here...?

Aragorn: What's the worst thing about being a Fighter pilot...?

Residual: Hmm....? Being away from friends and family; not being around for holidays, birthdays. From a technical viewpoint? Knowing that if you mess up, one of your fellow Marines may pay the price...

Chris C: AFAIK the Hornet is capable of automatic carrier landings. Is it common to use the automatic landing mode, or is the autopilot landing an "emergency" procedure?

Residual: At this time the Navy, and Marine Corps policy is one of: "No landings under any type of autopilot..."

Bell: Residual - as a Real Life Pilot - what is the WORST thing about Falcon4.0. What is the MAIN thing it lacks (which you wish it had)...?

Residual: Well, the original reason I offered my help, and support to the FF project, was Avionics. It's what always hindered my flights in the past. So in the future, we will see what we can do.

RedSmurf: What's the typical duration of a sortie? Also – how much time does it take to prepare a sortie; how much is done by the pilots and how much is done by Intel and mission planners.

Residual: *I cant go into to much detail here, however - typically we're in the air anywhere from 4-6 hours. We don't prepare missions; we get told what to do, where to go, and who to contact. 99% is done by Intel and the higher brass that determines priorities*

The Penetrator: What is the ONE thing you remember MOST from Basic Training?

Residual: *Being completely isolated from everyone I knew, and having absolutely 0 freedom.*

Aragorn: If you could fly any jet, OTHER THAN the Hornet, what would you choose...?

Residual: *F-35 JSF...! I've seen the un-published flight characteristics. All I can say is: "Wow...!" Speaking of which - any plans for implementation? Don't tell me the Marine Corps will get it before Free Falcon...? The Marines are the last to get everything...!*

RAM22: Does Bitchin' Betty really say: "Guns Guns Guns"...?

Residual: *If Bitchin' Betty talks to you in a F/A-18A-D you're probably in trouble...! She only starts mouthin' off if something is wrong - like you're in danger of hitting the ground with your landing gear up; you're on fire, etc.*

Aragorn: Have you ever "done" Betty; is she really a bitch...?

Residual: *haha...! Betty doesn't 'do' pilots; I think she prefers engineers.... ;)*

The Penetrator: Given the chance, what would you ask me?

Residual: *Are you a male or female, and would you pass a drug test?*

RAM22: Residual - are there any times when you cannot read the HUD clearly...? Does it AUTOMATICALLY adjust for sunlight, background and clouds, so that it is always bright enough to read...?

Residual: *I wish it did... by design it has a "Automatic" feature, but it is rarely used, and no you cant always read it clearly, especially if the sun is in your face.*

Aragorn: My favourite pilot is Manfred von Richthofen or Werner Voss. What about you...?

Residual: *Col Dean S. Hartley, Jr., USMC (ret.)*

Commanding Officer Marine Fighter Attack Squadron-115 (VMFA-115), Korea.

Distinguished Flying Cross with one star; Air Medal with seven stars; Navy Commendation Medal with Combat "V"; Presidential Unit Citation, 1st Division Guadalcanal; Navy Unit Commendation; American Defense Service Medal; American Campaign Medal; Asiatic Pacific Campaign Medal with three stars; Victory Medal WW II; National Defense Service Medal; Korean Service Medal; United Nations Service Medal; Armed Forces Expeditionary Medal; Letter of Appreciation (2)

Aragorn: What movies have you seen which depict Air-Combat MOST realistically; and, LEAST realistically...?

Residual: *Most realistic 'eh? hmmm - that's a tough one. I would have to say: Flight of the Intruder. Many of the problems faced by pilots in the Vietnam war are experienced today, as politicians stick their hands where they don't belong; adding so many restrictions to the battlefield, that it makes winning a war nearly impossible. I think today we are handling it a little better, though. LEAST realistic...? Independence Day. He flips the "Spin Recovery Switch" and says: "Master arm - ON"...!!! Or, maybe: "Iron Eagle. ha-ha...!*



RESIDUAL

BOMBKAPSEL M/90 MJÖLNER

with Snail



Both the SAAB Viggen (*AJS37 version*) and the Gripen can carry the Mjölner JSOW cluster bomb as a stand-off, GPS-guided air to ground weapon.

Of the two versions, the MJ2 for hardened targets is available in FF5.0.

The M/90 has no self-propellant. The stand-off capability is therefore dependent on the speed and altitude of the launch platform. It has two small wings to help maintain altitude.

As with all GPS ordnance, it is only deployable against stationary targets.

The M/90 blast can cover an area of approx. 700 x 1200 feet.

Targeting is like any other JSOW in FF5.0: power on, align, use of GM radar and CCRP Manual mode.¹

There are two different ways to deploy the M/90: low-level and high altitude.

Of the two, low-level deployment is the most exciting.

LOW LEVEL DEPLOYMENT

When flying below 300 feet at maximum speed, the M/90 can be released at about 5 nautical miles from the target. **Important:** if released at this altitude in level flight, the Mjölner will probably hit the ground immediately. So when you are ready to launch, pitch the nose up ten (10) degrees, release the weapon, and back to the deck again.

Remember - it is GPS guided, so you can launch from a different angle than directly on target, but changing course bleeds energy, so be cautious with this.

You don't want to fly deep into enemy territory just to miss your target.

¹ See "Learning Section" – *GPS Munitions*

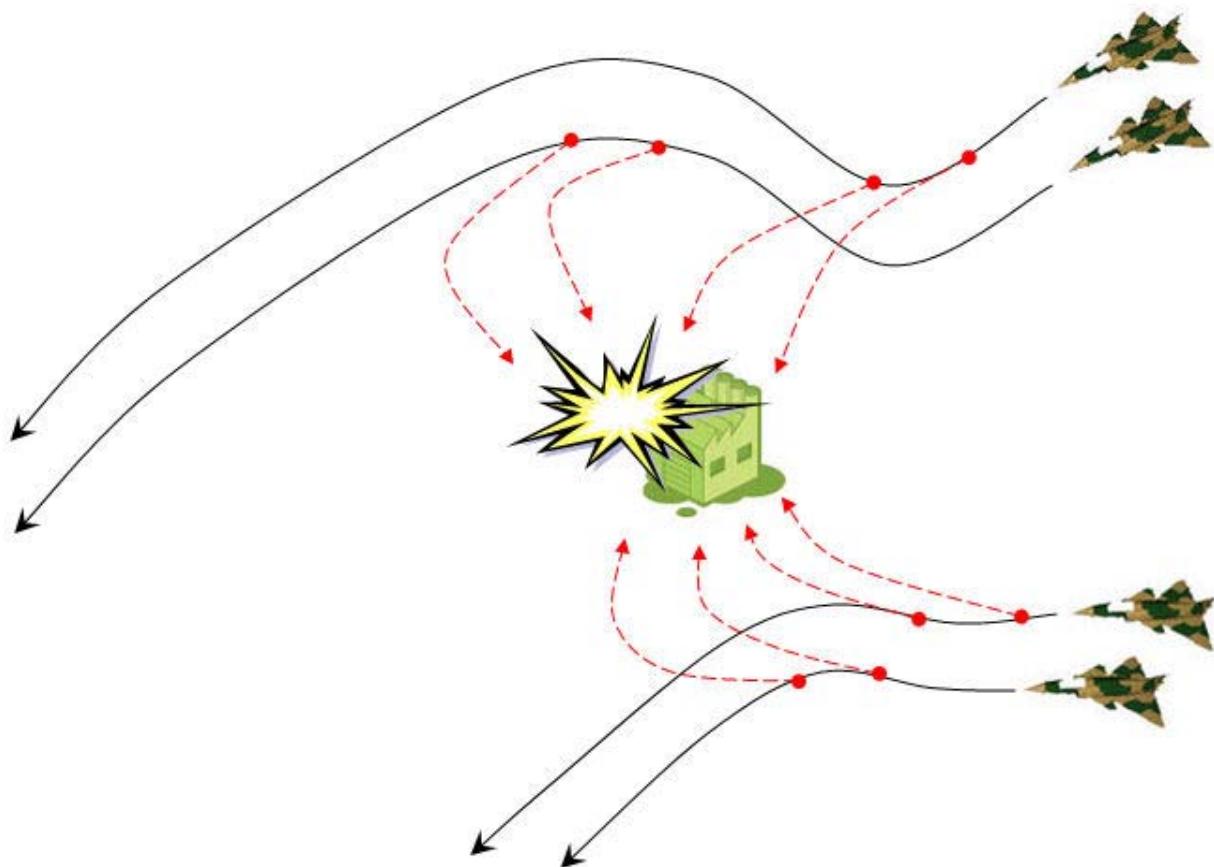
HIGH ALTITUDE DEPLOYMENT

Flying high will increase the range of the weapon to approx. 12 nautical miles.

Also note → **Speed = Distance**.

The faster you fly, the further you can stay away from your target.

A typical Viggen tactic for deploying the M/90 would be a low level attack, with several aircraft flying from different directions toward the target area. Each of the aircraft would then release their surprise package simultaneously (see *diagram below*).





5.0
mfg

'Gorny Interviews Gilman "Chopstick" Louie... .

Aragorn: Gilman - just one thing straight off: Is it true that you were the inspiration for the Four Kinsman hit - "Louie Louie"

Chopstick: No. Not at all.

Aragorn: That's amazing...! Do you mind if I call you "Louie Louie"...?

Chopstick: Yes.

Aragorn: That's great...! So - the first thing the Falcon community would like to know is this: Why do you have two FIRST names, but no surname...?

Chopstick: Er..... "Louie". Louie IS my surname.

Aragorn: Right...! Hee hee....! Seriously, though....?

Chopstick: My given name is "Gilman", and my....

Aragorn: Okay, then. So - you work for the CIA....?

Chopstick: Well - not really. My company sub-contracts to various government organisations. After the folding of Microprose, I established...

Aragorn: So - have you ever killed anyone...?

Chopstick: What...? I beg your pardon...?

Aragorn: Being a spy, have you ever - like - killed an enemy agent with an umbrella or something....? Have you ever killed anyone...?

Chopstick: No. But - you may the first.

Aragorn: I love you.

Chopstick: WHAT....?!?!

Aragorn: I said: "I'd love to..."; love to... ask you another question...!

Chopstick: Go ahead.

Aragorn: Have you seen "Brokeback Mountain"...?

Chopstick: Aragorn....

Aragorn: Please - call me "Pumpkin Pie"....

Chopstick: Aragorn - I agreed to this interview on the understanding that we'd be discussing the early days of Falcon Development.

Aragorn: Who would win in a Dogfight between you and Pete Bonanni...?

Chopstick: Haha. Well - I'd have to say Pete. He's quite the pilot, you know.

Aragorn: Who would win in a Dogfight between your dog, and Pete Bonanni's dog....?

Chopstick: Oh. I don't have a dog.

Aragorn: Can your dad beat up Pete's dad...?



Chopstick: This interview is....

Aragorn: Which do you really consider "your baby"...? Falcon 3.0 or Falcon 4.0...?

Chopstick: Now - that is a very difficult question...

Aragorn: "Recite 'pi' to 50 places" is a difficult question.

Chopstick:you see - Falcon3.0 was ground-breaking in just SO many ways...! It was one of the first pieces of software which DEMANDED a math co-processor to.....

Aragorn: 3.1415926535897932384626433832795028841971693993751

Chopstick:huh....?

Aragorn: So - Gil the Man.... er.... do you mind if I call you "Gil the Man"....?

Chopstick: Yes. I do mind, actually.

Aragorn: So - Gilly-Meister-Manster - if you were NOT a software developer, what do you think you would be...?

Chopstick: *Hahaha.* Well - I'd like to BELIEVE that I'd be a fighter Pilot. But - to tell the truth - I really enjoy working with technology.

Aragorn: Why would you NOT tell the truth....?

Chopstick: I wouldn't.

Aragorn: Wouldn't WHAT...?? Tell the truth.....?!?!

Chopstick: What the hell are you talking about....?!

Aragorn: How much money did you make from the Falcon franchise...?

Chopstick: *Haha.* Aragorn - you'd have to ask my accountant about that. [*Smiles*]

Aragorn: Maybe I have. 'Eh...? Maybe I HAVE asked him....!! MAYBE I KNOW THINGS I'M NOT SUPPOSED TO KNOW.....!!!!

Chopstick: Do you?

Aragorn: No.

Chopstick: Maybe I should be leaving, now.

Aragorn: Is it true you took an incentive flight in a Viper...?

Chopstick: Ah... yes. Yes, I did. It was one of the most memorable experiences of my life.

Aragorn: First time I had sex was very memorable for me.

Chopstick: How was it...?

Aragorn: Kind of lonely. I wish somebody else would have been there to share it....

Chopstick: [*stares*]

Aragorn: Soooooooooo - did you actually FLY the Viper, or did you just enjoy the view...?

Chopstick: Pete was good enough - and brave enough, *hahaha* - to give me the controls for a short time.

Aragorn: Why?

Chopstick: Why did he give me the controls...?

Aragorn: No. Why do you keep laughing at yourself. It sounds a little mental.

Chopstick: [*stares*]

Aragorn: Hahaha.... ha ha..... ha. Ha...?

Chopstick: [*stares*]

Aragorn: So - how did you go with the flying...? How did it compare to Falcon...?

Chopstick: Pete tells me I didn't do too badly. The amazing thing was - the ONLY experience I had up to that point was.... well - FALCON.

Aragorn: Zero.

Chopstick: Sorry...? What?

Aragorn: Zero. I only gave pi to forty nine places. I forgot to add the 50th. "Zero".

Chopstick: Aragorn, I feel you may be misrepresenting the wishes of the community, with regards what they'd like to hear about Falcon development, and my modest role in that. Could we get back on track...?

Aragorn: I wear red underpants when I fly Falcon. So - why was the product so buggy upon release; what was Microprose's over-riding business philosophy, and would you like to see them, because I'm wearing them now...?

Chopstick: Firstly - IF you are talking about your underpants - no. No, I wouldn't. Secondly, the "buggy" nature of the release was simply due to that time-honoured tradition of Art Vs Business. The accountants at Microprose weren't willing to allow us a further cycle of Beta.

Aragorn: Why not...?

Chopstick: It's a simple matter of economics. Pre-release is a period of total expenditure and no revenue. Such a situation can only be maintained for so long. Especially as the post-release - or revenue stage - has projections, but NO guarantees...!

Aragorn: No. I meant - why don't you want to look at my underpants...?

Chopstick: Okay. That's it, I think. It's pretty much time we wrapped this up....

Aragorn: Do you know that - on the Falcon Forums, I usually refer to you as "Mr Falcon"...?

Chopstick: Really? That's very kind of you.

Aragorn: Because - I've always thought that your nose kind of looks like a beak. Has anybody else ever commented on this...?

Chopstick: Uh... no. No. This would be the first time.

Aragorn: Have you flown my An-2 'Pit....?

Chopstick: To be honest, I don't really fly Falcon4.0 very much these days. I am so very busy with my company, that I seldom have the time.

Aragorn: IF you could choose ANY pit at all, including ALL the work by Aeyes, Paul Wilson, Stopworks, Rufus Parson and the like, WHICH Pit would be your FAVOURITE pit, considering I'm carrying a knife, and I'd gut you like a fish.

Chopstick: Uh.... ah..... ah..... A... N.... 2...? An-2.....?

Aragorn: Stop it....! Really...? Do you know Frugal...?

Chopstick: Yes. I have the privilege of knowing him quite well.

Aragorn: Does he ever say nice things about me...?

Chopstick: Well, probably. But - just not to me. I find it scary that Frugal looks like Jan Michael Vincent on a bad-hair day....

Aragorn: Do you know "Hustler"...?

Chopstick: The magazine...? I read it occasionally for the articles and current affairs.

Aragorn: No. "Hustler" from the Falcon community.

Chopstick: I don't recall the name.

Aragorn: The thieving, malevolent personification of evil who heads the cult of demon-spawned hell-children known as FreeFalcon.

Chopstick: Oh, yes. THAT "Hustler". I once channelled him in a séance.

Aragorn: Mr. Gilman Louie, I'd like to thank you on behalf of the entire Falcon Community, as your vision has brought millions of hours of pleasure, education and relaxation to countless men and women (and Pumpyhead) over the years. In fact - that your product is STILL being enjoyed globally; is still unsurpassed TEN YEARS LATER - is a testament to both your skill and your vision.

Chopstick: It was always my pleasure, Aragorn. I have enjoyed both the response to – and the enormous challenges of – the Falcon concept. I hope you all continue to enjoy Falcon4.0, and I hope you all continue to share in the “spirit” of Falcon.

Aragorn: Could you look at my red underpants, now...?

Chopstick: No, mate. No. I don't think I could.

Aragorn: Just the elasticised band at the top...?

Chopstick: Okay, then.

Aragorn: [*undoing belt*] Just, don't tell Seifer.....





Gilman "Chopstick" Louie ponders an "exit strategy" from the interview...

Projects



The Tornado Project

The LEGACY Project

The Phantom Project

T h e T O R N A D O U P G R A D E



Project

A Complete Overhaul for the Euro Fans

Euro Pilots Rejoice...!

Featuring:

- ✓ a NEW MODEL by WaveyDave
- ✓ a NEW SKIN by Red1
- ✓ a NEW 2D Pit by Rufus Parson
- ✓ a NEW 3D Pit by PumpyHead



Wavey Dave has produced the most DETAILED aircraft model ever seen in Falcon4.0™

To bring out the full potential of the model, Red1 – recognized as the Falcon Community's premier skinner - has spent months producing his finest and most detailed skins to date. Various Schemes are represented.

Pumpyhead & Qawa have produced a 3D 'pit which features complete functionality, and amazing detail, including both animated pilot arms and legs.

Featuring SIXTY-THREE gifs, Rufus Parson has collaborated closely in the development of a 2D Pit, which matches seamlessly with the 3D Pit for complete immersion. The pit utilizes the latest code developments, and features views from both the front and rear seats.

Rack & Data tweaks have been implemented to enable the greatest degree of realism when choosing the loadout of the Tornado.

New Weapons models have been created, and skinned; the entire package integrated into the FreeFalcon Legacy Database Project.¹

The Tornado Project also represents the beginning of a new standard for the employment of textures in FreeFalcon; in relation to both size and distribution of textures.² For the first time, Falcon has a Model, Skin and 'Pit package to rival – and , in many ways surpass – that of the F-16 Fighting Falcon.



¹ See the "Legacy Project" Section for more details.

² See the "Skinning Section" for more details.



The LEGACY Project

With the change to DX based models, FreeFalcon fundamentally altered the DB. This fundamental shift, combined with ten years of tweaks and goodness knows how many iterations, meant the Database was rendered both cluttered, and semi-functional.

For the release of FF5.0 – the DB reins were handed over to Ranger822.

Ranger discovered that devs were developing the DB, using DX files exclusively; thus entirely neglecting the LOD-based approach. Ranger decided to take a radical course, designing and implementing his: “Database Legacy Project”.

In effect, the Legacy Project reversed engineered the DX files back to a working version of the LOD database, and established a new start point; essentially, Ranger had RE-BUILT the entire Db from scratch. The “incidental” effect...? A complete “scrubbing” of the DB, with each step in the process requiring the creation of new spreadsheets to verify data, thus identifying conflicts and errors, which were fixed along the way.

BaldEagle stepped up and designed some tools especially for the job.

Thus – taking a clean and streamlined “Legacy” database, Ranger822 painstakingly

- ✓ Re-built a LOD-based database, to act as a clean “starting point”.
- ✓ Removed shared parents
- ✓ Identified unused parents / Cts / models
- ✓ Removed unnecessary lower level LODs
- ✓ Identified mismatched model sets
- ✓ Corrected shadow model shapes
- ✓ Corrected shadow model sizes
- ✓ Corrected Hitbox values
- ✓ Renamed vehicle / weapons / features to match actual entities
- ✓ Identified and corrected type / subtype / specific values mismatches
- ✓ Identified and corrected vehicle and unit entity mismatches
- ✓ Reconciled all mismatches with Teplanes.lst file
- ✓ Text scrubbed the lcktxrc.irc file to match vehicle entities.

The result...? A new Db which is free of corruption, redundancy and error.

FreeFalcon has always prided itself on the strength of it's database, and now – due to the efforts of Ranger822, and his LEGACY PROJECT – we are happy for you to fly the most stable, most realistic database ever constructed for Falcon4.0™.



The PHANTOM UPGRADE



Project

A Complete Overhaul of the Classic Jet

The Phantom Upgrade Project started several years ago with Thoarek showing off a new model of the F-4E Phantom he built. It got almost no attention from the community. He texmapped it and skinned it, and showed a few pictures in the FF Forums. It caught Ranger822's attention, and he decided to ask Thoarek for the the model, so as to use it for MacFalcon. By that stage, Thoarek had decided not to pursue the project to completion, and the texmapping, skins – and, even the model itself – remained incomplete.

Realizing that it would take quite a while to get the model up and running, Ranger sat on the F-4 model. About a year later, Ranger was working on ITO with Peled and CCC. He passed the model to CCC, and shared his vision of making the F-4E Phantom the centerpiece for their Yom Kippur 1973 campaign.

CCC looked at the model and did some tweaks, before sending it back, reporting that it was too much work. Ranger persevered, countering that he would texmap the model, put on the slots and fix the nose section, in order to get it flying/fighting in-sim. In return, CCC should agree to take another look at it.

When CCC saw the Israeli skin which Ranger had made for the model, he suddenly caught fire...! CCC went to work, adding all sorts of cool shit. To quote Ranger822: "CCC was like a man on a mission; absolutely fucking nuts...!"

CCC made an entirely new model out of it, before kicking around node fuser, and – ultimately – adding even more stuff. Ranger then proposed: How about making an F-4C?

In a single night CCC sent it back to Ranger, who then skinned it in a Vietnam SEA scheme.

Then Ranger ventured: How about some other variants? CCC took off. He then went thru a flurry of work and - within a couple of weeks - the fledgling Phantom Project had ALL of the other F4 variants. Complete, yet un-skinned.

Over the course of the spring and summer, Ranger completed all of the skins. He posted all the skin work at his Israeli Theater Forum at PMC.

Further development has led to The Phantom upgrade now including re-skinning of the centerline and wingtanks, as well as adding canopy reflections that will show the pilot's shoulder patch and nationality (when appropriate) that match up with the variants skin sets. Individual reflections for each variant...!

Originally the Phantom Upgrade was not made with ITO in mind. Ranger only wanted the F-4E. The other variants were really intended as a fitting model for - perhaps - one of the greatest (*the greatest..?*) jet fighters of all time. It was envisioned that the other models would be used in Korea, ODS, Vietnam, Falklands, etc.

Finally, the project needed to be integrated for testing purposes. Initially, the FreeFalcon group was not enthusiastic, so ITO was chosen as a test-bed. Now – with FF having seized upon the Project with great enthusiasm¹ - Ranger says: "I am really glad I have an opportunity to share these models with a wide audience and hope folks enjoy flying them as much as CCC and myself enjoyed bringing them to the public."

¹ Thanks, Ara'. You are a true VISIONARY...! - Ara'

In addition to the fine Models and Skins from the Original Phantom Project, the current FF iteration of the Phantom Upgrade Project also includes some new ‘Pit offerings.

Qawa’s 3D Pit Emporium has engineered a beautiful 3D Pit.

Aragorn has taken the original Cockpits.nl 2D Phantom ‘Pit, and brought it up to FF5.0 Standard, with new gifs, new panels, new functionality and a completely re-worked .dat.

Both the 2D and 3D Pits have been designed to “mesh” as seamlessly as possible.



Q: What do you call a Rhino without any horns....?

A: Anything you like.



Q: Why did Mrs Rhino divorce her husband...?

A: Whenever she had her friends over for Bridge, her husband would insist upon walking around the house with a permanent Horn.

The animals were bored. Finally, the Rhino had an idea. "I know a really exciting game that the humans play called American football. I've seen it on T.V."

He proceeded to describe it to the rest of the animals and they all got excited about it so they decided to play. They went out to the field and chose up teams and were ready to begin.

The Lion's team kicked off. The Rhino's team received. The ball went straight to the Rhino. He caught the ball, lowered his head and charged. First, he crushed a leopard, then two rabbits. He gored a wildebeest, knocked over two cows, and broke through to daylight, scoring six.

In shock, the Lion called time out, and gathered his team. "Look you guys. We can win this game. They only have one real threat. We've got to keep the ball away from the Rhino, he's a killer. Mule, when you kick off be sure to keep it away from the rhino."

The game recommenced. Just as the mule was about to kick off, the rhino's team changed formation and the ball went directly to the rhino. Once again, the rhino lowered his head and was off running. First, he stomped two gazelles. He skewered a zebra, and bulldozed an elephant out of the way, and scored.

By halftime, the score was 326 – Nil. The Rhino had scored every touchdown.

Second half commenced. It was the same tired story. First play – ball went to the Rhino. Off he charged...! It looked like he was home free. Suddenly at the twenty yard line, the Rhino dropped over DEAD...!

There were no other animals in sight anywhere near him. The lion went over to see what had happened. Right next to the dead rhino he saw a small centipede.

"Did you do this?" the Lion asked the centipede.

"Yeah, I did." the centipede replied.

The lion retorted, "Where were you during the first half?"

"I was putting on my shoes."

F-4 PHANTOM TACTICS



with Toonces

A Brick With Wings - A guide to flying and fighting the F-4 Phantom in *FreeFalcon 5*

*Find this article in the **TACTICS SECTION...**!*



Dedication to Falcon™ Award



veranna_ss builds the world's first PAPER cockpit...!

We're not sure if he has too LITTLE money, or too MUCH time.



"BALDEAGLE"

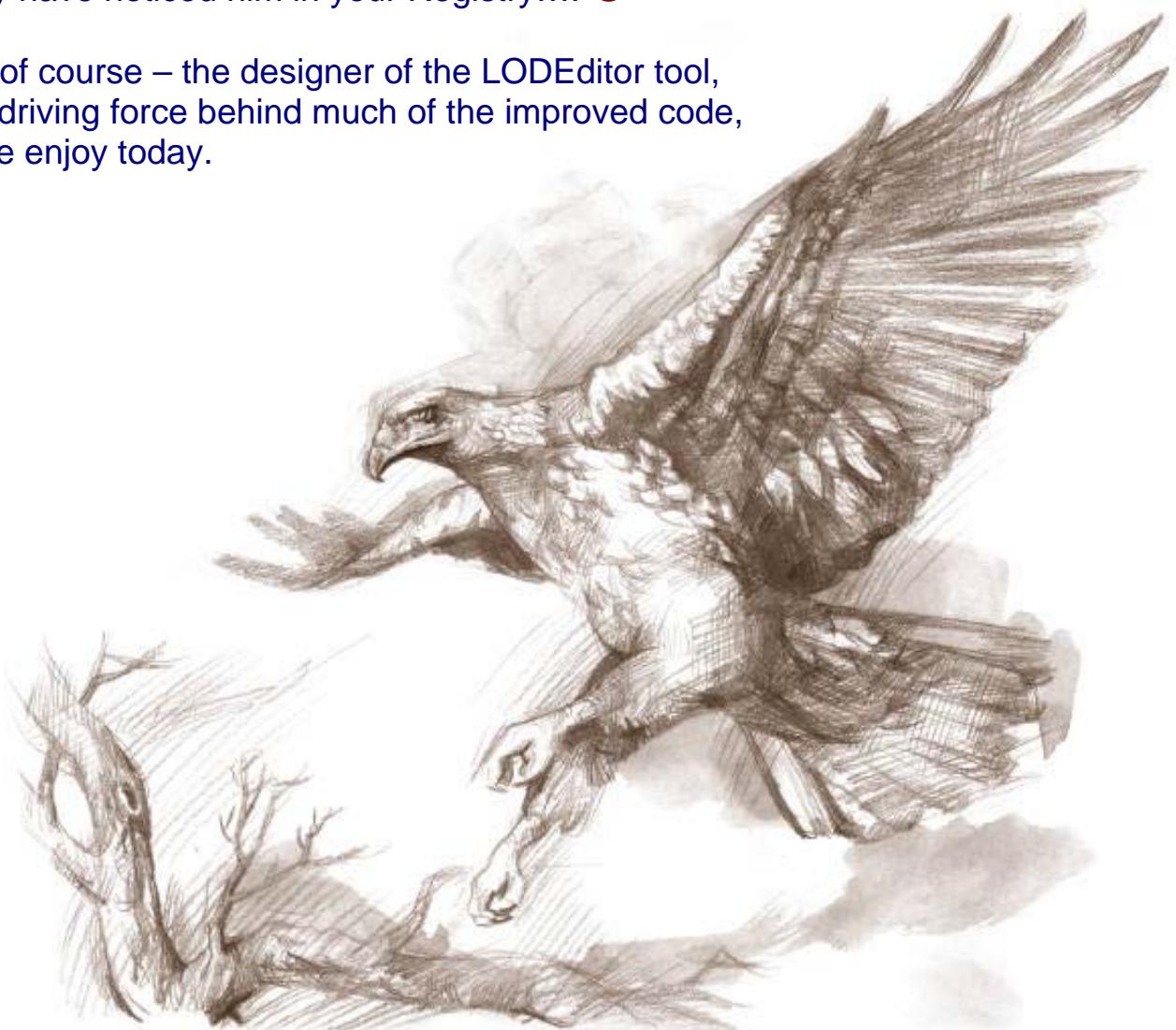
As we all well know, Falcon4.0 is a great hobby.

Whereas some of us enjoy the Study aspect of the simulation, others enjoy the visceral thrill of the mission itself.

Others, though, derive their pleasure from developing the simulation. Adding those features and extras, which have brought our simulation from it's Original Microprose state, to this amazing FreeFalcon5.0 iteration.

One of the names most associated with Falcon development is "Baldeagle". You may have noticed him in your Registry.... 😊

He is – of course – the designer of the LODEditor tool, and the driving force behind much of the improved code, which we enjoy today.



You're sometimes referred to as "Dr Fred". What is the "Dr"....? A nickname....?

I have a *BA in Botany* from University of California at Riverside, a *Master of Science* at New Mexico State University, and a *Ph.D. in Biology* from NMSU. Thus, I actually am a Doctor.

How long have you been "interested" in Falcon; how long developing...?

My son-in-law introduced me to Falcon 3.0 in 1993.

I started working on F4Terrain Team's *Balkans Theater* in August of 2001.

What first drew you to Falcon...?

I like Simulators, and I like airplanes.

Do you have any 'Real Life' experience with aircraft...?

Yes, I do - Military. I served 4 years in the USAF fixing comm. radios on B-52's and KC-135's in the Strategic Air Command (*SAC*).

What drew you from FLYING Falcon to Developing Falcon...?

To be honest, I didn't fly Falcon4.0™ very much. I was involved with jF/A-18 mission development (*jF/A-18 TACOPS website*). For personal reasons I decided to get involved with Falcon4.0™ theater development.

What was the very first thing you did, in the way of "Developing"....?

As mentioned above, I joined the F4Terrain Team, in tiling the Balkan Theater. I did 85% of the Balkan side of the Adriatic Sea.

Many people say they want to "code Falcon". I get the impression, it's a kind of convoluted code. A little "messy". Am I correct...?

Correct. Actually, it started out "messed up" when Falcon4.0™ was originally released, by Microprose. Since Falcon 4.0™ was put together by at least two separate teams with very different philosophies (*the first team was "fired" in 1993/4 because they weren't getting Falcon 4.0™ working*). Of course, after that - with each new team working on the leaked code - the code got progressively more "messed up".

What is your coding background...? I mean - is it just something you do as a hobby.....?

Both my Masters, and my Ph.D. research required the use of computers to analyze the data, so I had to learn how to use the computing power available at that time (*pre-PC and Mac*) on NMSU's IBM 360. After graduating I worked as independent programmer. After that – whilst I was working as a Research Assistant at NMSU - I became a contract programmer for the United States Army (govt' ECM engineers) at White Sands Missile Range (WSMR), New Mexico.

For the next 25 years I was developing data analysis system and simulator for the WSMR engineers to help them evaluate the performance of the Patriot Missile Systems.

You were involved with the PATRIOT Missile System... ??

Indeed. A two-year study I made on the potential problem Patriot units may have defending the Fulda Gap (*East/West German border*) led directly to the incorporation of "Home-On-Jam" in the Patriot software. Actually, I built a small Force-On-Force simulator to help with the above study.

The things I worked on are still being used today, in places like Iraq.

Your latest LODEditor Tool is amazing. Where can we find the latest "Public Version"... ?

Since LODEditor is a Dynamic Tool (in a constant state of development), the only place to find the latest version is at the BaldEagle WebSite. Other sites which host LODEditor, routinely host older, obsolete versions. Keep up to date with LODEditor + Support at FreeFalcon.

At the time of publication, the latest can be downloaded here (*Active Link*) →

<http://www.zianet.com/baldeagle2/Downloads/LODEditor622.zip>

*You've worked with MANY of the Developers during the Falcon Community history.
Any developers you really enjoyed working with...?*

Steve "Hustler" Wooters has remained a friend through all the good AND "bad times".

Why choose Flight Simulation as a hobby...? Because of the "Flight" or the "Military" aspect...?

Flight. I like flying, and the simulation of flying.

What do YOU feel is YOUR greatest contribution to Falcon Development....?

LODEditor, and also my Theater & Terrain utilities.

In Falcon, *what is your favourite Aircraft to fly, and your favourite model...?*

The A-1H Skyraider is my favourite to fly. The C-130 is my favourite model.

What is the one thing you would REALLY like to see added to FreeFalcon...?

Truly "Dynamic Weather"

Why the "BaldEagle" nick....?

Name is BALDing; I am BALDing (*losing my hair*); EAGLE flies = "BaldEagle"
I adopted the nick while I was active with Jane's ATF series.

Would you recommend Dev'ing to a Community Member, or do you think - ultimately - it is more fun to simply FLY the Sim...?

It is really a personal preference; a person's way of thinking and doing stuff. I knew nothing about Falcon4.0 ™ data or code. I learned by studying and asking those who knew the facts. Those who want to contribute to the FreeFalcon community can learn how "things" work by studying, and asking the "old-timers".





FreeFalcon – where Virtual meets Reality



2D VS 3D WORLD



As one flies Falcon5.0, it may be good for one to understand the fundamental relationship between the 2D World + 3D World of Falcon™. We all know of the Dynamic Campaign, but – it is the 2D World, which makes the existence of that Dynamic Campaign, possible.

Simply put - Falcon™ has two separate (though related) "Worlds".

These are the 2D World, and the 3D World.

The 3D World, is that which one sees whilst flying. One can see various aircraft, vehicles, buildings, runways, taxiways, and a variety of skins and models. But the distance within which one may detect these entities - as real 3D objects - is NOT infinite...!

There is - in fact - a "bubble" around your aircraft.

Beyond a certain distance (a unique value, defined for each object) a 3D entity (Aircraft, vehicle, etc.) disappears from the 3D World, and – along with all of its data - "moves" into the 2D World.

The 2D world revolves around statistical modeling. There are variables (strength, range, effectiveness, etc.) which are used for calculating what happens in the 2D world. The degree of success of an attack, or casualties sustained - for example – are calculated using statistical modeling, based upon variables and adjusted for various situational modifiers.

(Players of Dungeons & Dragons™, would be very familiar with this concept... :D)

There is no "bridge" between the two Worlds. SAMs or AC in the 2D World – for example – can't use missiles against targets in the 3D world. 3D Sensors, also, cannot detect past the bubble. For example – a flight of MiG-29's inbound, but still outside the bubble of your 3D Aircraft, will show as a single contact on your RADAR. This represents a piece of data from the 2D World being shown on your RADAR, as opposed to the individual members of that flight in the 3D World.

For a thorough description of "The Bubble", refer to the RP5 Manual (see Study Programme).



LAME JOKES

It is often assumed that the FreeFalcon Team is comprised of humourless twats; that the Team lacks any sense of humour. It is believed that 'smiling' and acts of humour are both discouraged AND punishable in the Private Forums; a "sense of humour" slowly stripped and beaten from Team Members.

Correct.

However, as a social experiment, I have asked several FreeFalcon Team Members to share their personal favourite joke...

The results – as the title suggests - were.... well.... read on.....

Why does Mower have his name engraved on the back of his leather belt?

So when he pulls his head out of his arse, he can see who he is.

- Hustler

A Horse walks into a bar. Bartender says: "Hey – why the long face...?"

- Aragorn

A three-legged dog walks into a bar. He says: "I'm looking for the man who shot my PAW...!"

- NightFalcon

A little Sioux boy asks his father: "How do we get our names?" The Indian Brave replies: "My son, when you are born, we open the folds of the Teepee, and we name our children after the very first thing we see. Thus your sister is named "Running Deer"; your brother "Rising Moon". But... why do you ask, "Two-Dogs-Fucking"...???

- T-Rex

How do Vietnamese name their children...?

They roll a can down the stairs. "*Tin-Ton-Pin-Bon-Tang-Ging*"

- Bluejay26

An Intelligent FreeFalcon Member, An Intelligent GlobalFalcon Member and Father Christmas are standing in a elevator. Suddenly, a \$100 bill floats from the ceiling. Who picks it up...?

The Intelligent FreeFalcon member. The other two don't exist.

- Lee

Drinking American beer is like making love in a canoe. Fucking close to water.

- Snail

Two army officers lose their weapons, and wonder: "What should we do?" They decide to judge each other. So, Officer Smith puts his beret on, and stands at attention. Officer Tomkins looks him up and down.

Tomkins: You are accused of losing your personal weapon! Do you have anything to say?

Smith: I lost it. Sorry. Nothing to add.

Tomkins: OK. I release you this time with a serious warning; to be noted on your record.

They switch sides... Officer Tomkins puts his beret on, and snaps to attention.

Smith: You are accused of losing your personal weapon! Do you have anything to say?

Tomkins: I lost it. Sorry. Nothing to add.

Smith: I sentence you to 7 years in a military prison, after which you shall be dishonorably discharged...!

Tomkins: WTF??? Why...??? I released YOU with only a simple warning!!!

Smith: Yes, Tomkins. That's true. BUT – this is the second time in our unit in less than 5 minutes...!!

- *I-Hawk*

A man is talking to God...

Man: God, how long is a million years?

God: To me, it's about a minute.

Man: God, how much is a million dollars?

God: To me it's a penny.

Man: God, may I have a penny?

God: Sure. Wait a minute.

- *derStef*

Why does a dog lick his own balls...?

Because he can.

- *Aragorn*

What's a Pirate's favourite letter of the Alphabet..?

Rooooooooooooo....

- *Ripsaw*

There are 10 kinds of people in the World. Those who understand Binary, and those who don't.

- *WaveyDave*

A man comes out of a Lourdes church and shouts: "I WALK...!! I WALK...!!"

A woman approaches with great admiration and asks: "Did the Lord's miracle cure you...???"

"NO," he answers. "Some bastard has stolen my car....!!"

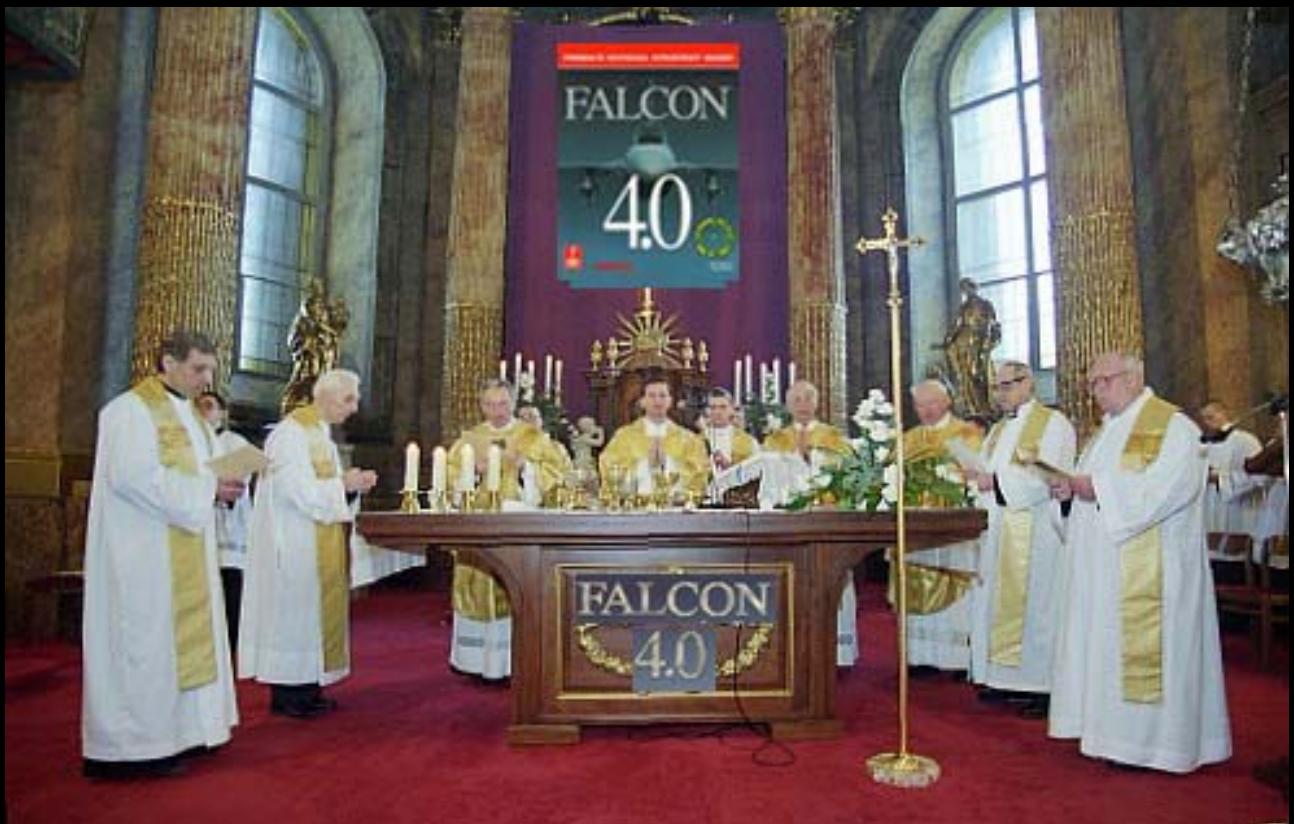
- *Snail*

What do you call a boomerang that won't come back...?

A 'Stick'.

- *der Stef*

LOL!



In Falcon We Trust...

Build A Rig with Ranger

Ranger shares some tips for building a Rig to get the most out of your Falcon Installation. Not entirely satisfied with your frame rates or overall stability? Considering upgrading or trying to squeeze a bit more out of your current system? Read on...

1. **Low end frame rates appear to be the result of a CPU limitation.** Low end frame rates occur at the FLOT, with dense objects, lots of dogfighting, lots of special effects and explosions, etc.
2. **High-end frame rates appear to be graphics card limited.** High-end frame rates occur when flying over water.
3. **We have some hardware/software limitations.** Whilst Falcon is multi-threaded (*meaning several tasks are run simultaneously*), Falcon is unable to use more than a single processor core. This would suggest that we cannot take advantage of multi-core processors. Similarly, if you use Windows XP 32bit your CPU only recognizes 3GB of Random Access Memory - regardless of how many sticks you have on your motherboard.
4. **New hardware presents opportunities** to increase framerates by using faster processors, faster memory, faster Front Side Bus (FSB), and L1/L2/L3 Caches. Overclocking CPUs provides additional processing speed. Currently the upper limit for a commercially available Pentium 4 process is 3.75Ghz. The upper limit for a dual-core processor is 3.33Ghz, and the upper limit for a quad-core is 3.2Ghz. If one adds overclocking onto the existing upper limits we are probably topping out at around 4.0-4.5Ghz.

Regarding Low Vs High FPS

Generally, it appears that when you have low frame rates (*e.g. in combat at the FLOT and crowded environments*) this appears to be limited by the CPU, memory, Front side bus, and cache size. Whereas when you have single aircraft in a training TE flying over water in a clear sky - you can see your highest frame rates and these are limited by the rendering capabilities of your graphics card. With regards to which part of a user's system will be the limiting factor, there is some cross-over of effect, as we progress from take-off to landing.

In general if you want to increase your low-end frame rates you must:

1. Increase your CPU speed
2. Increase your CPU's L1/L2/L3 cache size
3. Increase your Front Side Bus speed
4. Use a faster hard-drive read/write time
5. Minimize other active programs operating in background of OS
6. Fresh installation of operating system and Falcon
7. Increase your memory to the maximum allowable 4GB RAM in a 32bit OS and 16GB in a 64bit OS.

In general if you want to increase your mid to high-end frame rates you must purchase the most powerful graphics cards money can buy.

Regarding Multi-cores

"Falcon 4 code is multi-threaded. However it is not written to use multiple processors (multiple core). Apparently, the newer OS versions determine when a software uses multi-threads and directs them to different cores (pipes)" - Dr. Fred 'BaldEagle' Balding

As such, there is no second or other core being used, or that we can shift to. Perhaps if one were to run a diagnostic of Active-Falcon, one will probably see that only one core is active, as the other core runs Windows and - perhaps - other non-Falcon related progs. One may see additional "bumps" if other software is active in the background, but - it seems that Falcon is only going to be active in a single core of a multi-core processor.

It does seem, however, that a multi-core 64bit operating system will give one access to up to 16GB of RAM. If Falcon is loading into RAM, then I suspect you may be able to increase processing speed by keeping more data in RAM, instead of having to read/write back and forth to your hard-disk or make use of virtual memory (*also on your hard-disk*).

Regarding 64bit

Falcon will run on a 64bit platform successfully - and the prospect of being able to access a full set up RAM beyond 3GB is pretty damn exciting to say the least.

Regarding RAM

One should never have 5GB of RAM. Nor 3GB; nor 7GB.

Typically one must "pair up" memory on one's motherboard in even-numbered groups. Memory sticks are commonly sold in 1GB, 2GB, or 4GB increments. So - with four slots for RAM on one's motherboard - the typical memory configurations would be: 4GB, 8GB, or 16GB.

One may very well run into problems by trying to mix dissimilar memory sizes. For example, using two sticks of 1GB ram and then two sticks of 2GB ram is problematic. Part of this has to do with the fact that different memory has different latency values. If you try to mix memory with different latency values the bios will get confused. It is best to select the amount of memory you want, and then choose the same values for each stick. 4GB (which would be four sticks of 1GB RAM), or 8GB (Four sticks of 2GB RAM), or 16GB (four sticks of 4GB RAM).

It will cause problems, if at least one of your sticks of memory is not the same "make" as the rest. All RAM should be the SAME. Ideally, all sticks should have the same numbers like 4,4,4,12. Thus, you should try to keep your memory all the **same make, model, and size**.

Further - for 64bit systems - you need to use what are called "matched sets of memory" for dual channel capability. If you check a place like NewEgg.com you can learn all about the memory requirements for your particular motherboard.

64bit + RAM

Given what I have learned, it seems logical to suggest going to XP and 64bit because of the RAM increase. The more ram you have resident, the faster the processing will be. The faster the RAM the better.

Khronik Says:

Some people have reported BSODs and other problems, when using XP32, with 4GB of RAM. I see no evidence that this is the case.

I have 4GB of ram and have had XP32 SP2/SP3 for quite some time.

I've never had any BSODs related to having 4GB of memory installed. If this is the case, it may be that you have a problem somewhere else..

Here's a trick to get windows to use only 3GB of memory →

- * Press windowskey+R, and run msconfig
- * At the boot tab, pick advanced options and put maximum memory to 3072
- * Reboot
- * You can also revert the setting by above method to get your full 4GB back

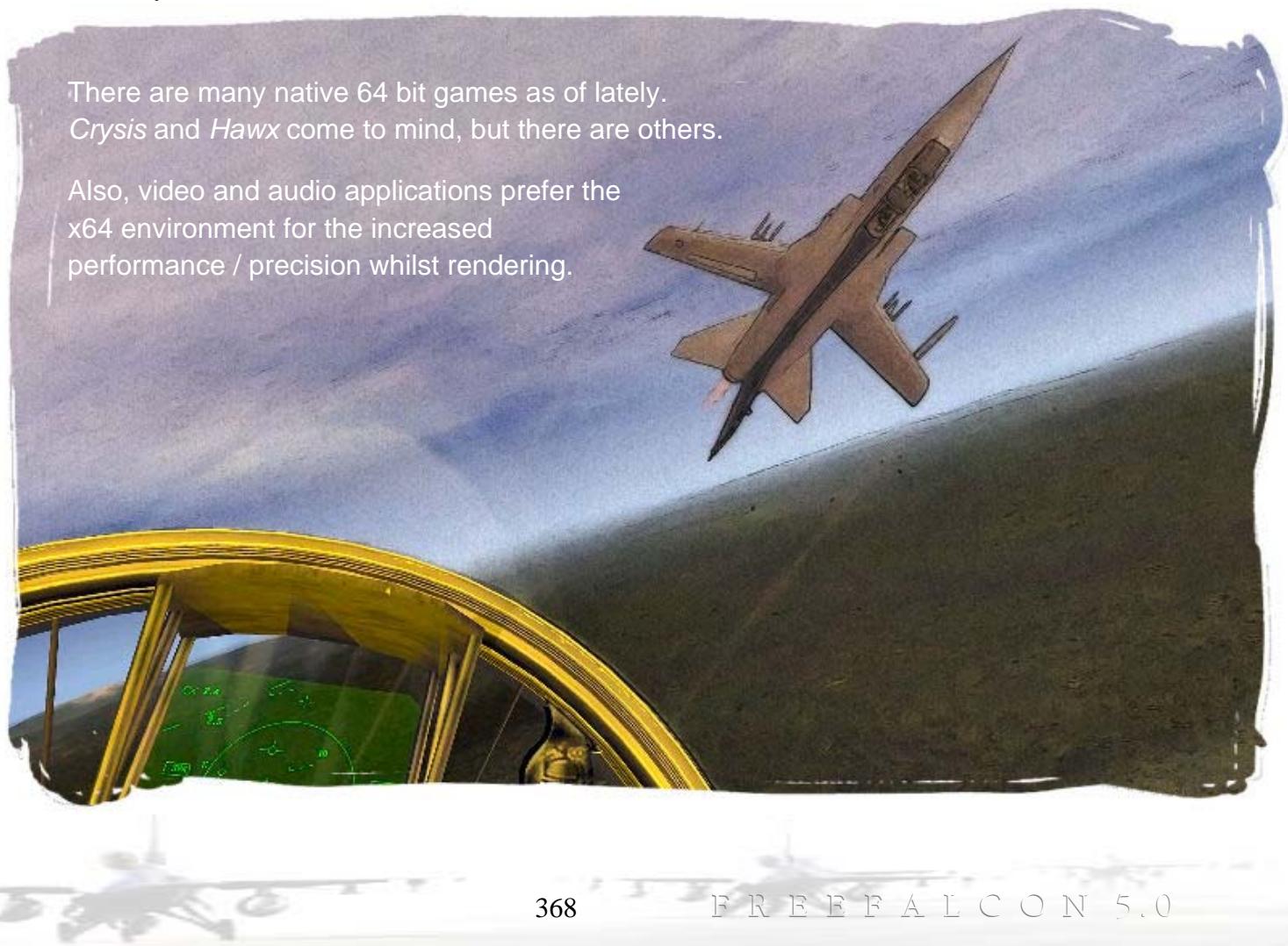
Having 4GB of ram on a 32bit system still is advantageous since it can use up to 3GB out of the available 4GB. You don't need to "pull" out the other 2GB.

Anyhow, there is little to no applications which can fully utilize the 4GB memory space, and directx limits the amount of ram allocated for D3D to 2GB so there isn't much difference gaming wise.

"Feel" of the system and other user-perceptions are usually placebo effects. Even synthetic benchmarks can be inflated, with no real world difference.

There are many native 64 bit games as of lately.
Crysis and *Hawx* come to mind, but there are others.

Also, video and audio applications prefer the x64 environment for the increased performance / precision whilst rendering.



Regarding FPS Vs Refresh Rate

RP says → It can be characterized as this: “FPS” pertains to the consecutive calculation of each scene and therefore the overall smoothness of the 3d motion as each consecutive scene is calculated.

A loss of fps therefore will occur relative to any bottlenecks in the ability to compute the scene.

“Refresh Rate” pertains to the overall speed of when the picture on the monitor is updated and happens independent of the 3d calculation. It is really the synchronization of the monitor and the 3d card as to the rate of the picture feed.

FPS typically fluctuates relative to the complexity of the image calculated.

Refresh rate is fixed. If refresh rate is too low, then the presentation can become painful to the eye due to the on/off shutter effect....but this depends on the monitor. LCD monitors, since the led has some latency in the transition between on and off will not exhibit the same shutter behaviour / effect therefore is soother on the eye.

So evidently, 60hz is the happy medium for refresh rate, where above that there is no gain for LCD. Meanwhile on CRT, the higher the better.

FPS being the product of the calculation of the 3d engine as it calculates each scene, since some scene are more difficult to compute, a frame may take longer to calculate and therefore this can be seen as a loss in the overall smoothness of the movement. If all that is being shown is a texture...then FPS would be high since 3dengine wouldn't have to do a whole lot of work (meanwhile if the refresh rate is low, you will get shutter effect that could be very uncomfortable to eye).

If scene includes lots of movement due to layers and effects etc, then fps will drop and movement will deteriorate between being increasingly jittery to having whole gaps in movement. So if you need to track a fast moving object, fps becomes even more critical....less so for slow objects And for overall viewing, below 30 fps the eye becomes very sensitive to FPS and the scene becomes more displeasing due to jitter effect.

In a perfect world if fps is kept above 30, then you'll kept smooth movement. However, you may still see the difference between 60fps and 30fps in the overall crispness of the 3d portrayal. So, if you could have 60fps all through, as well as 60hz refresh rate, you would be in 3d nirvana.

It is recommended to experiment with V-sync **OFF** for CRT's.

Regarding the OS + GPU Purchase

Hustler says: XP is still the OS of choice. As for Video Cards, the newer pricier cards may not be the way to go as they may not have DX7 support like the older cards.

Regarding the Dream System

At the time of publication, my dream Falcon System would be:

* *Intel 3.3Ghz dual core Wolfdale Processor - overclocked to 4Ghz.*

OR

* *Intel 3.0Ghz quad core processor - overclocked to 3.75Ghz*

* *CORSAIR XMS2 8GB (4 x 2GB) 240-Pin DDR2 SDRAM DDR2 800 (PC2 6400) Dual Channel Kit Desktop Memory Model TWIN2X4096-6400C5DHX*

* *GIGABYTE GA-EP45-UD3P LGA 775 Intel P45 ATX Intel Motherboard*

* *BFG Tech BFGEGTX2951792E GeForce GTX 295 1792MB 896 (448 x 2)-bit GDDR3 PCI Express 2.0 x16 HDCP Ready SLI Supported Video*

I am eager to see what the new Intel i7 chipsets produce. They will take 64bit processing to a new level - perhaps seeing some stuff in the 4Ghz range stock without overclocking.

I think that Falcon will be running **very** smoothly at that level...!

If we are only able to access a single core for Falcon - then finding the single fastest core with the highest values for front side bus and L1/2/3 cache will produce the smoothest frame rates.

Also consider the fact that, the above machines will conquer just about any of the current GPU/GPU intensive games (e.g. *Crysis*; *COD 5*; *Farcry2*, etc.)

Regarding Overclocking

A great set of tutorials is available on a site called "Tom's Hardware" also there are a number of overclocker forums which discuss all the details of optimizing (also known as "overclocking") a system to its maximum potential **before instability occurs**.

There is a balance between stability and optimal performance and unfortunately, every individual CPU is different.

In my case I choose several orders of magnitude below optimal to ensure good stability.

Be aware (as stated in the F.A.Q. Section) - Overclocking is NOT recommended.

Choosing the best possible hardware to begin with is the best way I know to ensure a nice stable system and consistently high frame rates.

Regarding Further Reading

A great place to compare stuff is "Toms Hardware"

Check the section: "Best Graphics Cards for the Money" . It lists Tom's picks for various price ranges; giving a summary of all cards, from the latest/greatest to the old dinosaurs.

Another great place to look is Newegg.com. This site is a builder's dream. Just look thru and find the most popular MB's, CPUs, graphics cards.

Tom's Hardware → <http://www.tomshardware.com/us/>

Newegg.com → <http://www.newegg.com/>

Regarding ATI vs NVIDIA

Something I have noticed about graphics cards - ATI/Radeon cards seem to be better suited for Falcon, because the Anti-Aliasing will include both 3D game rendering, as well as the UI 3D model rendering. I was unable to figure out how to get the Geforce/NVIDIA cards to render the 3D model Tacref and the Munitions Screen without the "jaggies". Maybe someone else has solved this...? I have found that the ATI/Radeon cards would automatically render it all in the desired Anti-Aliasing format. Apart from this point, I think that either of these two companies provide a very good card for Falcon.

A really good card which I have chose to use is the: **Sapphire 4870 Toxic**. It is an overclocked card, which runs very cool due to heat pipe technology. This card retains additional overclocking capability, and its top end performance still beats the later 4879 card from ATI. The only faster card is the "*Atomic*" version, which is essentially two 4870's on a single graphics card; thus negating the need for the "Cross-Fire" link (*whereby two 4870 cards are loaded onto the motherboard's PCI Express 2.0 slots, and then linked physically*). I believe this is overkill for Falcon. There are plenty of good graphics cards that will give very decent frame rates, and retail for less than US\$100.

Regarding Self-Built Systems

One thing for sure - I will never buy a store bought PC again - they just don't compare to what you can build for yourself and you get to skip all that proprietary crap like Gateway and Dell stick you with and the best thing is you can swap stuff in and out and continue to evolve your system for several years, constantly upgrading - squeezing the last ounce of speed out of your machine before moving on to a new platform.



Track-I_R & You



The Track IR is a device that moves the view as you move your head. Look left, the view moves left; look up, the view looks up.

So – instead of using your hand + mouse to look around, you actually use your HEAD to look around.



This thing clips onto your hat whilst you fly the sim.



This thing sits on top of your Monitor.



HOW DO I LOOK BEHIND...? IF I turn my head so far, I CANNOT see the monitor....!!

Indeed. Whilst using the Track IR, a very SMALL movement of your head translates into a LARGE movement on the screen. Looking to one side of the screen with your REAL head, will swivel your "simulated head" all the way around to look behind...!

So – I'd have to keep my head quite still, or my view would keep moving...?

Actually – yes. That is correct. But – you can adjust the sensitivity, and – with a little practice – it becomes very natural.

HOW do I adjust the “sensitivity” or the “amount of movement required”...?

Track IR comes with a G.U.I.

It is quite intuitive, and simple to use.

Do I need Software Drivers...?

Yes.

Drivers are available at the Track IR WebSite

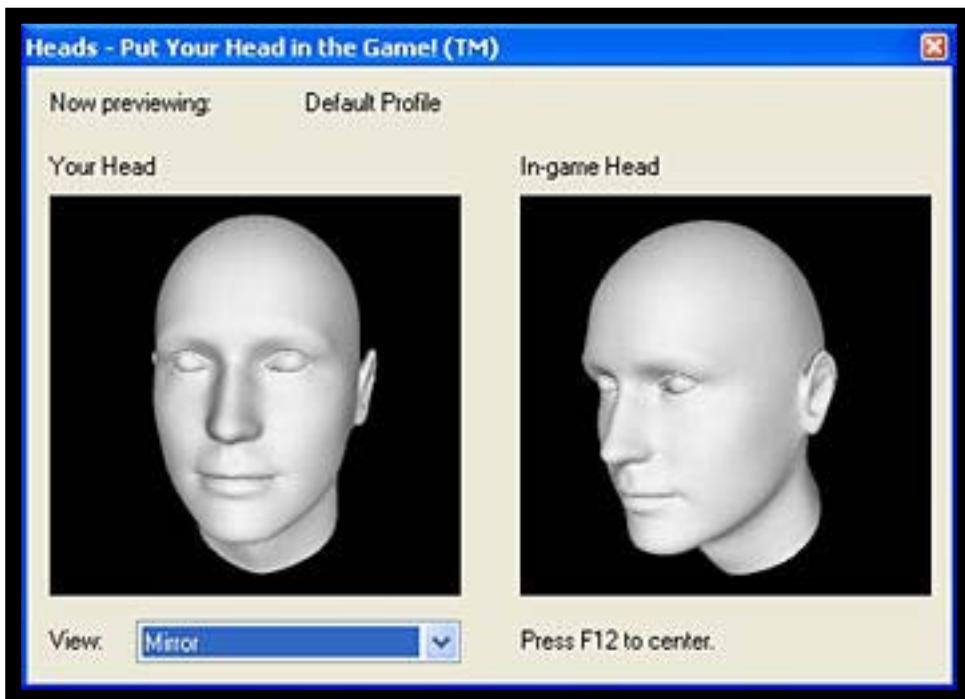
The TrackClip Pro is pictured right



It combines TrackIR with a headset.

Like the TrackIR, it offers 6 DOF.





This is the GUI in which you can adjust movement and sensitivity.

On the left you can see the amount of movement of YOUR actual head, and – on the right – how much movement this translates to in the Sim.

WHY BOTHER....?

Most people who have Track IR agree – “How did I ever fly WITHOUT it?” and “I would never again fly without it...!”

It is extremely intuitive AND immersive. You look with YOUR head about the virtual skies, AND – the cockpit. You cannot experience the “3” D in a 3D Cockpit without a Track IR.

Track IR allows you to move about WITHIN the cockpit. You can lean forward for closer views of your instruments; you can lean to the side and look around the HUD; you can lift yourself UP and look back OVER the seat, or forward OVER the nose. In fact – there are some instrument views which are simply impossible WITHOUT a Track-IR.

Also – padlocking. It is no longer required. Because – with Track IR – it is YOU who padlocks, not with a coding function, but – with a MkII eyeball...!

What does 6 Dof mean...? It simply refers to SIX degrees of freedom. Crudely speaking: Up/Down/Left/Right/In/Out. (*Like sex with a rodeo horse.*)

Disadvantages to flying with Track IR...? Cost...? ¹ Once you do it, you’ll never do without it.

‘Gorny advises: Especially with the latest drivers you MUST assign TIR hotkeys (e.g. Centre; Pause; Precision) to keystrokes which are **NOT USED IN SIM**. If not, some aircraft functions will be lost, as will HOTAS functions. Which keys? Scroll Lock. End. Shift+End. ANY keys which are NOT in the Falcon keystrokes file.

Website → <http://www.naturalpoint.com/trackir/>

¹ Some may argue that it is overpriced. “Price” Vs “value” need to be considered.

Track-IR Alternative

by Falstar

This is a quick guide for those holdouts that don't have TrackIR4, would enjoy 6DoF (Six Degrees of Freedom) in flying, race simulations, and first person shooters that support TrackIR, while having fun tinkering and saving money.

First: Look in the back of your closet and dig out that old webcam that you no longer use. Since my son no longer uses his Sony PlayStation EyeToy, I borrowed/stole it. I goggled for "PC EyeToy Drivers".



A mod you may wish to do, is convert your webcam into an Infrared Webcam. This site will show you how.

<http://www.wikihow.com/Make-a-Webcam-Into-an-Infrared-Camera>

You may get away with taping a black end piece of 35mm exposed film over the webcam lens to make an IR Filter.

Second: Go to <http://www.free-track.net/> download, and install the free software – FreeTrack version 2.1

There you will find build guides, Wiring Diagrams, and Calculating Wizards for Resistor sizes. They are very helpful .

Third: Gather together your building materials, soldering iron, electrical tape, resistors, 4 wire phone cords, coupler, Visor Glasses Clip, etc.

The IR light emitting diode they recommend is the OSRAM SFG485P, or you can use regular LED, then you won't need an IR Webcam. But I have these TV remotes that I have kept throughout the years. I will use those, since I don't want bright lights next to my head.

My wife thought I was crazy to keep them. HA!



What we are after here are three of the Infrared (IR) Light Emitting Diodes.

Another salvaged item I used is the USB plug and cord from an old USB mouse.

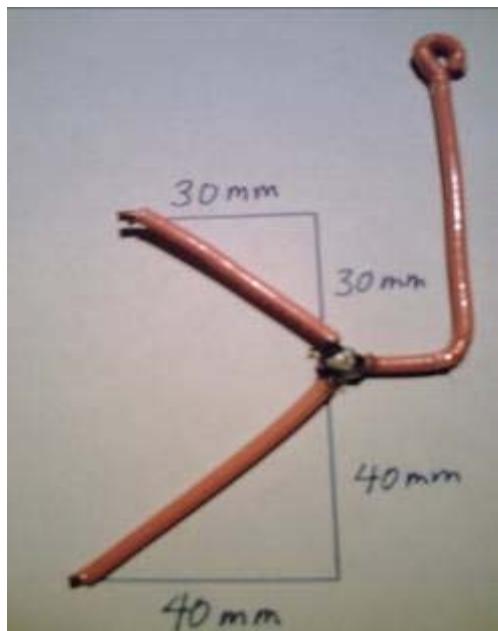
Or you could also use a 5Volt DC Charger from an old cell phone.

Fourth: Now the real fun starts... ☺

The Assembly:

(1)

I took some 16 gauge insulated copper electrical wire.
Then bend them as illustrated.



Solder them in the middle.

(2)

Solder the Negative wire of the IR LED to the frame. (Be Sure to Observe Proper Polarity)
Use Electrical Tape to prevent shorts.



Solder on the phone wire leads to the Positive lead. Use Hot Glue to relieve strain and stress.

(3)

Don't worry about the dimensions a lot. They can be adjusted in the FreeTrack Program.



Wrap with Electrical Tape.

(4)

This is one of those Sun Visor Clips to keep track of your Sunglasses in your car. I got 2 for \$2.99 at an auto parts store. I removed the spring on the back and trimmed the block of plastic that spread the wire apart.
I then drilled a hole in the front and screwed a machine bolt from the inside outward.



(5)

Then attach the IR holder to the machine screw with nuts on each side of the wire loop.



It's starting to look a lot like that name brand IR head tracking system that clips to your headphones that sells for \$40.

(6)

At the other end of the phone cord I made this junction box since I'm still in the prototyping stage. I can change the IR without having to rewire the USB connector. This USB end is from an old mouse.



Mine →



Theirs →



Have Fun!

[home](#)

Reach out and touch somebuddy...



TouchBuddy

Intruder's FreeFalcon5.0 TB Profile

TB version 1.3.0

FreeFalcon 5.0 includes a fully-functional, fully compatible TouchBuddy Profile.

Designed by **Intruder**, this profile is designed for the following settings:

- * Target Resolution: 800x600
- * Hide the Title-bar

INSTALLATION →

- ✓ Copy the contents of the *freefalcon5/EXTRAS/TouchBuddy* folder
- ✓ Paste into your TouchBuddy Profiles folder
- ✓ Check “Enable Touch Buddy” in the UI setup/controllers page.

GENERAL →

If you load a profile into your TouchBuddy toolkit, you can pre-select the position of your loaded profile in the "Window Tab".

The default position for the FreeFalcon profile is: "top 0" and "left 0".

If you run an in-game resolution of 1600x1200, you may set the left to "1600".

Also – in order to get the best results for your TouchBuddy window, you can deselect the "title bar" and activate the "maximize window" option.

The FreeFalcon5.0 Profile include 6 start files →

FF5 (Inflight) GER - with German Keyboard layout

All systems running, gear is up; Canopy is closed. For flights starting in the air.

FF5 (Ramp) GER - with German Keyboard layout

Cold and dark. All systems are set to off. For flights using Rampstart

FF5 (Taxi) GER - with German Keyboard layout

Systems are running; Canopy is open; gear is down. Ready for taxiing

FF5 (Inflight) US - with US Keyboard layout

All systems running; gear is up; Canopy is closed. For flights starting in the air.

FF5 (Ramp) US - with US Keyboard layout

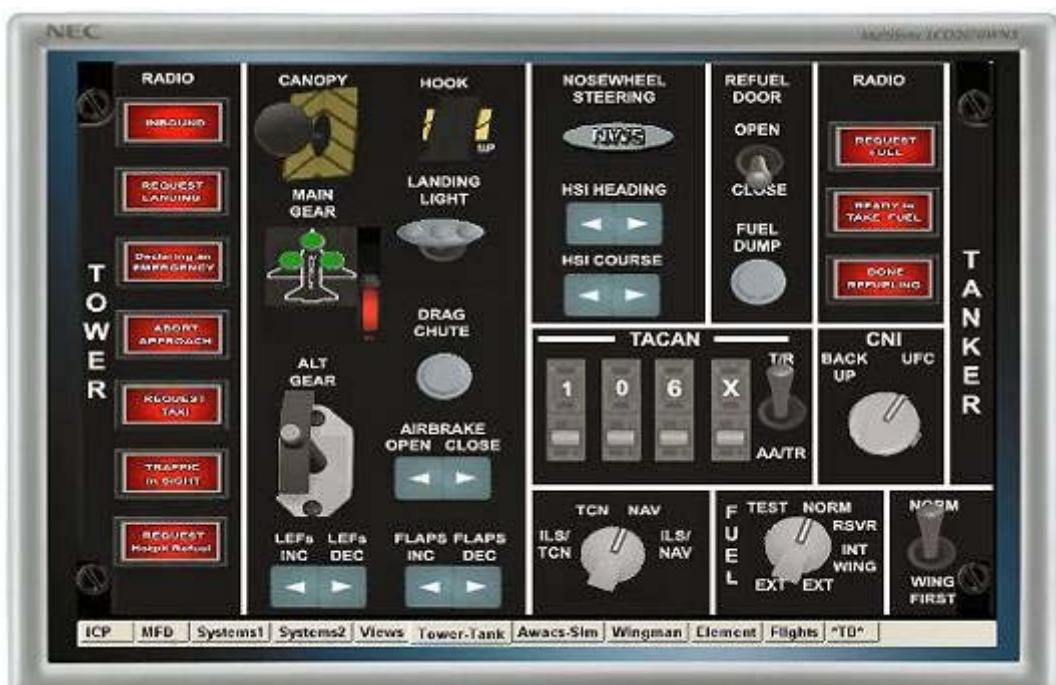
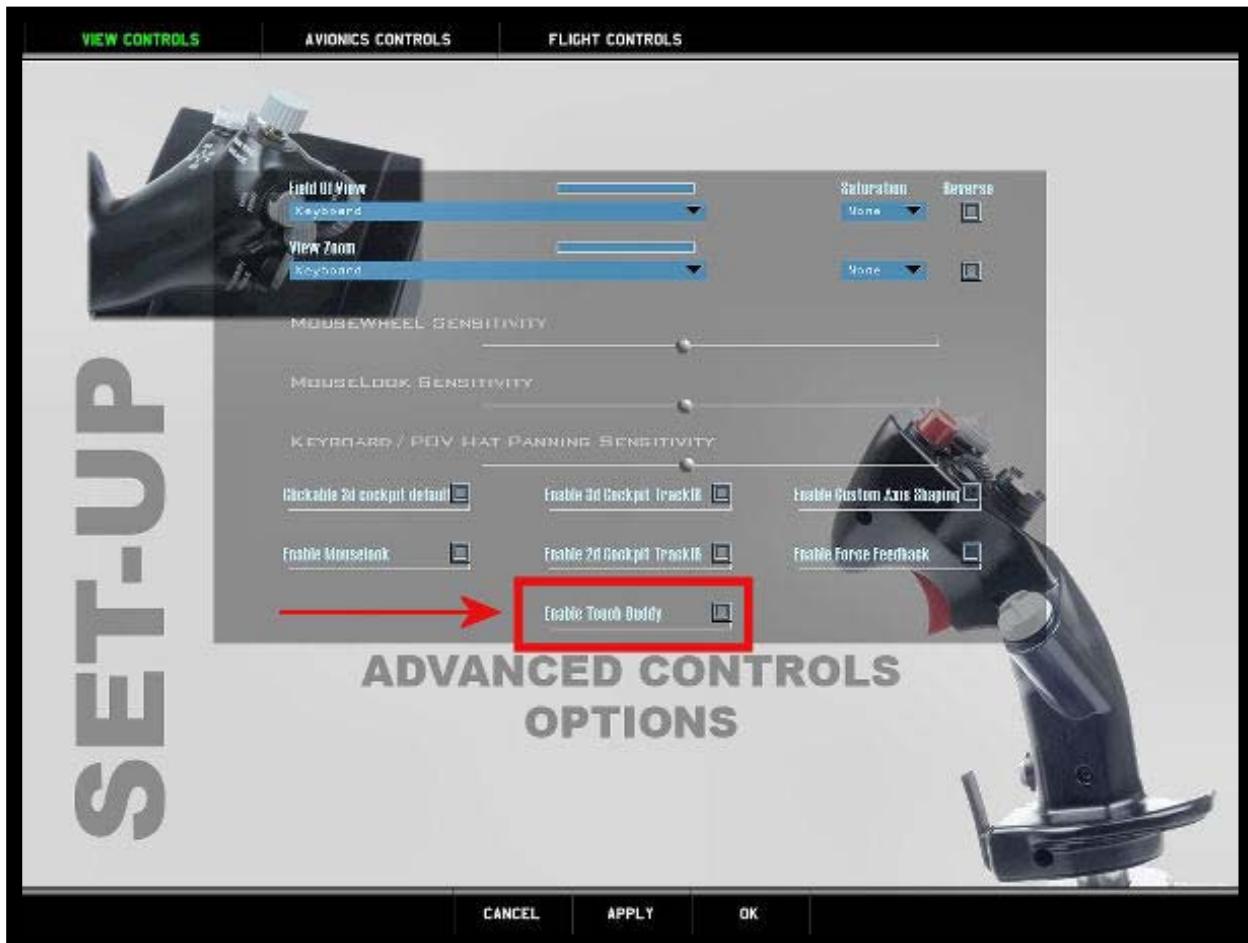
Cold and dark. All systems are set to off. For flights using Rampstart.

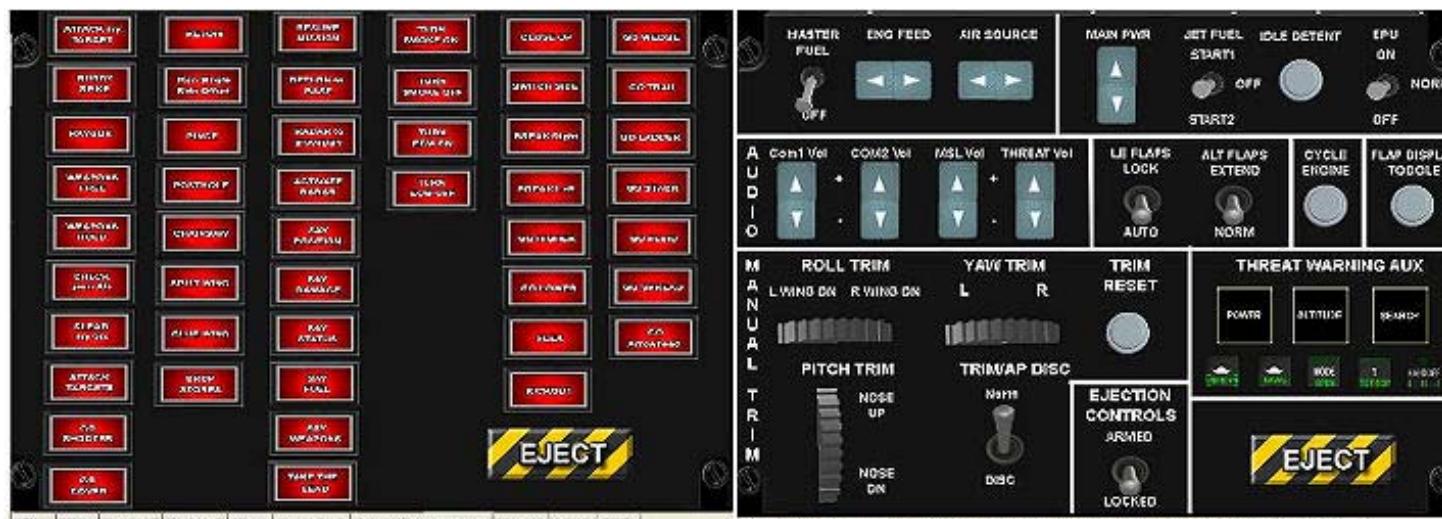
FF5 (Taxi) US - with US Keyboard layout

Systems are running; Canopy is open; gear is down. Ready for taxiing

[VIEW CONTROLS](#)[AVIONICS CONTROLS](#)[FLIGHT CONTROLS](#)

SET-UP





Regards, Intruder

Pocket MFP

I have a confession to make. I have always been a little jealous of the guys that have a full cockpit, or have a desk full of monitors just for “Touch-Buddy”.

The problem is I run FF5.0 on a laptop which limits my ability to have buttons to press, while getting the feeling of actually being in a cockpit.

This craving has been filled by a cool application called “Pocket MFP” available for purchase from <http://www.pocketmfp.com/> €15.00 or \$24.57 depending on the current exchange rate.

Check out the manual and the video. I’m sure it will answer all your questions as it did mine. Now, for some of that technical mumbo jumbo...

Requirements: A PocketPC running 2003, Windows Mobile 5, or WM6 with 240x320 or 480x640 display resolution. AND has Microsoft .Net Compact Framework 2.0 installed, which you can download from-

<http://www.microsoft.com/downloads/details.aspx?FamilyID=aea55f2f-07b5-4a8c-8a44-b4e1b196d5c0>

You can use up to 3 devices using a combination of ActiveSync and WiFi.

I just use the MS ActiveSync, since I use the cable for charging and the WiFi would be an extra drain on the battery.

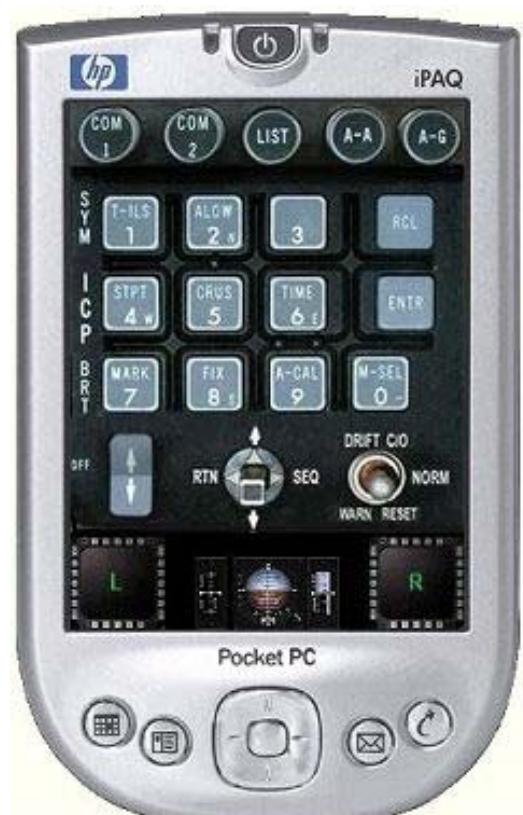
Pocket MFP has two components to it. The Client runs on the PocketPC, while the Server runs on your desktop computer or Laptop to communicate with Falcon 4.0

There are 5 panels implemented and animated in Pocket MFP v1.2

- ✓ ICP
- ✓ Left MFD
- ✓ Right MFD
- ✓ Misc. Armament + Threat Warning
- ✓ Gear Panel

By touching the smaller icons, one brings up the larger view of that screen.

Very Cool!



Falstar





F A C T O R Y

A Day In The Life of FLYBOY ARAGORN...!

Puking into my damned helmet. That was always the worst thing.
I remember one mission; I vomited into my helmet seven times...!!
And that was before I left the runway. In fact, it was before I left home.
Okay - to be honest, it was a couple of days BEFORE the mission.
I was bulimic, and trying to shed a few pounds.
And - it was sorta' fun. In fact - puking into my damned helmet was possibly the best thing.
It was putting it on AFTERWARDS that wasn't so great....

When I graduated from the Academy, I was presented with a fine pair of Ray-Ban Aviators.
They were way-cool sunglasses. I'd wear them proudly, everywhere I went. I was The Man; a proud pilot.
I remember, soon after graduation, taking a stroll down the mall. Saw a guy there, carrying a golf-club, and
wearing his Ray-Bans. Why the hell was he wearing his sunnies INDOORS...? I had EARNED the right to
wear Ray-Bans.

"Hey," I said to him, "are you some kind of wannabe...??"
"Excuse me," he replied.
"The Ray-Bans. What are you...? Some kind of wannabe...?"
I laughed directly into his face.
I pointed to the Squadron Patch I was wearing. "See this?" I asked.
"No," he said. "I'm blind."
"I'm guessing that white stick, ISN'T a Seven-Iron, then...?"

Life on-base was always a barrel of laughs. *Ha ha ha...! Hee hee hee....!!* Oh, deary me...!
I can't actually THINK of anything funny that happened, but - I'm pretty sure something must have.

The day of the fateful mission began like any other.
I woke up, brushed my teeth, and then popped them into my mouth.
After tilting my Ray-Bans to a rakish angle, I proceeded to the Mess.

The "Mess" was what I called my Living Room. It was a disgrace.
I tidied up for ten minutes, and went to the Kitchen, for a quick breakfast.

As I walked across the base, I saw a group of Iraqi pilots exchanging jokes. They were our guests; here for
training and cultural exchange. One thing I did notice – whilst here, those Iraqi pilots had ALL been out to
purchase authentic Ray-bans. Probably not available in Iraq.

I called over to them with a friendly wave: "HEY, GUYS," I waved "COOL SUNNIES...!"
They all stopped laughing, and looked my way. "We're SHIITES, DICKHEAD...!"

When I made the Ready Room, I exchanged a few "hellos" with the pilots milling about the room, and grabbed a cup of coffee. I found a chair, and sat down to wait for the briefs. It didn't take long.

The Laundry Service soon arrived, and passed me three pairs of briefs (and a singlet) which I had asked to be delivered there.

At that moment the Squadron C/O made his appearance. The Squadron rose as one, and saluted.

The C/O returned a brisk salute, and gestured for us to take our seats. The Ready Room was being painted, so we all needed to take our seats to the spare room. We were soon re-situated, and ready to start.

The air was electric. You could literally FEEL the electricity in the air....!!

The overheard projector cord was frayed; sparks were coming from everywhere.

The Brief itself, was kinda' boring.

We were just leaving to spend the day in a training exercise, when I heard the Klaxon....!

I was both amazed, and - yet - strangely delighted...!

It had been YEARS since I had seen a game of Klaxon.

Seems one of the Squadron members had found an old Colecovision, and plugged it in to the TV.

Klaxon...?! Cool....! We shot at some Alien bases for an hour, and then went to meet with our respective crew-chiefs.

My crew-chief was know as "The Germanator".

He was of German ancestry, and he was big. I mean BIG...!

Everybody else called him "John". Because that was his name.

He wasn't actually SO big. About 5'11". 140 pounds.

Kinda' big, though. Well - not really.

Not FULLY German. Technically - he wasn't REALLY of German ancestry.

His grandfather had come from Melbourne, and his grandmother was an Inuit.

BUT - if he HAD been of German ancestry, and he HAD been big, then - "The Germanator" would have been a WAY-CLEVER name for him. So - I just called him "The Germanator".

I didn't call it to his face. I just sort of whispered it to myself. "...the germanator"...

"Hey, John," I said. "What's up?"

"Ara'. Good luck today with your Force-on-Force."

"Yeah," I laughed. "May the Force be with me." *hee hee...*

"What?"

"May the 'Force' be with me...!"

"What?"

"Like – it's "force on force", and I said": 'May the force be with me'. Like – 'The force'. Like Star Wars..!"

"What?"

I also might have mentioned that The Germanator was really fucking stupid.

Today, I'd be flying with my RIO – Hobbit. Up against two of the finest members of the Squadron.

"Aragorn" and Hobbit Vs "Ice", and his RIO - "Cube".

"Ice" was good. Real good. But – he had one weakness: Aerial Gunnery.

With a Missile, there were none better. But – guns...? We stood a better than equal chance.

Both teams crossed the flight-line together, and there was some friendly banter exchanged.

"So – what's your favourite song from the seventies, dude?" I asked Hobbit.

"Tough call. I really liked that band 'The Sweet'. Maybe one of their songs."

"Hey, dickwads...!" It was Ice.

"Yo'."

"What are ya' talking about?"

"Seventies. Best song."

"Song...? What about TV Series...?"

"That'd have to be MASH," I answered.

"Cool," said Ice. "I liked that."

"Who was your favourite character?" I asked.

"Whoa..! I'd really have to think about that..."

"No problem," I replied. "Let me know later, after I smoke your arse from the sky."

Ice and Cube flipped the bird, and began to pre-flight their ride.

Hobbit and I did the same.

Hobbit had been my RIO for two years. I remembered the first time we'd been introduced at the Base Bar.

"Name's Hobbit," he'd said.

"HaHaHa...! Cool name, dude. How'd you get that?" I asked.

"Er... same as everybody. My parents chose it." He rolled his eyes.

"Excuse me? Your NAME is "Hobbit"...?"

"Duh...! You have a problem with that, wise-ass...?!"

"Ah... no. What's your 'Handle'....?"

"Smith."

"Oooookay, then. Nice to meet you."

We'd been friends ever since.

If you can call somebody who doesn't like you "friend".

The flight was like any other. Weaving from side to side; sliding about the 'Pit. Helmet pressed hard against the canopy. Pressed hard into the seat; head pumping from side to side.

"What the fuck is up with you, Aragorn?" asked 'Smith' thru the intercom...?

"I can't tie my seatbelt, dude...!"

"Well, hurry up and start the jet...! Ice/Cube are already taxiing."

We were soon airborne, and primed for action.

The Ground Controllers were monitoring the Exercise, and the Squadron C/O was airborne to check the action up-close. My headset crackled to life...

"Wolf One; Hare One. Lead. Get ready to rumble, boys. Copy."

"We HAVE to win this one, Aragorn," said 'Smith' through the intercom. We need to make up for the embarrassment of the last 'Force-on-Force'."

"There's no disgrace in ejecting from a damaged aircraft, 'Smith'" I replied.

"There is when you're still on the RAMP, Aragorn..."

He had a point.

"Lead. Hare One. Ready to rumble, Over."

"Lead. Wolf One. Ready to smoke Ara's butt, Over."

"At least he's not blowing it up Lead's arse," I said over the intercom.

"Hare One. Lead. Say again, over."

"Ah.... I said Intercom and Radio are similar switchology. Over."

"WEAPONS FREE....!"

The next second I felt the force of gravity punch my guts, as I leapt into the vertical and pirouetted, the canopy spinning on its vertical axis, as 'Smith' and myself strained our eyes for a MkII eyeball on 'Ice'.

I pulled the nose over, and rolled the jet into the horizontal, easing into afterburner to regain the speed I'd just bled. "What the fuck...!? THREE O'CLOCK; THREE O'CLOCK...!" 'Smith's' voice screamed through the intercom. I broke hard to the right, driving my nose to the 3 o'clock, and hitting my Dogfight override.

"Where is he, dude...!? I don't see him....!?" I had no visual. I knocked my Glareshield down over my visor, and strained against the G-force.

"What..?" came 'Smith's' voice, "Why are we breaking...!?"

"No visual...!" I repeated.

SCREEE.....!!!!

Klaxxon. The missile warning lights lit up around the 'Pit.

"FOX ONE...!!" came Ice's Voice.

Whump Whump. I felt the jet vibrate as 'Smith' dumped chaff....

WHEEEEEEEEEEEEEE.... The sensors on board told us we were toast.

"Wolf One. Lead. Good kill."

Ice zoomed past and rolled in the horizontal.

"Why did you break right, dude?" asked 'Smith'.

"You called him on our Three, Hobbit!" I replied, tersely.

"NO...!! I said THREE O'CLOCK...!! It was ONLY THREE O'CLOCK...! Mission brief told us we wouldn't go weapons-free until 3:05. I was simply making a formal declamation of fact, based upon the perceived temporal anomaly. We were five minutes early. It was only THREE O'CLOCK...!!"

"My bad."

"Hare One; Wolf One. Lead. Heads up, lads."

"Roger"

"Roger"

"GAME ON...!"

For another five tense minutes, we danced about the skies. A ballet of death, man against man; against machine, against machine. Then I had him...! 'Ice' and 'Cube' were ahead of me; I selected a heater, and listened as the tone spooled up, in anticipation of being unleashed for the kill. My finger hovered above the pickle....

"Fox One...!" Hobbit's voice pierced my concentration.

I dove right, and spun toward the Earth, waiting for the sound of Counter-Measures.

"Ice" dove in behind, and unleashed death.

WHEEEEEEEEEEEEEEEEEEEEEEEEEEE.....!!!

"HAHAHAHA...!" 'Cube's' whiny laugh sounded through my headset.

"Why did you dive, dude?" 'Smith's' voice was very quiet; very dangerous.

"You SAID: "Fox-1", so I went evasive!"

"No."

No?

"NO...!!!"

"What DID you say, "Smith"...???"

I said: "Fox On The RUN"...! IDIOT...!!!!"

"The Sweet...?"

Yes...! THAT is my FAVOURITE SONG FROM THE SEVENTIES...!!

"Fox on the Run'...?"

"Yes. YOU asked; it suddenly just popped into my mind....!!"

"GAME ON...!"

Things were close, and I knew that – having smoked us several times – Ice/Cube would soon be low on missiles. THAT was when our chance would come. We fenced about the skies, trying to maneuver into the envelope which would allow weapons release.

Another klaxon squealed, as "Smith" dumped counter-measures and I pulled into a hard break right, and began to notch.

Then I heard the call over the headset. It was clear; it was "Ice": "WINCHESTER....!"

We had the bastards...! "Ice" was known as a poor marksman. So – just to rub salt into the wound, I decided to play with him. I pulled my jet onto his 12 o'clock, and began to jink in front of him.

"C'mon, Big Boy," I taunted....! "What've ya' got...!? HAHAHAHA....!"

SCREEEEEEEEEEEEEEE.....!!!!!!

"What the....," came Smith's voice....

The Simulated Aim-9x pierced my tail-pipe

WHEEEEEEEEEEEEEEEEEEEEEEEEEEEEE.....!!!!!!

"Okay, Ice_Cube - GOOD KILL; GOOD KILL...!!" came Lead's voice. "RTB, gentlemen. Game over."

Hobbit's silence pierced my back, and twisted like a knife in my spine.

I fired up the Radio – "Ice – you gotta' cheat to win, buddy," I asked?

"Say again...," he replied...!?

"You called 'Winchester', when you still had missiles aboard...!"

"Negative, dickwad. 'Winchester' was my FAVOURITE character from M.A.S.H. Y'know...? After 'Frank' left the series, Dr Winchester came to the 4077th. You ASKED me for my favourite character. I suddenly thought of it, and let you know."

I switched off the Radio, and returned to base.

The only sound was that of the silence, radiating from the back-seat.

ARA'



Holy Shimmer Batman...!

Bat's Hints For nVidia Drivers.

Bat has some advice for Falconeers suffering from Shimmer.

If you suffer from shimmer, and you are running a nVidia card, *this Bat's for you.*

Bat mentions the 8800 series specifically, but – hey – who knows...?
Maybe results will improve across the nVidia range. You can only try.... ;)

During his nocturnal forays, Bat claims to have found the cure for eliminating texture shimmer on 8800 GTS/GTX card. “It’s all about how nVidia drivers interpret AA Supersampling, Coversampling and Multisampling,” squeaked Bat, as he fluttered madly about the Forums.

“To get rid of the shimmer effect and chase away those fucking annoying *marching ants*,“ he added excitedly; seemingly immune to profanity, “you will need the following...”

(Bat bit the head from a live mouse, before continuing...)

i. NGO HQ modified and improved Forceware drivers.

Bat tested the earlier and the most recent versions. Version **2.15822** produced the best results.
Bat – therefore - recommends the 2.15822 drivers.

NGO NVIDIA Optimized Driver 2.15822

http://www.ngohq.com/home.php?page=Files&go=cat&dwn_cat_id=10

ii. nHancer.¹

nHancer

http://www.ngohq.com/home.php?page=Files&go=cat&dwn_cat_id=24

iii. Driver Cleaner.

Deletes and destroys all driver remnants after uninstalling.

Will also get rid of your – to quote Bat – “Rivatuner and other bullshit tuners. The do squat.”

Driver Cleaner

<http://downloads.guru3d.com/download.php?det=745>

¹ If you have a DUAL CORE you might wanna try the "CPU MULTICORE SUPPORT" in compatibility tab - *Novum*

Procedure:

- i. Install Driver Cleaner
- ii. Uninstall your current nVidia video drivers via **Control Panel**.
- iii. Delete ALL nVidia folders from your Local drive.
- iv. Reboot.
- v. Run the **Driver Cleaner**.
*(For a Double-Whammy, you could also use **Detonator RIP**. see – FF4.0/RV Manual, Pg. 102)*
- vi. Install **NGO NVIDIA Optimized Driver 2.15822**.
- vii. After rebooting, go into your nVidia Control Panel and set it up to your normal preferences
*(Important you do this **before** running nHancer!)*



AND NOW THE TRICK.....

Install **nHancer 2.2.2** Run it.

Set up the 3D Setting in the nHancer as follows:

Enhancements tab

Anti Aliasing → Override, make sure to choose SUPERSAMPLING (4xs or 8xs or 16xs). If you look at what comes up by default, you'll notice that your nVidia Control Panel settings choose coversampling

Anisotropic Filtering → Set this @ 16
Vertical Sync → Off

Optimizations tab

Texture filtering → High quality
Trilinear → Off
Aniso Sample → Off
Negative LOD BIAS → Clamp
Prerender Limit → 2

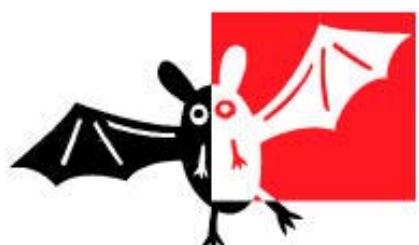
Compatibility tab

Force mip maps → None
Texture Clamp → Off

Perhaps experiment with the rest of settings in nHancer, but the above are paramount.
In future, use nHancer for **all** your tweaks and customizations instead of nVidia Control panel.

If you must use Control panel - **be SURE to go back to nHancer** and reset everything back.

If you so much as open the nVidia CP, it overrides nHancer settings.



In the middle of the night with no other cars on the road, an Air Force guy & an Army guy have a head on collision. The Air Force guy manages to climb out of his car and surveys the damage. He looks at his twisted car and says: "Man, I am really lucky to be alive!"

The Army guy scrambles out of his car and looks at his wreckage. He too says: "I can't believe I survived this wreck!"

The Army guy walks over to the Air Force guy and says: "Hey man, I think this is a sign from God that we should put away our petty differences and live as friends instead of archrivals"

The Air Force guy thinks for a moment and says: "You know, you're absolutely right! We should be friends. Now I'm gonna see what else survived this wreck."

So the Air Force guy pops open his trunk and finds a full, unopened bottle of Jack Daniels. He says to the Army guy: "I think this is another sign from God that we should toast to our new found understanding and friendship"

The Army guy replies: "You're damn right!" and he grabs the bottle and starts sucking down Jack Daniels. After putting away nearly half the bottle the Army guy hands it back to the Air Force guy and says: "Your turn!"

The Air Force guy twists the cap back on the bottle and says:

"Nahh, I think I'll wait for the cops to show up."



Miscellany...

MOLNIBALAGE SAYS :

Be careful...!!

When flying the SU-39 loaded with At-16 missiles, you can ONLY fly Red-Side.

The SU-39 itself is no problem.

But – loaded with AT-16's – you must fly RED side.

DANNYCOH SAYS :

"FTIT" – we all have the gauge in the 'Pit, but do we all know what it is...?

Simple, really...!

The FTIT is a simple indicator which shows the temperature of the engine.

FTIT = *Fan Turbine Inlet Temperature*.

There is a direct ratio between RPM and FTIT.

If RPM goes up, FTIT should rise also.

If RPM goes down but FTIT goes up.... *err - Houston, we have a problem...!*

QAWA SAYS :

When using the 3D Pits, you may notice your HUD Symbology + Aiming Cues sometimes "drift" or go out of calibration.

If this happens, simply use the "Center Hotkey". This is configured through your TIR User Interface. In fact – you should use this key OFTEN during 3D Flight, to ensure your view is optimal at all times.

Make sure you have the key's "enabled" box checked, before launching the sim.

Also – **make sure to choose a key which is not used by anything else in the 'Pit...**



STICK IT!



Dannycoh's Viper Stick

'Gorney Does Bin Laden

Ara': Mr. Bin Laden, are you aware that a Bin is a receptacle for trash...?

OBL: Of what relevance is this, Infidel...?

Ara': About as relevant as "Bad neon salami" – an anagram of your name.

OBL: It is a noble name of great honour.

Ara': More noble than killing children or less honour than me shoving a broom up your arse...?

OBL: We kill only the infidels.

Ara': Do three month old infidels count...?

OBL: I don't know. I was 28 years old before I learned to count to three.

Ara': Let's try a word association game. I'll say a word, and you say ANY words which pop into your head, before I shoot it with this Browning 9mm.

OBL: Sounds good.

Ara': The first part, or the second part...?

OBL: I am shielded by my faith.

Ara': Well – unless it's faith in Kevlar, things are gonna' get messy, dickhead.

OBL: Why do you call me such a word...?

Ara': Check the photo on this page, Bin-boy.

Anyway, let's start. Just relax, and let your mind wander. Ok? First word: "Fucker"

OBL: "Mother"

Ara': "Bitch"

OBL: "Son of a"

Ara': "Ant"

OBL: "Piss"

Ara': "Garbage"

OBL: "Human"

Ara': "Bag"

OBL: "Scum"

Ara': "Wonder"

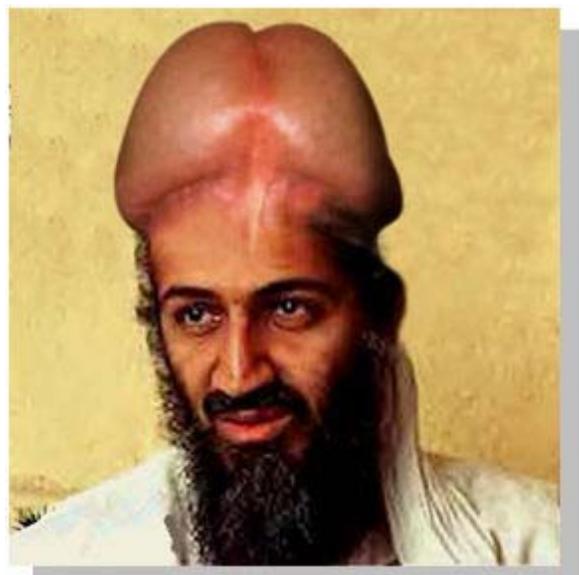
OBL: "Gutless"

Ara': "Brains"

OBL: "Shit for"

Ara': Osammy – Where on EARTH was your mind wandering...?

OBL: I was thinking of my brave warriors in Al-Qaeda.



Ara': Sambo – You like slinking around in a cave; living in your own shit, like a diseased rat...?

OBL: Paradise awaits me.

Ara': Dickhead – there is NO WAY you are getting to Florida after all *THIS*...!

OBL: What think you doomed Westerners of my videotaped messages...?

Ara': We prefer watching *Allah McBeal*.

OBL: I would retaliate if you hadn't tied me to this chair.

Ara': Do you feel a slight tingling in your balls at the moment...?

OBL: (*puzzled*) Why, yes; strangely - yes, I do.

Ara': That's my K-Bar.

OBL: **gulp**

Ara': What most Westerners want to know is: Why the fuck do you wear that STUPID HAT...?

OBL: It is a matter of modesty.

Ara': So – you want to murder children, but you don't want to be thought immodest...?
Do you see any inherent contradictions here...?

OBL: The West will suffer at my hands....!

Ara': Dude...!? You are a skinny little puke, living in a filthy hole wearing a stupid hat, and shooting grainy home videos with a group of bearded retards. Your entire miserable and worthless existence is spent HIDING in the dark. And, what...? We are – like – supposed to be collectively pissin' our pants or summin'....?

OBL: The day will come when you will all.....

Ara': Whatever. What's with that ridiculous hair on your face...? Is that a BEARD, or did some unshaven whore camp naked on your face...?

OBL: All women are whores and must be protected from their base desires, by we men.

Ara': So – I read this as: you all have limp dicks, and are scared of women.

OBL: Women are the source of ignorance, and will lead men astray.

Ara': Thank you for admitting that you and your ilk are all closet homosexuals. If you spent more time with women, you'd have less time to blow up children, limp-dick. Though dressing your women in those fat, black potato sacks certainly doesn't help.

OBL: I have ten wives.

Ara': Five of whom work as your "double".

OBL: My wives are beautiful...!

Ara': Your wives are so ugly, that when they sit in the sand, cats try to bury them.

OBL: I am immune to your infidel words.

Ara': I wish I was immune to your monkey-stink. When's the last time you bathed...?

OBL: I bathe in the glory of my faith every hour.

Ara': Well - try soap instead, wanker. Why do you have so much goat-shit about the place?

OBL: It makes a good culture for anthrax, and...

Ara': ...and doubles as deodorant.

OBL: For too long have we been trodden on by the decadent West; the worm is turning.

Ara': The worms will soon be feasting on your rotting corpse, idiot. You live in a cave.

OBL: So does Batman.

Ara': Is that why you force your women into Burkas? So – they'll look like Batman?

OBL: I destroyed your World Trade Centre...!

Ara': We'll see your two buildings, and raise you two COUNTRIES. Anything to add...?

OBL: Our martyrs are in paradise, surrounded by virgins.

Ara': The only person surrounded by virgins is you. None of these smelly bearded wankers will be getting a chick, anytime soon.

OBL: If I were not tied to this chair, I'd...

Ara': *Pulls a hair from Bin Laden's beard *

OBL: OUCH...! Stop it.

Ara': Why do all of your friends wear robes?

OBL: It is to protect us from the sun.

Ara': Yeah? And - a camel can hear a zipper being undone, a mile away.

OBL: Your insults betray your ignorance

Ara': Do you smoke pot?

OBL: NO...!

Ara': I thought you guys just sat around all day, getting "bombed".

OBL: We eschew the use of alcohol and drugs...!

Ara': I heard you had to go through "Jihad".

OBL: You're just stealing all of these jokes from the Internet.

Ara': It's a weakness. Hey, hear that distant "buzzing"?

OBL: Yes.

Ara': That's the sound of an unmanned drone. Hear the sound of that close up "buzzing"?

OBL: Yes.

Ara': That's the homing beacon. So - I bid you adieu.

OBL: Are you going to untie me?

Ara': Is the Pope a Mullah?

Ara' exits, and runs like a sunvabitch.

Distant sound of teeth chewing on rope; lost beneath a ground-thumping "WHUMP"...





Spotlight On Ordnance

THE AIM-54



Because of the limitations of Falcon4.0™, one needs certain work-arounds when employing the AIM-54 "Phoenix" Missile at **very long ranges**.

Let Molniblage show you how...

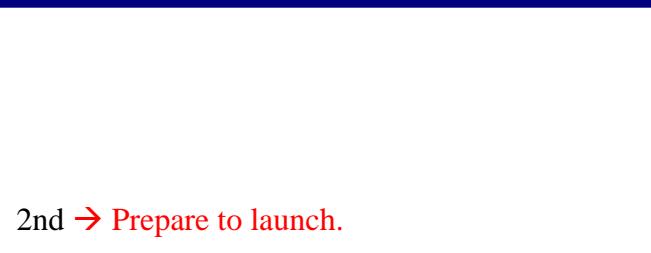
with Molni

In real life, the AIM-54 can achieve phenomenal ranges in excess of 115 statute miles ². These ranges are attainable, because - after launch - the missile climbs to stratosphere (around 30 km) and is able to travel at this altitude with very low drag.

By following this simple tutorial, the Falcon Pilot can also attain impressive ranges in-sim.



1st → Lock your target.



2nd → Prepare to launch.

Pitch your F-14 up.

A **20 – 30 degree** nose-up attitude.

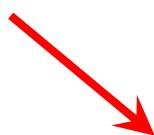
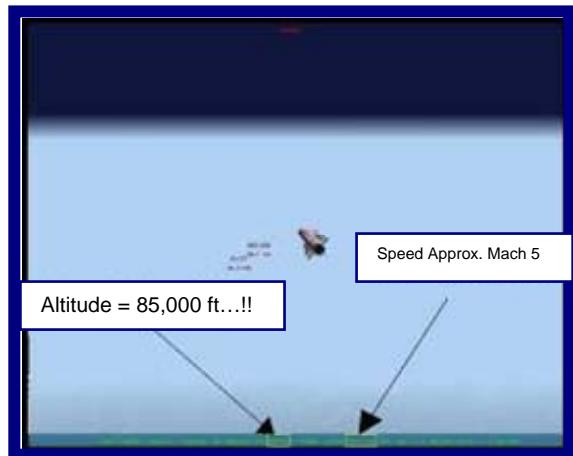


² Actual Range is classified. TBH – I could tell you. But, I'd have to kill you. - Ara'



3rd → Launch.

Fox Three Long...!.



From 55 nautical miles...

Good Kill; Good Kill...!



Utilising this method, high altitude targets (~30k) which are closing can be targeted at 70 – 80 nm.



Be aware that the “bubble” of Falcon™ can be a limiting factor

MULTIPLAYER TEST

In a multiplayer test, my F-14 targeted a MiG-25 inbound at 30k feet & Mach 2.

Launch distance was 143 miles...!

Result...?



SPLASH ONE MiG...!

Qawa's nVidia →

The screenshot shows the NVIDIA Control Panel interface. At the top, there are tabs for "Global Settings" and "Program Settings", with "Program Settings" being the active tab. Below the tabs, the title "Settings:" is displayed. A large table lists various GPU features and their current settings. The table has two columns: "Feature" and "Setting". The "Feature" column includes: Anisotropic filtering, Antialiasing - Gamma correction, Antialiasing - Mode, Antialiasing - Setting, Antialiasing - Transparency, Conformant texture clamp, Error reporting, Extension limit, Force mipmaps, Maximum pre-rendered frames, Multi-display/mixed-GPU acceleration, Texture filtering - Anisotropic sample opti..., Texture filtering - Negative LOD bias, Texture filtering - Quality, Texture filtering - Trilinear optimization, Threaded optimization, Triple buffering, and Vertical sync. The "Setting" column provides the corresponding value for each feature. At the bottom right of the panel, there is a "Restore" button.

Feature	Setting
Anisotropic filtering	4x
Antialiasing - Gamma correction	On
Antialiasing - Mode	Enhance the application setting
Antialiasing - Setting	16x
Antialiasing - Transparency	Supersampling
Conformant texture clamp	Use hardware
Error reporting	Off
Extension limit	Off
Force mipmaps	None
Maximum pre-rendered frames	3
Multi-display/mixed-GPU acceleration	Multiple display performance mode
Texture filtering - Anisotropic sample opti...	On
Texture filtering - Negative LOD bias	Allow
Texture filtering - Quality	Quality
Texture filtering - Trilinear optimization	Off
Threaded optimization	Auto
Triple buffering	On
Vertical sync	Force on

This is Qawa's suggestion for better performance from FreeFalcon5.0

So – it's kinda' subjective and unscientific...? Break a leg...!



SAM Simulator →

Butt regularly kicked by SAMs...? Wonder what it would be like to be on the OTHER side of that...? Molnibalage came across something interesting - A Russian SAM Simulator...!

This program is free, and comes with ENGLISH documentation...!

The program was created by a Hungarian enthusiast nicknamed "Hpasp". A D/L Link is available on his site. I have also created an independent D/L link, though that version won't be "updated". (*Both links are at the bottom of this page*).

This Simulator covers both the SA-2 and SA-3 SAM Systems, and makes you the SAM operator. It is extremely challenging, and very much a SIMULATOR.

Be aware that - in order to run the SAM Simulator, you will need to set your screen resolution to 1280 x 1024.



SITE + D/L → <http://sites.google.com/site/samsimulator1972/sam-simulator-hun>

SIM D/L → <http://www.mediafire.com/?nznlnnnl4ynd>



Random Considerations...

AI TARGET THEFT: Falcon™ has an old problem, wherein an AI flight may destroy one's assigned target BEFORE one arrives, and – consequently – one will receive a Mission Failure... ☹

Of course, in TE Creation, one can simply be quite careful when creating missions, in order that one's squadron avoids any AI flight accidentally hitting the assigned target.

Campaign – however – is more problematic. One tactic may be to avoid taking flights that have other AI flights attacking adjacent or close proximity targets.

COMBAT AUTOPILOT – F4 at the movies: Take a break from your campaign, and try out the Combat Autopilot. It's used quite extensively for Dev'ing, but – it can be entertaining for everyone. Enable "Combat Autopilot" in your FreeFalcon Config Editor. Then – select Combat Autopilot from the pulldown menu in the User Interface. Now – find a campaign, where the action is pretty heavy. Climb into your jet. Now – engage "Autopilot" and sit back. Use the Shift + "˜" key for Action Camera. It'll jump around, and show you what's happening. Use the "8" key to jump to different aircraft. Jump to a different aircraft, and choose "Shift" + "˜" again to resume the Action cam. After a bit of practice with cameras, you'll be rushing about the ENTIRE campaign, seeing all the action unfold on the ground, and in the air...! It really IS like watching a Falcon Movie. When you can't stand to be idle any longer, hit "2". This will get you back into the 'Pit. Disable Autopilot, and go to work. "Weapons free"...!

CHANGING WEATHER: Before flying a mission it is possible to change the weather conditions. See the FF Weather Section for details.

MULTIPLE LANDINGS: Did you ever notice in your debrief that you landed MULITPLE times...? BEFORE you took off...? Don't worry. It is a well-known issue with Falcon. It only affects aircraft with more than one set of wheels on the main gear. So – you may experience it with such A/C as – for example - Viggens and Buffs.

Blood on the Canopy: Blood appears when your cabin depressurizes...? This 'pit was made in the days before Ramp Starts and opening canopies, so – the only time a cabin depressurized was due to damage. Thus, the blood.. (*Due to this new era of opening canopies, this effect has already been REMOVED from many 'pits'*)

UI SETTINGS: Enter your new Pilot Name (create a logbook) BEFORE making your UI Settings. If you don't, the settings will not "stick". The Graphics and Sound options will revert. After entering your Pilot Name and Callsign, be sure to check the Simulation Settings. They will often change to "Rookie" settings. By FIRST creating your Logbook and THEN setting your UI, you should have "stickiness" in your choices.



Red1

Beartrax

Hustler



2000 AD

A Blast from the Falcon Past



DICTA BOELCKE

BASIC ACM

THREAT EVASION

RHINO TACTICS

HOGWASH



DICTA BOELCIE

- Try to secure the upper hand before attacking. If possible, keep the sun behind you.
- Always continue with an attack you have begun.
- Only fire at close range, and then only when the opponent is properly in your sights.
- You should always try to keep your eye on your opponent, and never let yourself be deceived by ruses.
- In any type of attack, it is essential to assail your opponent from behind.
- If your opponent dives on you, do not try to get around his attack, but fly to meet it.
- When over the enemy's lines, never forget your own line of retreat.
- Squadrons: In principle, it is better to attack in groups of four or six.
Avoid two aircraft attacking the same opponent.



BASIC AIR COMBAT MANEUVERS

with derStef

Because air combat involves dynamic movement in three dimensions, one could conclude that it is an infinitely variable maneuver/counter-maneuver process. But such is not the case. A fighter pilot has only a limited number of options with which to meet a given situation. Which one he uses will be dictated more by the relative positions and energy states of himself and his opponent than by any potential technical advantages that his aircraft may possess. He will strive to deny his adversary the initiative, knowing that air combats are lost more often than they are won.

The pilot who holds the initiative can push his opponent around the sky, keeping him under constant pressure. The longer the pressure continues, the greater the stress on the defending pilot becomes as his life is threatened. Stress breeds mistakes and the first error may well prove fatal. Even if the defending pilot makes no errors he is likely to be forced into a series of energy-dissipating maneuvers that deplete his maneuver capability, and render him ever less capable of defending himself.

The maneuver phase proper generally begins when a pilot realizes that he is about to come - or already is - under attack. His first priority is survival; turning the tables is secondary at this stage. The opening moves are thus defensive, with the attacker conforming predictably to the defender's movements. Each maneuver has its counter, however, it is the precision and timing of a maneuver which is important; the ability to out-fly an opponent. The most advanced fighter in the world is only as good as its pilot. If, however, the defending aircraft can achieve an early sighting the pilot should be able to maneuver using normal turns to prevent the attacker from positioning in the lethal or vulnerability cones.

Having negated the attack, the defender should either disengage (*for instance, on an attack sortie the primary aim must be to complete the bombing mission*) or - alternatively - continue maneuvering into an attacking position.

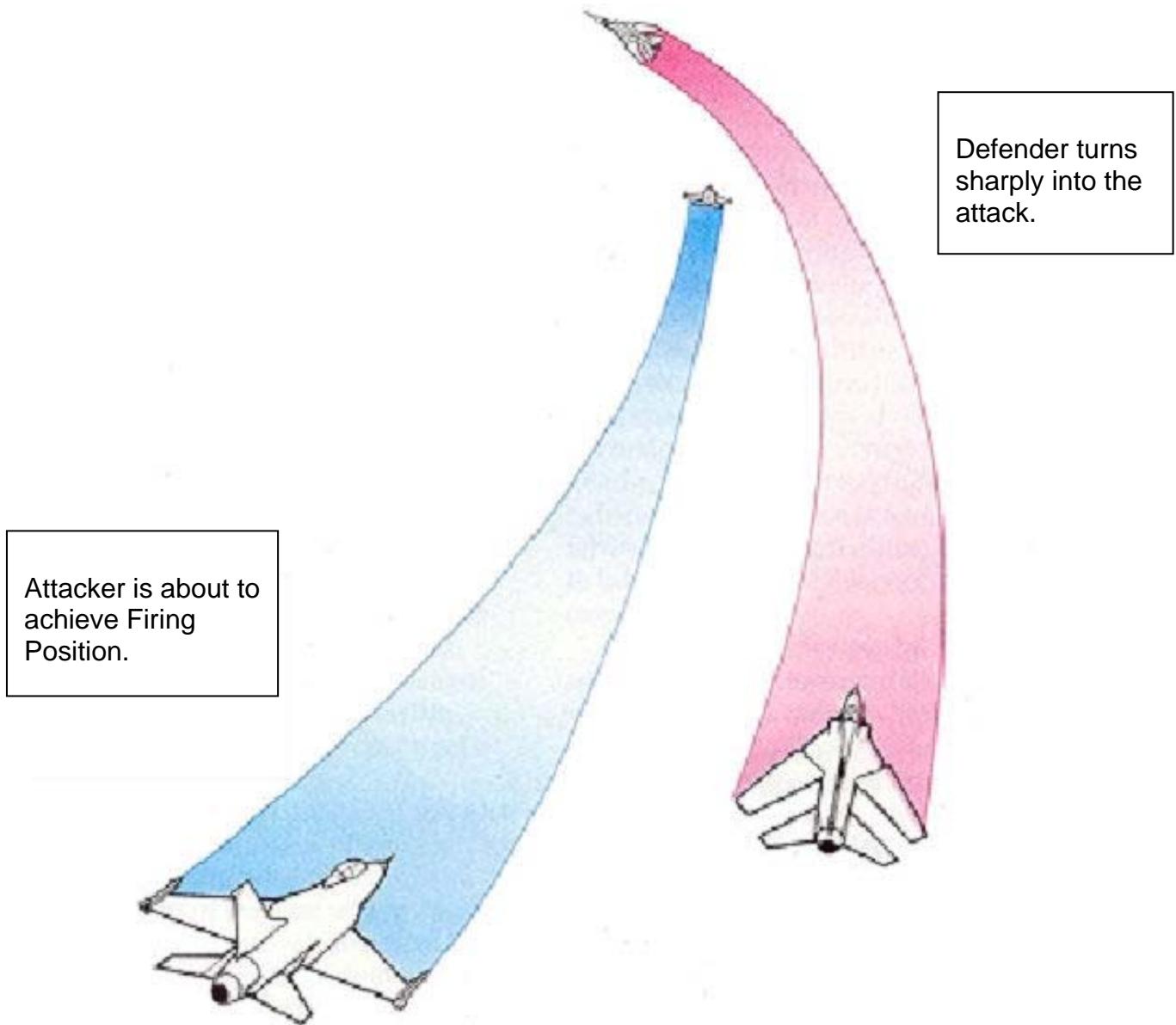
There are both Offensive & Defensive basic air combat manuevers. These include:

- *the Break*
- *the Scissors*
- *the High-G Barrel Roll*
- *the Jink*
- *the Spiral Dive*
- *the Vertical Rolling Scissors*
- *the Split S*
- *the High Speed Yoyo*
- *the Lag Pursuit*
- *the Low Speed Yoyo*
- *the Barrel Roll Attack*
- *the Vertical Reverse*
- *the Immelmann*

THE BREAK.

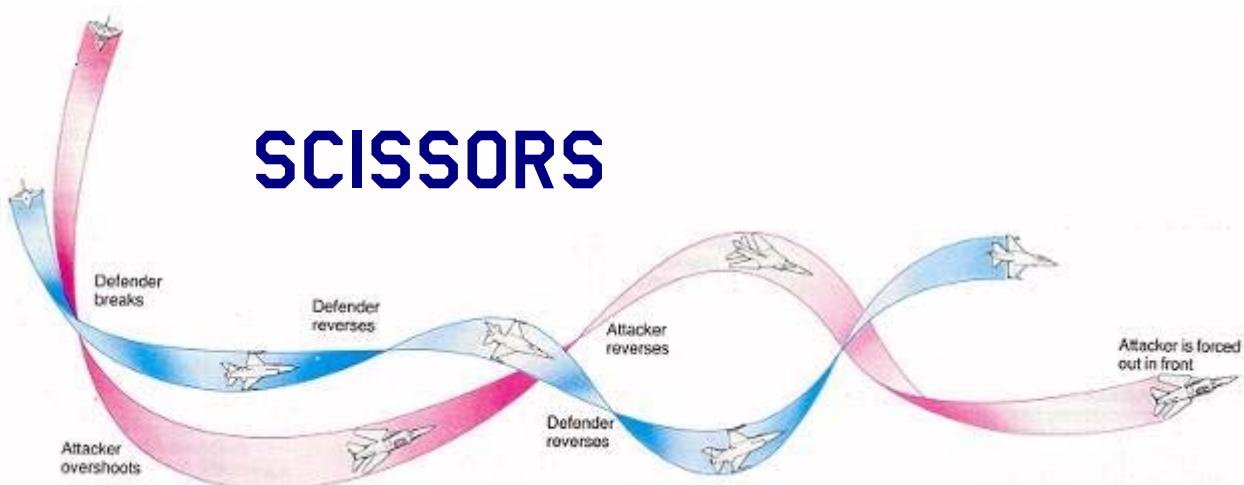
This is used when an attacker is first seen, or is already in the cone of vulnerability. Its purpose is twofold: to spoil the attacker's aim and to force him to overshoot. The break is always made towards the direction of attack. This generates "angle-off" as quickly as possible which makes the defender a difficult target. The attacker may be able to cut inside the turn but he is forced to pull lead. To do this he must tighten his turn, which increases his angle of attack. It is difficult for him to pull his nose around at high angles of attack to achieve a firing solution. The defender should also alter his plane-of-flight to make himself a more difficult target.

Two forms of break are possible. Depending on the circumstances of the attack, the defender can use a maximum-rate sustained turn in which he does not lose speed, or the hardest possible turn in which he almost certainly does. The speed loss attendant on the turn aids his chances of forcing the attacker to overshoot, as does the smaller radius of the turn.



If the break succeeds in forcing the attacker to overshoot, the Scissors may follow...

SCISSORS

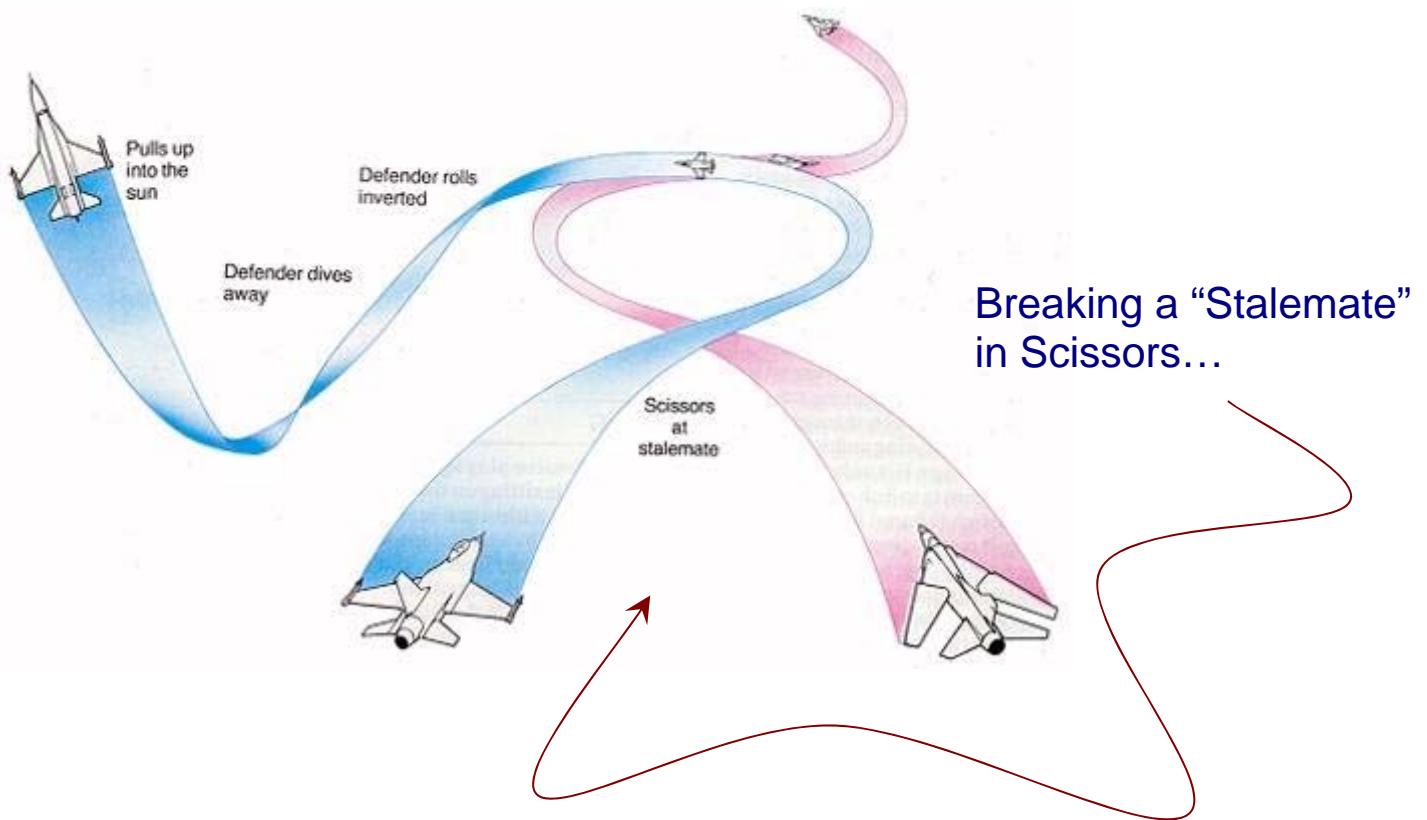


This is a series of turn reversals performed with the object of forcing the overshooting attacker out in front to a position of disadvantage. The initial turn is reversed when the attacker has definitely overshot and has drifted sufficiently wide as to prevent him from pulling back into the cone of vulnerability when the defender reverses. Timing the reversals is absolutely critical. The basic rule is that if the attacker is overshooting fast, reverse early, but if he is drifting slowly wide, take time and make sure.

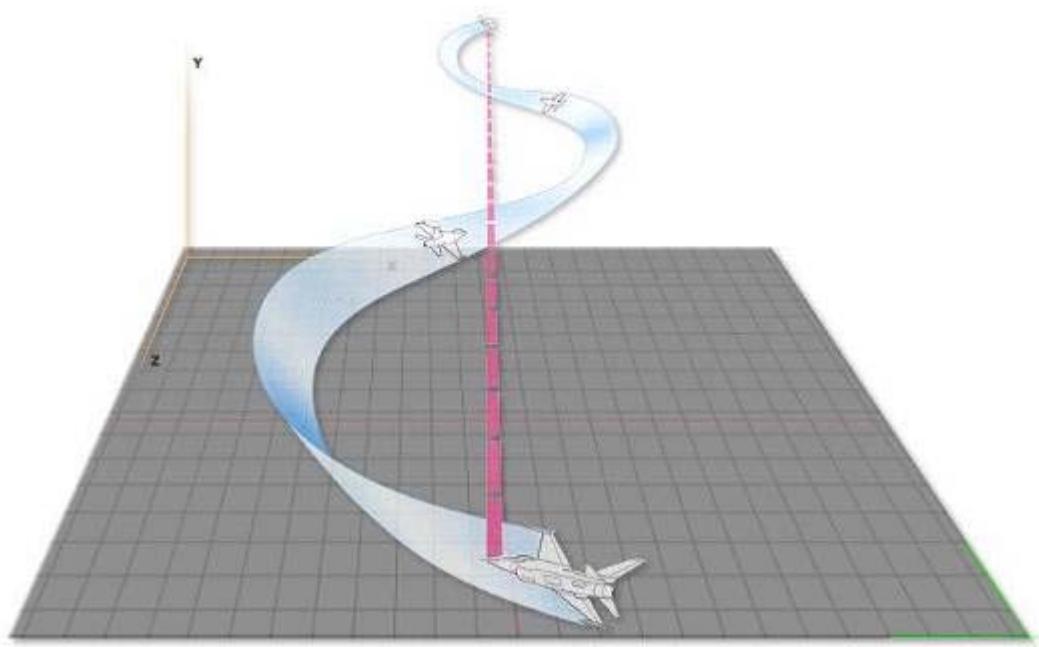
Full power is used throughout the scissors but with the nose trimmed high to reduce the forward velocity vector. Airbrakes can be used to force the flythrough but if they are used too early they will advertise the defender's intentions. The scissors may turn into a stalemate with neither side gaining the advantage. The stalemate can be broken by one fighter rolling inverted when passing through the adversary's six o'clock and diving away to gain speed before pulling back up, preferably into the sun by surprise.

Scissoring for more than a couple of reversals are not recommended against an opponent who is able to turn faster and/or tighter and it should not be attempted if there is more than one attacker, either.

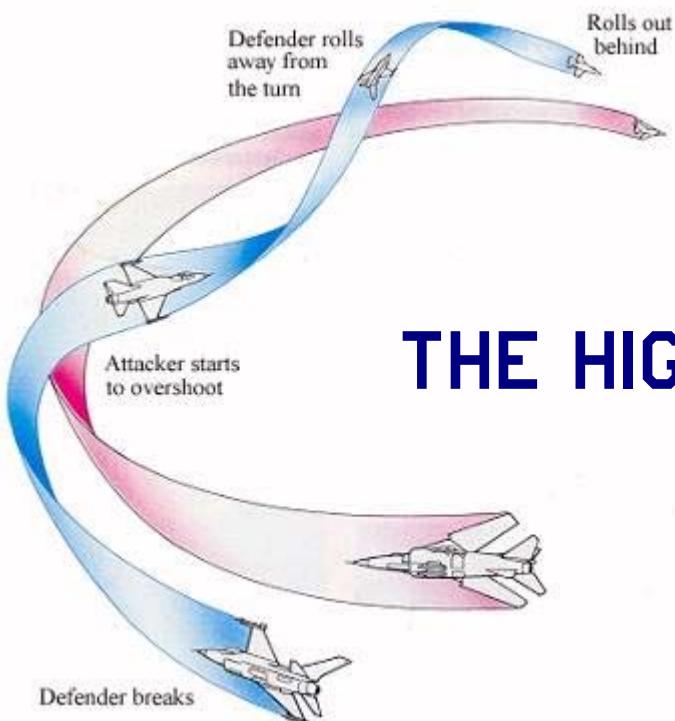
Fighter pilots recommend that unless the advantage is gained after three reversals, the pilot should, aiming to pass head-on the attacker, since this would put him at a disadvantage in having to turn back toward the defender as he runs out.



THE FORWARD VELOCITY VECTOR



In the scissors, both fighters are trying to reduce their forward velocity vector, which is their speed along a straight line around which they are both reversing. The winner will be the fighter with the slowest forward velocity as he will finish up astern of his opponent.



THE HIGH - G BARREL

This maneuver is used against an attacker closing fast from astern. It starts with a break, then a roll in the direction of the break. The fact that it is a high-g maneuver means that quite a lot of speed is lost - up to 100 knots in some cases, particularly if performed "over the top."

If the attacker is closing fast and is caught by surprise he may easily fly through and end up in front, the positions reversed. If he attempts to follow the barrel roll, he will probably end up high and wide of the defender who can then turn in towards him, forcing him down and in front. But – tragic outcomes for the defender who attempts a barrel roll in front of a slowly closing attacker, who will follow him through the maneuver, ending on his tail within easy gun range. His only recourse in this event is to jink.

The High-G Barrel Roll is a difficult maneuver to execute successfully, and is - in fact - easy for the attacker to counter. It will only work if the attacker has been led into (or is in) a high angle-off, high overtake situation.

JINKING

This is a defensive ploy against an attacker who is sitting on the defender's tail within gun range with little or no overtaking speed. It is a series of random turns, skids, pitch-ups and yaws to spoil the attacker's aim. While the attacker is able to retain the advantage, the longer he is forced to concentrate on attaining a shooting position, the more nervous he is likely to become about what is going on behind him.

Obviously, at this point the defender is in a desperate situation, about to be shot down, following a break with rapidly decaying airspeed. What is called for is application of full reheat, max g in one plane for about 3 to 4 seconds, followed by max minus g in another plane held for 3 to 4 seconds. Speed should have increased by this time. Hopefully, now out of gun range, the defender can now start jinking , separating them by 30 to 60 degrees to avoid the missile envelope-or he can turn back in for a front missile attack (*if he has missiles*), followed by escape.

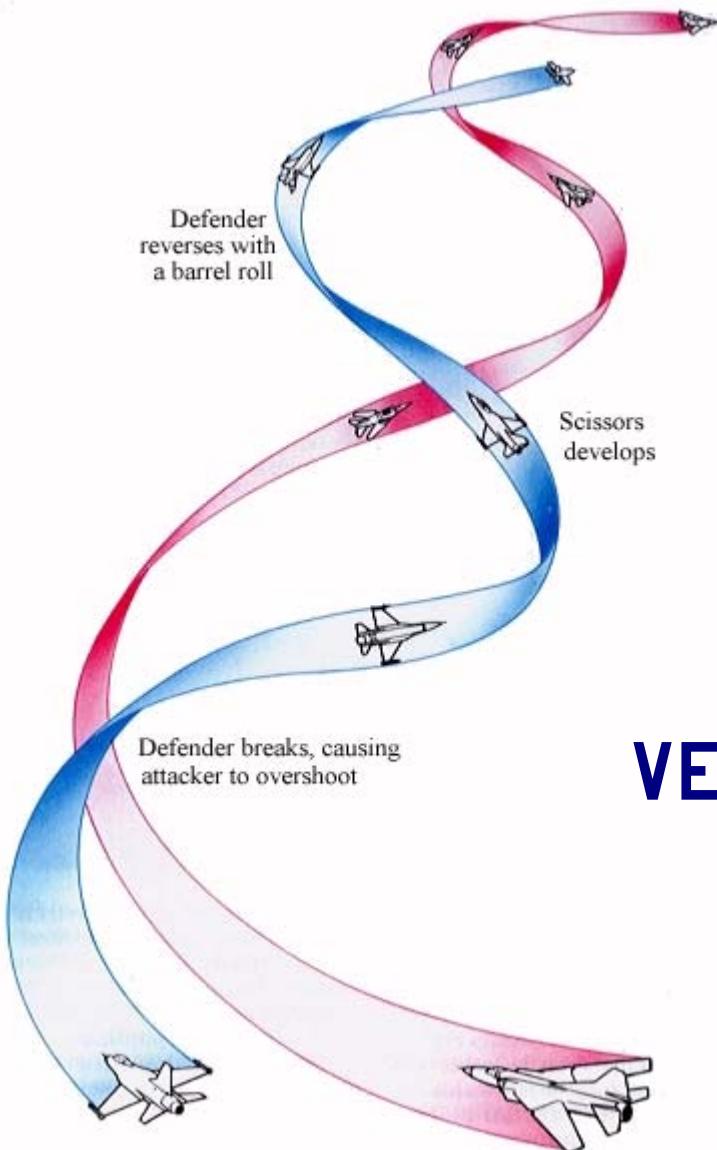
SPIRAL DIVE

When all other maneuvers fail, the spiral dive is a last-ditch attempt to shake off a resolute pursuer. This involves maintaining the highest possible rate of turn in a dive steep enough to retain maneuvering airspeed.

If the attacker follows the spiral the defender should throttle back. This tends to flatten out the spiral and reduces the rate at which height is lost. The defender will slowly lose speed.

As it is extremely difficult for the attacker to notice early enough that his opponent has reduced power he may start to overshoot at this point. If he does, a hard rolling reversal and pull-up by the defender will force the attacker out in front.





THE VERTICAL SCISSORS

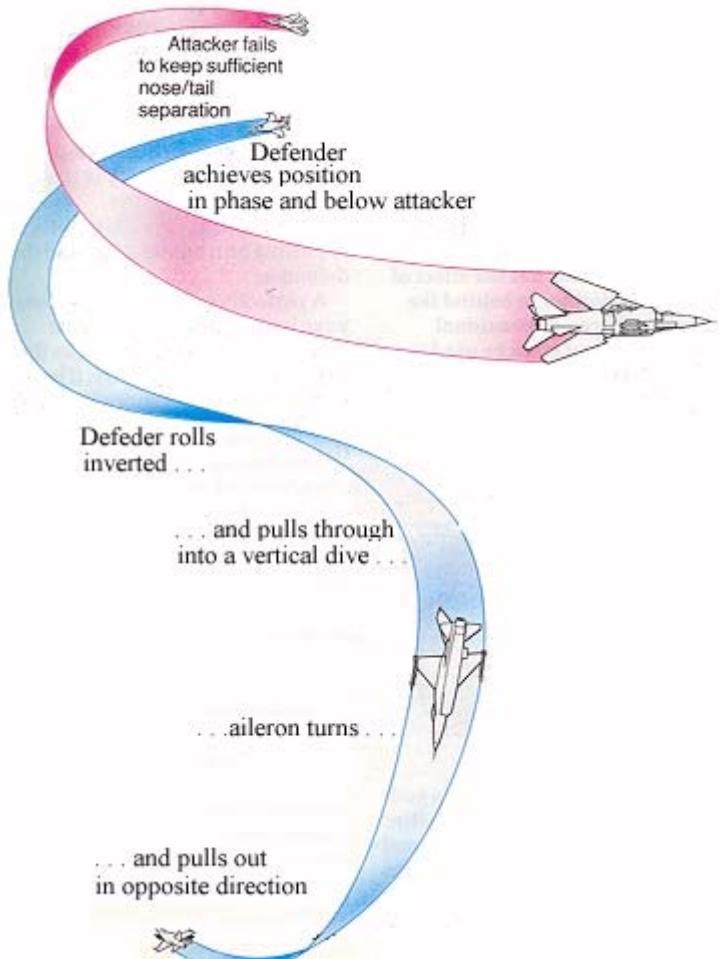
This is similar to the scissors, but it is carried out in either a steep climb or a dive, and the reversals are often carried out by executing a complete barrel roll. The ascending vertical rolling scissors places the fighter with the better zoom-climb (or *the higher initial energy state*) at a disadvantage at first. In latter stages, the fighter with the best sustained rate of climb will have the advantage.

If in a descending vertical rolling scissors the defender finds himself forced below his adversary, he should attempt to place himself directly beneath his opponent and maneuver in phase with him. In this position he cannot be seen and can pick his moment to disengage with a split S.

THE SPLIT-S

In this the defender rolls inverted and dives away vertically, pulling out in a direction opposite to that of his opponent.

Most defensive maneuvers are designed to counter an attack coming from astern, mainly by forcing an attacker to overshoot. What are the attacker's needs? Much depends on whether he is planning a missile or gun attack. A missile attack should be fast, deadly, and conclusive. But, as WW I German Chief of Staff von Moltke observed many years ago: plans rarely survive contact with the enemy. The fighter pilot should be prepared for his attack to fail and know precisely what he will do next, either enters into a maneuvering combat.



If his attack is from head-on, much will depend on the maneuver potential of the two opponents. The more maneuverable fighter will have the edge in a turning fight. (*The more maneuverable fighter at this stage is frequently the one traveling slowest rather than the one most aerodynamically capable.*) If this is the attacker he should endeavor to pass wide of his opponent to give himself turning room. If there is any doubt about relative maneuver potential he should pass close to deny his adversary turning room, then pull high in the turn. In either case he should pass down-Sun so that his next change of direction forces his opponent to look into the dazzle. If after a head-on pass both aircraft pull high a vertical ascending scissors may result.

A missile attack from astern is normally made at high closing speed. If the attacker must zoom climb to dissipate his excess speeds if he wishes to continue the fight, although it is easier and probably safer to disengage at this point. A gun attack should be made with an overtake speed of about 50 knots (just under 90 feet, 27m per second). This gives time to track the target in the sight, minimizes the risk of overshooting and retains an energy advantage for maneuvering combat.

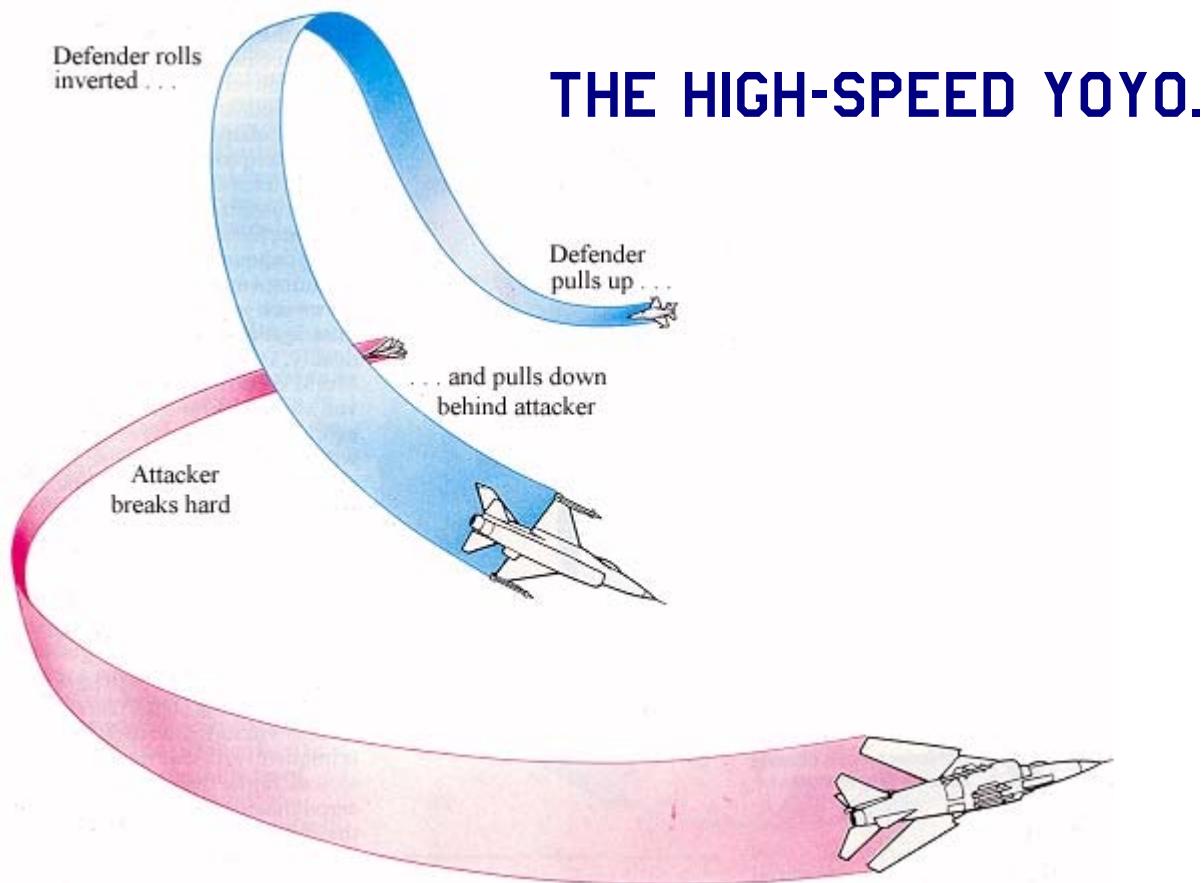
STAYING ON THE OFFENSIVE

Defensive maneuvers place much stress on forcing an attacker to overshoot.

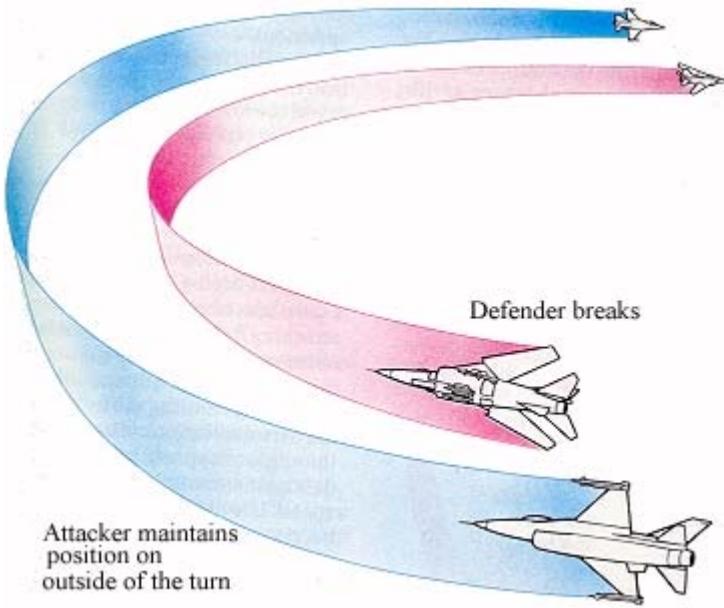
Obviously, then – it is important to avoid overshooting...! So - how is it done?

An overshoot is caused by one of two factors. The first is an excessively large angle subtended between the fuselages of the respective aircraft. The second is excessive closing speed. This is difficult for the attacker to spot until he is fairly close in. Either way the attacker is facing an overshoot scenario.

His first remedy...



When the attacker realizes that he is unable to stay on the inside on the defender's turn, he relaxes his angle of bank a little, then pulls high. As he comes over the top he is inverted, looking down at his opponent through the top of his canopy. His speed falls due to the climb, and this diminishes his radius of turn. The 1g of gravity is utilized by turning in the vertical plane, which reduces the radius of turn still further. The attacker should be well placed to slide down into a firing position.



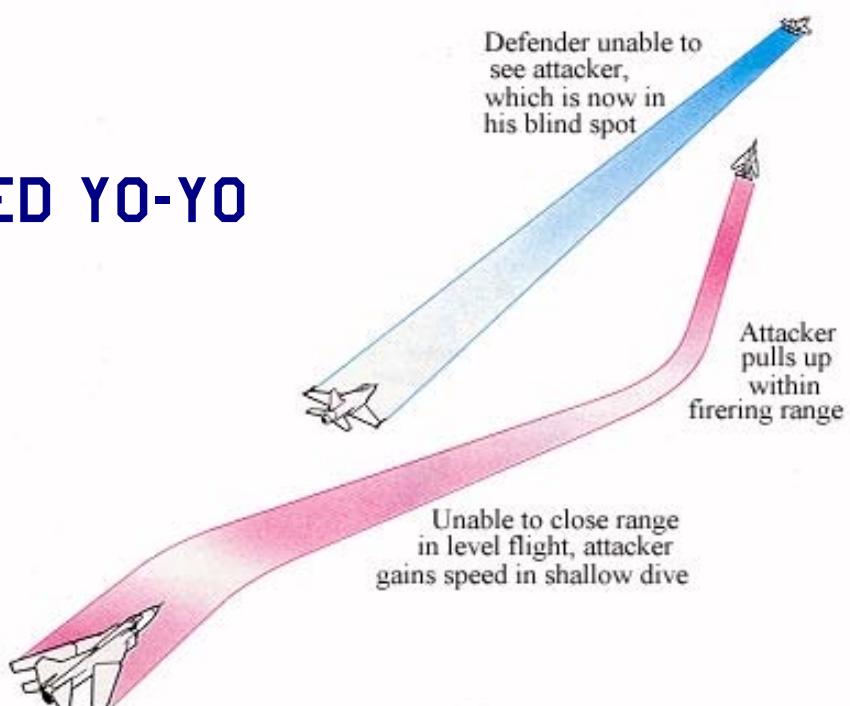
LAG PURSUIT...

...can be used when the primary cause of overshooting is excess speed.

Basically it consists of maintaining position astern, but outside the turn radius of the defending fighter. In this manner both speed advantage and initiative are retained; the attacker matching the defender's rate of turn in degrees per second, whilst remaining concealed in the blind spot beneath the defender's tail.

Lag pursuit is best countered by tightening the turn into a spiral dive. The temptation is to reverse and commence scissoring, but this is a good way to die if the attacker is skilled.

THE LOW-SPEED YO-YO



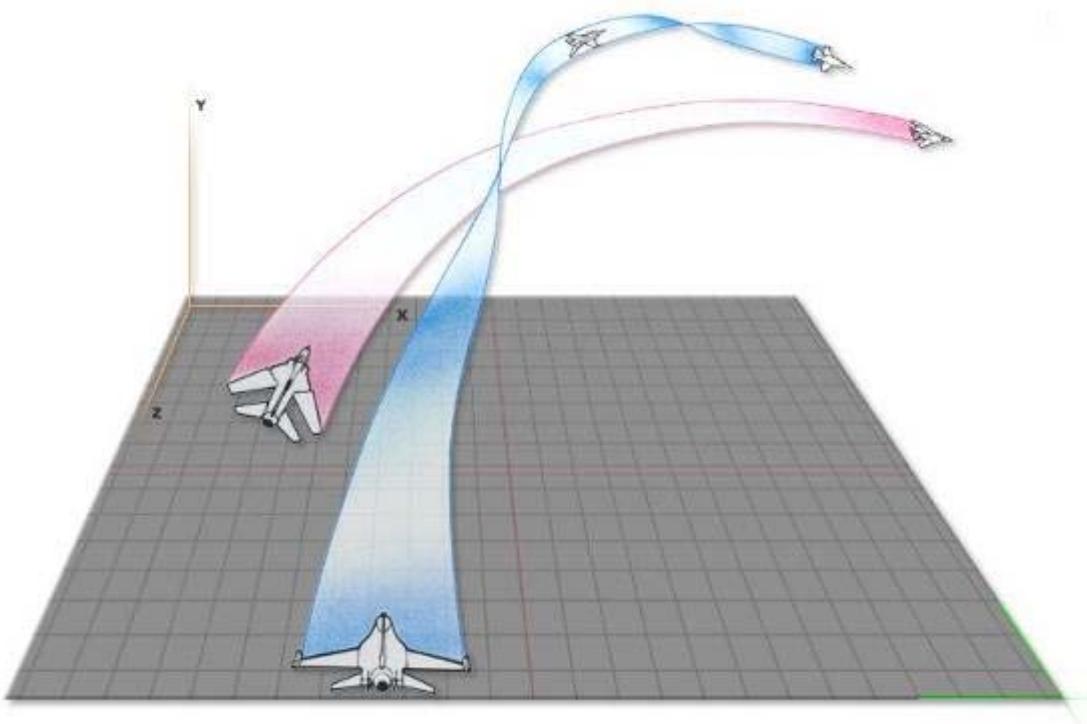
Another combat situation which can arise is a stalemate in either a tail chase or turning match. To break the stalemate, a low-speed yoyo is used. This is based on the age-old concept of trading height for speed. If the pursuer finds that he is unable to close to within shooting range in straight flight, he can gain extra speed in a shallow dive. This will allow him to close the horizontal distance and takes him into his opponent's blind spot at six o'clock low. When a suitable position and overtaking speed can be attained, the pursuer can pull up and attack. The counter? Keep a good lookout behind!

More often, the low-speed yoyo is used to break a stalemate in a turning fight. The attacker drops his nose to the inside of the turn, then cuts low across the circle before pulling up towards his opponent's six o'clock. The gain is often marginal, but repeating the process nibbles off a few degrees of angle each time, due to maneuvering in the vertical plane. The pull-up should be started when a position of about 30 degrees angle-off is reached. It is important that the angle of cut-off is correct or the attacker will arrive in a fly-through situation with too much angle-off as he approaches the target. If this happens then he must Endeavour to pull up into a high-speed yoyo.

Defense against the low-speed yoyo takes two forms. The first is to copy the maneuver while remaining in phase with the attacker. This maintains the stalemate. The second counter is more positive, the defending turn into his opponent.

If the attacking pilot has tried to lead the defender by too much or dived too low by being greedy, the defender can also pull up and barrel down onto the attacker.

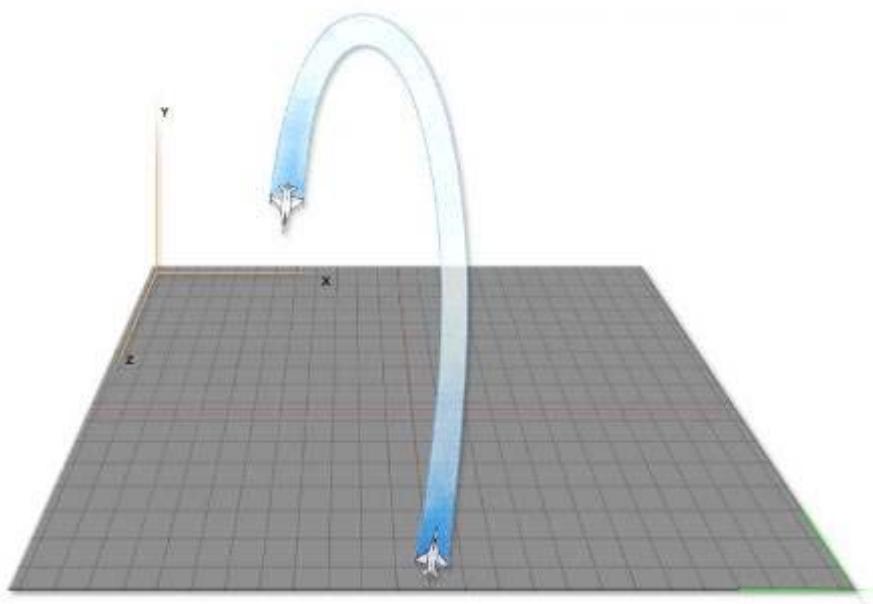
THE BARREL ROLL ATTACK



This maneuver differs from the defensive high-g barrel roll in that a great loss of speed to force an attacking fighter to overshoot is not necessary. The g forces can therefore often be quite small. Closely resembling the rollaway, the barrel roll attack is used to alter the angle of approach to the defender without losing a lot of speed. It is used when the attacker becomes aware that he is going to overshoot turning target. He rolls away the wings level, pulling the nose hard up, and then rolls away from the direction of turn. This three-dimensional maneuver is completed by sliding in astern of the target.

The counter to a well executed barrel roll attack is for the defender to dive away and increase speed. While doing this he must keep a sharp lookout for a missile attack and be ready to evade it. If he reverses his turn, he will probably set himself up for a gun attack.

THE VERTICAL REVERSE

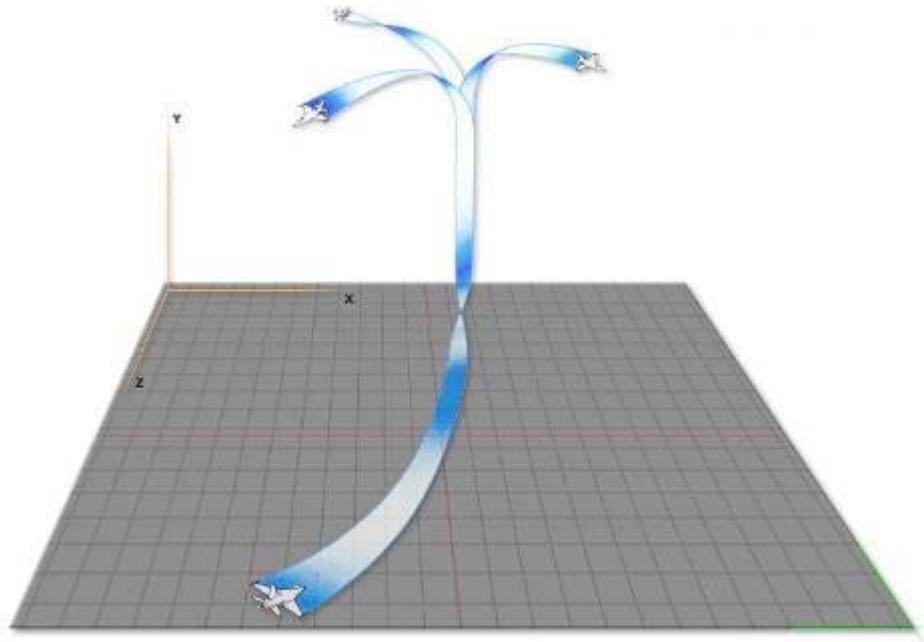


The vertical reverse can be used when an attack or maneuver is completed with a vertical climb. The aircraft continues straight up until it loses momentum. It is then thrown around very sharply into a steep dive, gaining speed as it goes.

This maneuver can be used at the top of a vertical ascending scissors either to disengage or to offer the pursuer a little head-on discouragement, but is mostly used to reposition for a further attack. Very few modern fighters are controllable at such low speeds.

The vertical reverse is only for the fighter with exceptional low-speed handling. It is used at the end of a vertical climb when all speed has been bled off, the aircraft falling sharply into a dive.

THE IMMELMANN



The Immelmann is essentially a maneuver for repositioning. Not to be confused with its WWI namesake, its main value lies in enabling the fighter to reposition at any angle with almost no lateral displacement.

A pair working as a team is much more effective than two fighters working individually. They guard each other's visual blind spots and hunt as a coordinated unit. The wide spacing is dictated by two factors: the long reach of contemporary weaponry, and the large amounts of sky needed for maneuver at high subsonic or transonic speeds.

Back in 1916 the original Immelmann turn was more akin to the vertical reverse than its present-day counterpart. The modern version of the Immelmann is a vertical climb or half loop, possibly aileron-turning during the climb, then rolling out into level flight at the top.

Its main value lies in using the vertical plane to change the direction of flight in the smallest possible horizontal space. Horizontal turns at normal fighting speeds take up a lot of room laterally. Using the vertical plane enables the fighter to turn square corners in relation to its position above the ground.

This maneuver makes repositioning for a further attack, or turning to meet a threat, much easier than would be the case using only the horizontal plane.



THREAT & MISSILE EVASION

with Molnibalage

Air to Air Threats:

- a. Semi Active Radar Homing missiles (**SARH**).
Radar guided missiles, fire control radar is on aircraft.
- b. Active Radar Homing Missiles (**ARH**).
Radar guided missiles, in end (active) phase missiles use onboard radar.
- c. Infra red guided missiles (**IR**).
- d. Internal gun.

AA-1	a*	R.530D	a
AA-2 (R-3Sz)	c	Mica EM	b
AA-2-2 (R-13M)	c	Mica IR	c
AA-2C (R-3R)	a	R.550 Magic II	c
AA-3 (R-98TM)	c	IRIS-T	c
AA-3R (R-98RM)	c	ASRAAM	c
AA-6 (R-40T)	c	PL-2	c
AA-6R (R-40R)	c	PL-5C	c
AA-7 (R-23T)	c	PL-5E	c
AA-7R (R-23R)	c	PL-8	c
AA-8 (R-60)	c	PL-12	a
AA-9 (R-33)	b**	Pyhton-3/4	c
AA-10A,C (R-27R,ER)	a		
AA-10B,D (R-27E,ET)	c		
AA-11 (R-73)	c		
AA-12 (R-77)	b		
AIM-9 (all version) Rb-74 = IRL AIM-9L	c		
AIM-7 (all version) Skyflash / Rb-71	a		
AIM-54A/C	B		
AIM-120 (all version) Rb-99	b		

A-A Missiles

* IRL this was a beam-riding missile, but this is not modelled in-game.
As one will never meet this missile in Korea, it is of no consequence.

** IRL this is not **ARH**, but in Falcon is modelled to simulate the simultaneous attack capability of **MiG-31**. Because of its **PESA** type radar it is able to engage multiple targets simultaneously, despite the AA-9 being **SARH** guided.

Land or Ship-based Threats:

- a. Radar guided surface to air missiles (**SAM**) systems have to perform **STT** lock to engage the target. In real systems, the more common guidance method is radio-command guided or **SARH** guided missiles. They are modelled the same way in Falcon. One battery has only one search and one fire control radar. There are two exceptions. Launchers for **SA-11/17** systems have onboard fire control radar.
- b. Radar guided surface to air missile (**SAM**) systems do not have to perform **STT** lock to engage the target. IRL these system can engage multiple targets simultaneously. In Falcon this is not modelled. If a **SAM** like this launches a missile, your **RWR** will only show search. This method is the same as **TWS** mode for aircraft radars.
- c. Optical guided **SAM** → The **SA-2/3** has this guidance option in **FF**. IRL the **SA-6** also has this option. Their main operational mode is radio command guided or **SARH**.
- d. IR guided **SAM** → **MANPAD** and **SHORAD** systems are typically like this, but some **SHORAD** is radar guided.
- e. Anti aircraft gun (**AAA**) → Radar aiming.
- f. Anti aircraft gun (**AAA**) → Optical aiming.
Machine guns on vehicles and infantry rifle shots are modelled this way.



SA-2, (HQ-2)	a, c
SA-3	a, c
SA-4	a
SA-5	a *
SA-6	a
SA-7 (HN-5A)	d
SA-8, (SA-N-4)	a
SA-9 (SA-N-9)	d
SA-10, (S-300MPU), SA-N-6	b
SA-11	a **
SA-12	a **
SA-13	d ***
SA-14	d
SA-15 (HQ-17)	a
SA-16	d
SA-17	a **
SA-18	d
SA-19 (2S6 Tunguska)	a, e
ZSU-57	f
ZSU-23-4	e
S-60	e
KS-12/19	e
ZU-23	f
Hawk ADS	a
Nike – Hercules	a
Patriot	b

**Land
&
Ship-Based Missiles**

Continued on Next Page...

K-SAM	a	
Mistral	d	
Stinger	d	
K-200AD	f	Land
SM-2	b	&
RIM-7	a	
K-30 BIHO	e	Ship-Based Missiles
M163	e	
M54 Chaparral	d	

* Modelling of the **SA-5** is not accurate. IRL that system has a combined guidance system. It is radio command guided, but **SARH** guided in terminal phase. In the game you can detect the launch as you do for the **SA-2** or **SA-3**, but in terminal phase, the missile uses onboard radar. IRL the missile does not have onboard radar, but – with FreeFalcon - this is a good approach to modelling the combined guidance.

** Because of the radars on these launchers, one battery can engage multiple targets. One needs to destroy all launchers in one battery to eliminate the threat.

*** The system has **IR** guided missiles, but radar helps with identifying targets and preparing to launch. It can happen that a naval **SAM** system has different capabilities than its land based version. The engagement zones of older **MANPAD** systems (e.g. **SA-7**) are about 1.5 miles in the horizontal. Max engagement altitude is 6,000 – 7,000 feet, but as the target flies faster and higher, this effective distance becomes smaller. Newer **MANPADs** have larger engagement zones. The **SA-14/16, Mistral, Stinger** are good up to 2 or 2.5 miles, and up to 10k - 11k feet. **SHOARDs** are also effective to about 10k - 12k and up to 2 - 8 miles.

Older missiles are not all-aspect missiles. They can effectively launch at targets from the rear hemisphere. These are - for example - the **AIM-9P, AA-2A, AA-8, SA-7**. This is not the whole story, however. You CAN launch these missiles if the target aspect is 01 L/R, but in this case their accuracy is lower, they are more vulnerable to flares and lock distance is smaller.

SA-2/3 has an optical guidance mode. This type of launch is neither overly effective nor accurate, but the pilot will get NO warning on the **RWR....!**

COUNTERACTIONS

- I. *Kinematic. There are two different ways to defeat the missile this way. These two methods can be combined.*

Escape from the missile. The kinetic energy (speed) of a missile is ‘drained’ by drag forces. Try to create a situation where the missile cannot reach you. The basic idea is very simple - put the incoming threat on your 6 o’clock, and use full afterburner. The key is how you perform the turn, and your initial speed and altitude. This will be explained later.

This kind of defensive manoeuvre is very effective against **SARH** guided air to air missiles, because your **RWR** system gives you instant information about the launch. The escape manoeuvre can be combined with hard vertical turns. The key is correct timing. This will be explained in later examples.

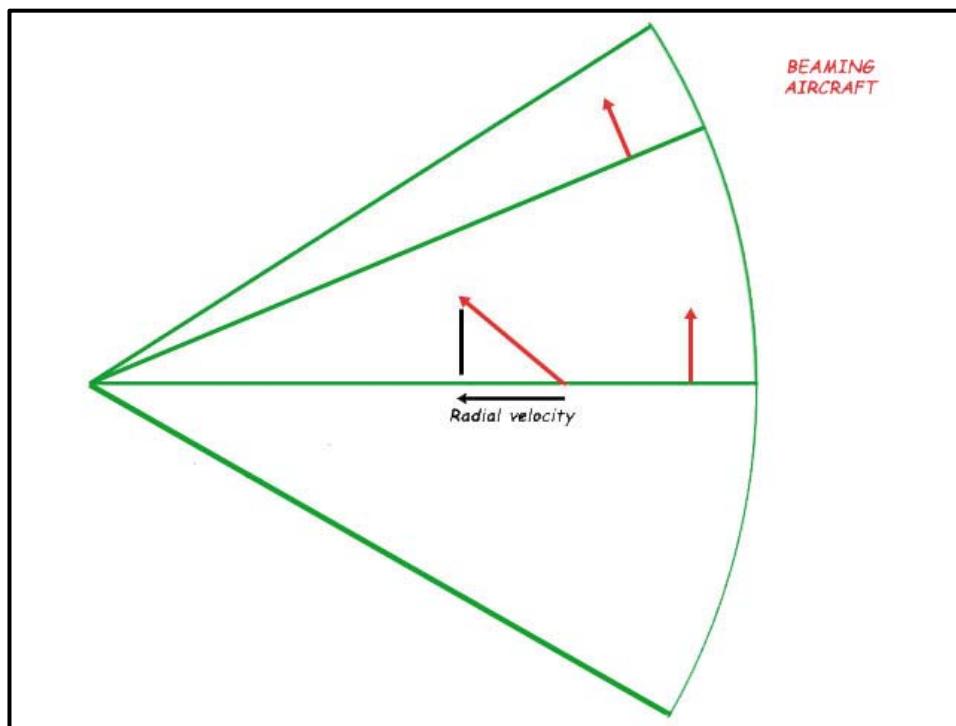
Perform a hard break-turn at the appropriate moment. You force the missile to turn so hard, that it cannot perform or it simply loses too much kinetic energy. This loss of energy is converted into loss of speed. Because of this loss of speed, it cannot reach you.

Combining the two. After the launch you turn back and hit after-burner. As the missile approaches with its kinetic energy ‘drained’, you perform a further break-turn into the missile.



*II. Using the EWS system, thereby defeating the sensors of incoming threats.
Of course, these actions can be combined with those mentioned above.*

1. **ECM - Electronic Jamming.** On the **KF-16C/D**, **F-16C/D HAF**, **F-16I** the jammer is integrated. On other **F-16** types you have to carry an **ALQ-131** or **ALQ-184** to have this capability. The **ECM** does not cover the whole airspace. Azimuth coverage is +/- 60 degrees for both the 12 o'clock and 6 o' clock direction. The elevation coverage is +15 and -30 degrees.
2. **Using chaff & flares.** On **F-16s** and most 4th generation jets, you have **EWS** programs. Some AC and AF do not. One press of the 'x' or 'z' key sends a release command to the dispensers. On some AC one command means multiple decoy launches. For example on the **F-15**, one command means launching two chaffs or two flares. On the **Su-25**, one command will launch four flares. Different kinds of missiles or threats will require different countermeasures.
3. **Beaming manoeuvre.** This is useful against doppler radars. The main concept is shown in the figure below. Put the fire control or search radar to you 3 or 9 o'clock.



If the radial velocity component is small enough, it is harder to detect the AC with Doppler radar. Be careful - not all systems have Doppler radar...! Against more advanced systems you have to fly more precisely; keep the radial velocity as close to zero (0) as you can.

4. **Flying in ground clutter.** SAM systems have MINIMUM engagement ranges and altitudes. Simply – fly lower than the effective minimum range of the enemy radar. Of course you can combine beaming, flying in ground clutter and using decoys. Combination of techniques is a very effective way to defeat **SARH** missiles.

Every aircraft has unique radar cross section (**RCS**) size. **RCS** is not constant, it depends on the aspect. **RCS** is maximum if the aspect is 01L/R. **RCS** is minimum if the aspect is 18L/R.

The infra red signal strength is also unique for every aircraft, but it depends on the current **RPM**. The Engine cooling time is modelled. Therefore, if you set the **RPM** from afterburner to 85% mil power, your **IR** signal won't become instantly smaller...! At 85% **RPM** your 'IR cross section' is about half of the 100% **RPM** state. Full afterburner means about a 150% larger 'IR cross section' than 100% **RPM**. The flare effectiveness depends on the distance from the missiles. As the missile reaches more closely, the effectiveness of the flares decrease.

Note → In Falcon the weather does **not** affect IR seekers; weather is only eye-candy.

1. Performing the counteractions

- a./ Setting EWS , some examples

Against older **MANPADs** like **SA-7**, the following setting is quite effective as a preventive measure if you do not fly at greater than 90%-95% **RPM**, and if your speed is above 400-450 kts. You have enough time to fly outside of the engagement zone of **SA-7**.

BQ : 8-10 BI : 0.750 SQ : 1 SI: 1

Against **SA-14** you can experiment with two different settings. The first is simple. You have to increase the qty. and decrease the burst interval. Using this setting means that you have a higher chance to drop enough decoys if a missile incoming, but you can't see it.

BQ : 12-15 BI : 0.350 SQ : 1 SI: 1

The other approach is as follows. The flare usage is more intensive for a short time, but for a time you are completely unprotected. If the missile comes at the right moment you have more protection, but in the other case...

BQ : 8 BI : 0.250 SQ : 2 SI: 2

The next setting is good against more advanced IR missiles, like **AA-11 (R-73)**. Of course this is not a preventive usage, you have to use if you detect a launch.

BQ : 12 + BI : 0.150 SQ : 1 SI: 1

For older radar guided missiles the default '1' program is not too effective. Many times you waste too many chaff. Against advanced **SAMs** increase the BQ.

BQ : 2-3 BI : 0.250 SQ : 1 SI: 1

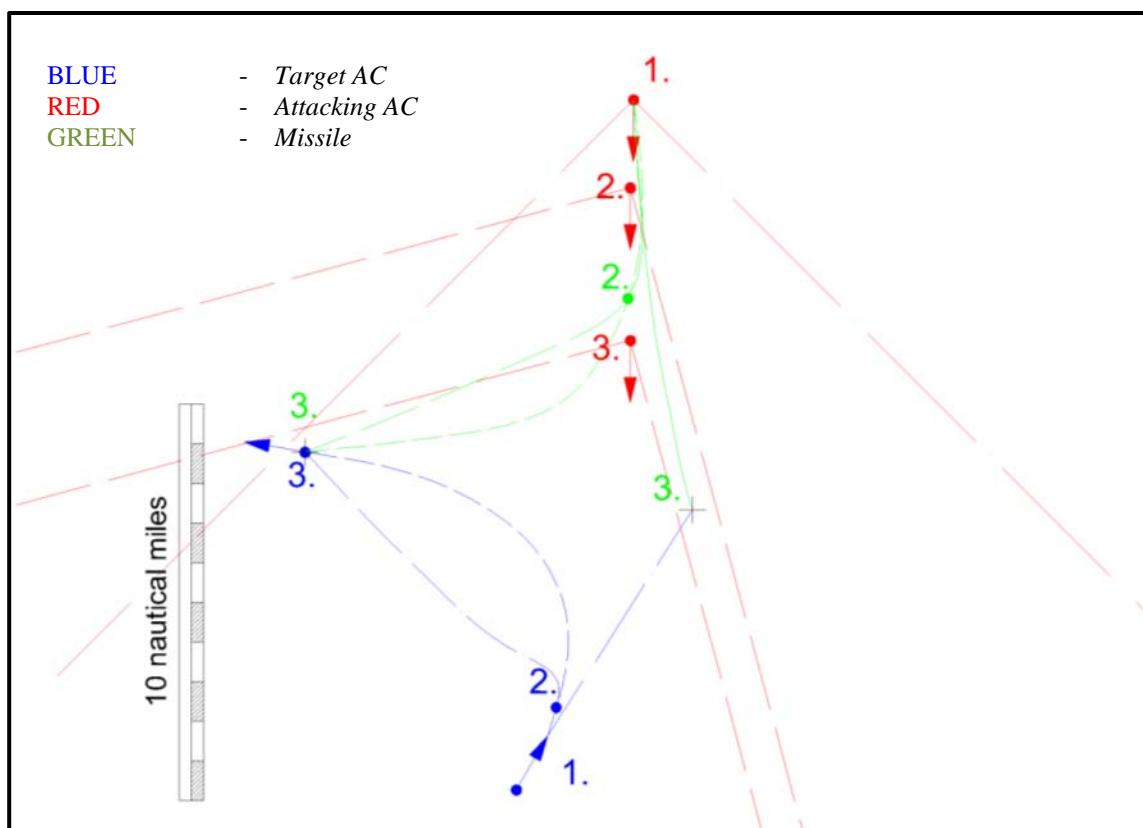
- **b./ Evasive manoeuvres**

There are three main requirements for a successful evasive manoeuvre:

1. Having the necessary speed and thrust.
2. The speed of incoming missile have to be appropriate.
3. The proper timing.

If any requirement is missing, the attempt likely won't be successful. The main goal of an evasive manoeuvre is to replace the pre-calculated impact point, thus the missile won't be able to follow you after your hard turn. It is important to know that there are situations where trying to defeat a missile by doing break-turns is impossible.

The following figures show some very basic cases for **BVR** combat and evasion examples. The figures are not scaled 100% correctly, and - because of many variables - it is impossible to draw them all. The figures do show the main concept of missile evasion.



The numbers on the figure show where are each object is at the same moment.

The blue colour shows the path the targeted aircraft

The green shows the path of missile,

The red colour shows the path of attacker aircraft.

The dashed line represents the azimuth of a radar that can search and track targets within +/- 45 degrees (but the zone can be tilted).

The cross shows the calculated impact point.

The example is very simplified; the following must be considered:

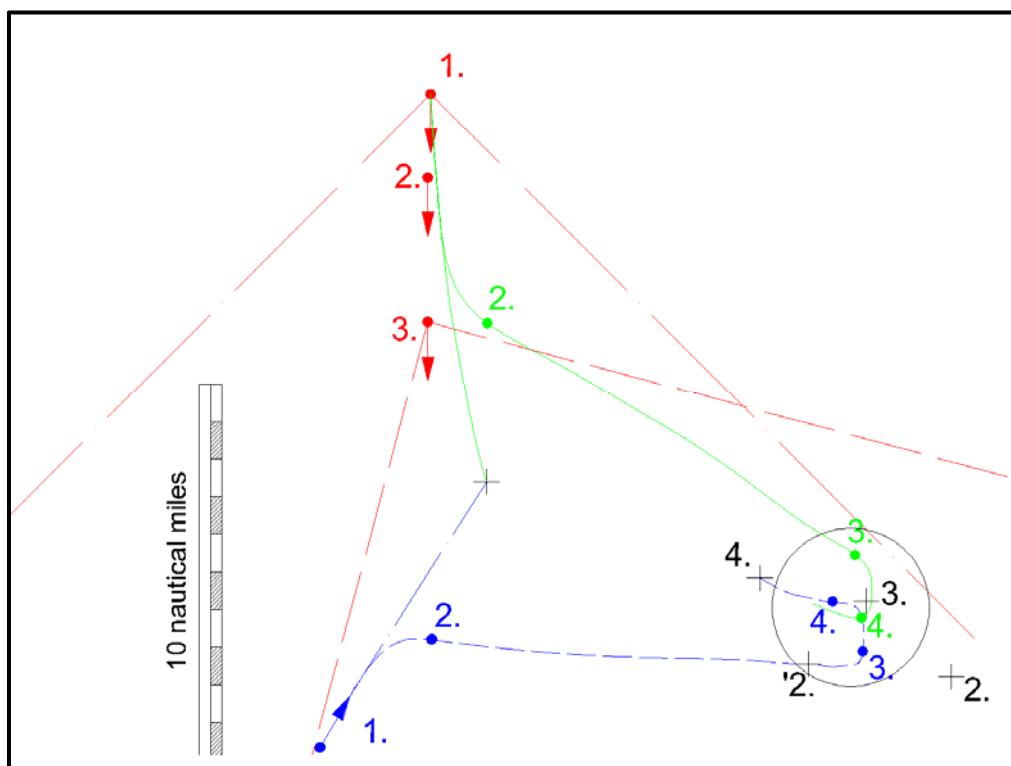
- The attacker and target are at the same altitude, about 15k -18k feet.
- The missile is an **AA-10A (R-27R), SARH** guided missile.
- The Attacker doesn't manoeuvre.
- The Target changes only its heading but not altitude. Its speed is more or less constant.

We can observe the following things from the figure:

- At the moment of launch the target is in location 1. If the target does not take any action, the missile will hit the target. Obviously this not the result that we want.
- In the second case – shorter-dashed line – the target does a long turn. Because the target does the turn slowly, the rocket has enough time to follow it by doing only a slight turn with low acceleration. The Target is reached, with only the kinetic energy loss being higher.
- If the target performs a hard turn, and does it instantly, it will lead to the same result. Because the missile is farther to the target, it has enough time and kinetic energy to react. We can see that only doing only a hard turn is not enough. The right timing is important.

In the second figure below → We see a good reaction to the **SARH** attack.

After the launch the target increase its speed and does a hard turn.



The actions in the 2nd figure are effective, as:

The pre-calculated impact point is replaced to a distant point.

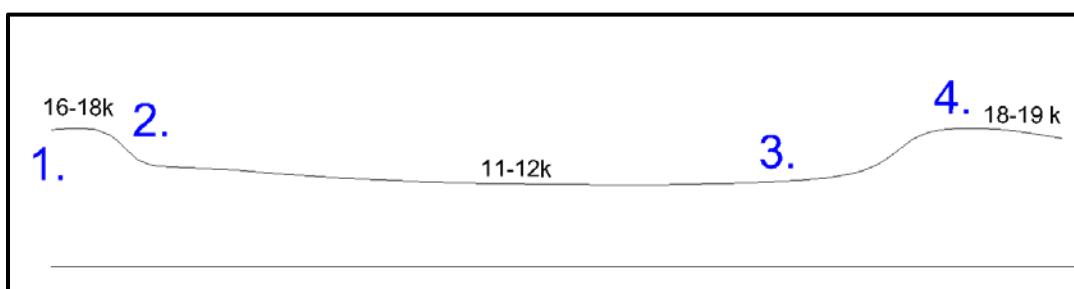
The missile has to fly to a more distant point; it has less kinetic energy before it reaches the proximity of impact point.

After the hard turn one can do a beaming manoeuvre and also use dispensers. Also, whilst performing the above, one can move into ground clutter...!

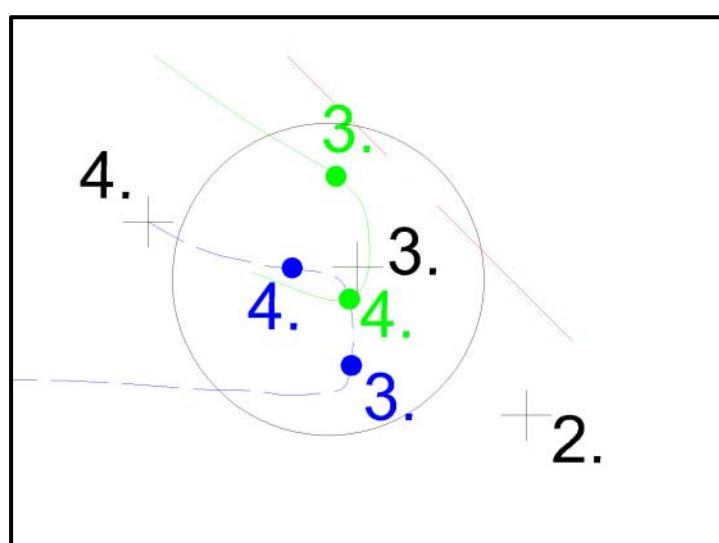
If everything goes well, one can see that one's counteraction is successful on the **RWR**. In this example, let's assume that it was not successful and you've ran out of chaff (or simply don't want to use more). At this moment the target is in location "2". The missile reacts to the turn, by also turning. At this moment, the target can do another turn and place the missile on its six o'clock.

(This is not shown in the figure.) If you do this it is harder to later achieve an engagement position on the attacking aircraft.

There is no sense in continuing to beam. It is also a good idea for the target AC to dive to a lower altitude. It is good because during the dive the target can increase its speed rapidly and the missile also moves through denser air. It will lose much kinetic energy. When the target AC can no longer accelerate significantly, the speed already gained in the dive can be converted back to altitude. Note - at this point, the missile does not have the thrust to effectively follow...!



If the actions to this point have still not been enough to defeat the missile, there is still a final opportunity available. Now that - due to one's earlier actions - the missile is likely to be at low speed, one may try the 'crossing' manoeuvre.

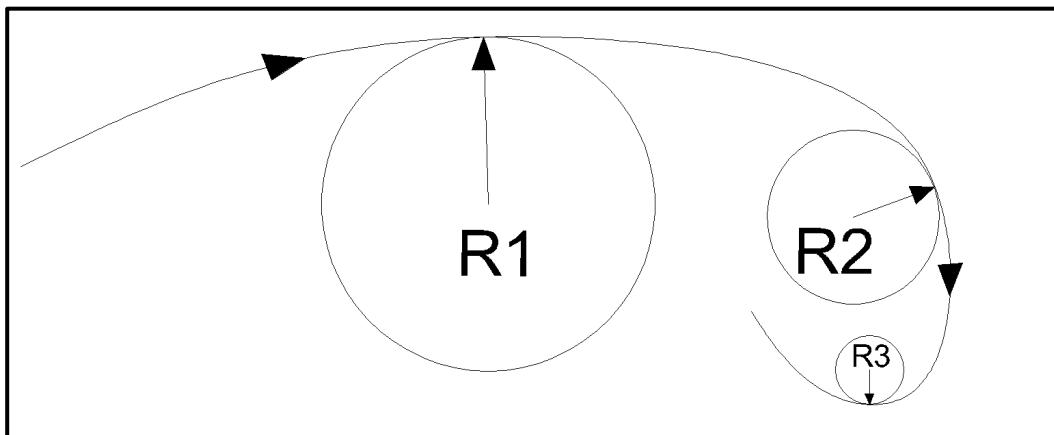


It is hard to describe this manoeuvre.

One may learn it via the video available at Molnibalage's Training Video Site:

<http://www.freefalcon.com/forum/showthread.php?t=16216>

There is - however - one additional thing that should be mentioned about the 'crossing' manoeuvre.



On the above figure, you can see a theoretical path of a missile.

If an idealized object moves on a circular curve, the acceleration is the following →

$$\alpha_{cp} = \frac{v^2}{R}$$

Aircraft and missiles mostly do not fly on an exact circular curve. The key is the radius of curvature.

You can see on the figure that if a missile is forced to a tighter turn it means greater acceleration.

Missiles have max. G values. If a missile has to do a harder turn than its max. value, it won't hit its target (in this case - You). Your goal whilst defensive is to create a situation like this.

Note that, the latest generation missiles are so high G, that it is quite hard to create a situation in which they can reach their limits.



F-4 PHANTOM TACTICS

for Iron Mike



with Toonces

A Brick With Wings - A guide to flying and fighting the F-4 Phantom in *FreeFalcon 5*

Introduction

The introduction of a brand-new 2D/3D cockpit, along with new models and skins, makes the Phantom even more exciting to fly in the Falcon 4.0 universe. However, before players strap on this exciting jet, it is important to keep in mind some of the aircraft's strengths and weaknesses in the virtual skies. This guide is intended to provide some guidance on how to best employ the Phantom in the sim, get kills, and RTB intact.

This guide approaches the Phantom from the perspective of the historical Vietnam campaign. Players should keep in mind that while the principles delineated as follows remain applicable, the disparity in performance increases as the timeframe increases. Discretion becomes very important in the other, later campaigns when deciding whether or not to engage in a fight.

Performance

If you are used to flying the F-16, F-18 and/or other late model jets, the F-4 will seem underpowered initially. The F-4 is *thrust limited*. Unlike the Falcon, the Phantom does not have power to spare. The F-4 needs to have performance (read: airspeed) before entering a fight. Furthermore, energy management is critical; lost airspeed requires pre-planning to recover. The Phantom is a fast, powerful jet, but if you're relying on your throttle to pull you out of a bad situation you are already way behind in a fight.

We have three measures of performance available to us in the cockpit: Mach Number, True Airspeed (TAS) and Indicated Airspeed (IAS). In a tactical engagement the only measure with is important to us is IAS. At a specific IAS, whether we are high or low, the aircraft is capable of virtually the same performance.

As a rule of thumb, you should always strive to maintain **450 KIAS** minimum on the F-4 in a combat environment. At 450 KIAS it becomes aerodynamically possible for the F-4 to pull $6\frac{1}{2}$ G. At this speed the F-4 can match the G availability of the MiG-21/19/17 and most other fighters. Below 420 KIAS the F-4 becomes G limited; anything below 420 KIAS is essentially unusable airspeed. In contrast, an aircraft like the MiG-17 is turning best at about 350 KIAS.

While the F-4 is thrust limited compared to later generation fighters, it still has tremendous thrust availability and excellent performance in the vertical plane. Provided you have **250 KIAS** when pointing straight up, the aircraft will fall through the top of a loop without any problems. If you have 450 KIAS on your aircraft, consider using the vertical plane. Trade airspeed in excess of 450 KIAS for altitude and avoid the huge radius turns that will result from flying at 500 KIAS or more.

When discussing the vertical performance of the F-4 in FreeFalcon 5, a special mention must be made of the engine modeling in sim. The following is taken nearly verbatim from a "real-life" F-4 Phantom flight manual:

CAUTION: At slow airspeeds a high rate of yaw can be induced, which in some tactical situations can be to your advantage. In aircraft fitted with the J79-10 engines (ie. the F-4), this yaw rate can, and does, fairly frequently induce a flame-out in one or both engines. This flame-out appears to be due to a momentary disturbing of the airflow in the intake. This apparently alarming situation can be overcome by being aware that the possibilities of a flame-out do exist, and be ready to put your fingers on BOTH relight buttons.

As soon as the flame-out is detected, hit both igniters and whichever engine has flamed out will relight before having a chance to run down.

The flameout emergency described is modeled well in FreeFalcon 5. If the F-4 is slowed to about 200 KIAS or less and a yaw is induced, a flameout in the low engine will result. Depending on which engine is lost, some systems in the aircraft will fall offline with the failure of the respective generator. It is possible to fly the jet single engine, lower the landing gear manually, and get the jet safely on deck; however in the meantime you will have significantly simplified the bogey's BFM problems. Therefore, it is absolutely imperative to be aware of your airspeed and the Gs you are putting on the jet anytime your airspeed falls below **200 KIAS**. Again, a minimum of **450 KIAS** before beginning any pure vertical maneuver will keep you out of trouble.

Along with the airspeed indicator, you will become intimately familiar with the angle of attack (AoA) gauge in the F-4 Phantom. Fortunately for us, the AoA is displayed in the top left of the HUD in FreeFalcon 5; this partially compensates for the lack of physical cues (like buffeting) that indicate units of AoA in the real jet. In the real jet, 11 Units AoA is buffet onset. Because buffet isn't modeled physically, perhaps the best use of this number is as a gauge of your opponent's performance in an F-4 v F-4 engagement.

Proper AoA use in the F-4 is vital. Two numbers to commit to memory are:

16 Units = Max sustained turn performance – Hard Turn

20 Units = Max instantaneous performance – Break Turn

At 16 units the aircraft is turning best and sustaining performance. At 20 units the aircraft has very high induced drag. The aircraft's performance washes off at the alarming rate of 100 knots in 7 seconds! There are, therefore, only two occasions when the aircraft should be pulled into 20 units:

1. If an opponent is inside of your lethal cone, with his nose pointing toward you, and you have no option but to **BREAK** into him.
2. You are attacked without having fighting performance on your aircraft. It is no good trying to turn with another aircraft when your speed is down in the 350 KIAS region. This might be the one occasion when you have no option but to break into your opponent using 20 units and pull the throttles to idle. One advantage the F-4 has is that with a high angle of attack and idle power it will slow down quicker than most other aircraft. In this method it may be possible to force your adversary into an overshoot situation, and perhaps out ahead of you. Now think about escaping, before his wingman comes into the picture with you at less than 200 KIAS.

Learn to periodically check your AoA, especially when turning the jet in a WVR engagement. The F-4 has a tendency to increase AoA rapidly with constant back-stick pressure applied as the airspeed falls below 450 KIAS. It is essential to either check AoA or develop a feel for how long the F-4 will sustain a 450 KIAS turn before getting above 16 Units.

A final word must be mentioned regarding fuel. The F-4 gobbles fuel. If you're used to buzzing around Korea in your F-16, fat with 6,000 lbs. of gas, the F-4 will almost feel like a luxury with 10,000 lbs. internal. Don't be fooled. The Phantom needs more power to accelerate, more power to maintain cruise speed, and more power in a dogfight. Expect to use burner more than you're used to- and to burn gas faster than you're used to.

Always try to accelerate in unloaded or straight and level flight. Do not try to accelerate against high angles of attack. Around high G corners, it may be best to use full military power and add the burner in when the aircraft is in unaccelerated flight. Remember, there are multiple stages of afterburner available in Falcon 4, use the min burner required; this will pay dividends in fuel saved.

Know your combat allowance, and anticipate how many minutes of combat you can expect from it. Plan your engagement to be able to leave without overrunning your bingo level. Furthermore, plan your engagement to be able to extract your flight as well. Anytime you set for a merge, check your gas and make a mental note of how many minutes of fighting time you have. Assume your element has at least 1,000 lbs. less than you at any given time and fight accordingly.

Basic Fighter Maneuvers

Aircrews designated to fly the Phantom have a unique choice. They can fly the most cumbersome dog ever to take to the air, or they can fly the best and most potent fighter ever built. The Phantom leads a Jekyll and Hyde existence. When flown incorrectly in a combat environment, the aircraft is no match for the fighters likely to oppose it. But, provided the aircrrew realize both its limitations and its massive capabilities the F-4 remains, without a doubt, a MiG killer to be feared.

It is imperative to realize first and foremost why one is flying the F-4. Your sole objective is to deliver weapons; therefore, an absolutely thorough knowledge of your weapons system, its limitations and capabilities, is of fundamental and paramount importance. You must be fully conversant with the function of every switch pertaining to the weapon system, and be able to operate all the switches without hesitation under all conditions and stresses of flight.

The first object of any engagement is to avoid being shot down. Heed this statement, and any time the situation is not entirely to your satisfaction it is time to start thinking about evacuating that predicament. Before one engages in air to air combat, be very sure that you have all the advantages. Anyone who takes on an opponent when it is 50/50 who will win is a gambler, and if you don't have absolute confidence in your own ability those chances are too high.

The AIM-7 Sparrow

The F-4's primary weapon is the AIM-7 Sparrow and the F-4 aircrew must be Sparrow oriented. We have an all-around capability. We know that if we fire from the beam, the possibility of a hit is not as high as when we fire from ahead or astern. But the possibility still exists and if the opportunity presents itself, grab it and fire. In many engagements the chances of firing successfully are rare, so do take every opportunity.

Always try and feed the correct inputs to the missile before it leaves the launcher. In other words, firing a missile, whether a Sparrow or a Sidewinder, is virtually the same as dropping a conventional bomb or rocket. If you are pushing and pulling on the stick and waggling the wings the weapons haven't a chance of hitting. Try and get as many constants on the aircraft as possible.

If firing from astern, match your target's angle of bank, match his G and hold him in a constant position in your windscreens glass. Then squeeze off the missile. When firing the missile from ahead, round to about 50° off his tail. Remember, the missile requires lead.

Often the pilot has to point his nose at the opponent in order to facilitate a boresight lock-up. Remember, once a lock-up has been attained, visually point your nose ahead of the enemy's aircraft. You need approximately 10° to 15° of lead, so by placing your nose ahead of the enemy, you are supplying virtually the correct input to the missile to improve the chances of a kill.

Opponent's Weapon System

The most common opponents in this campaign are the MiG-17, MiG-19, and MiG-21. All three of these aircraft are capable of carrying the Atoll heat-seeking missile in addition to cannons.

The Atoll missile has a performance envelope very comparable to the original Sidewinder 9B. Maximum range at altitude up to 20,000' is about 2 miles, and the minimum range remains fairly constant around $\frac{3}{4}$ mile. To hit you with an Atoll, he has to put his aircraft inside these parameters and have his nose pointing at you. Anytime he meets all those parameters, you have no option but to BREAK into him. If you can get 3 Gs or over on your aircraft, the possibility of the Atoll getting a kill is very small.

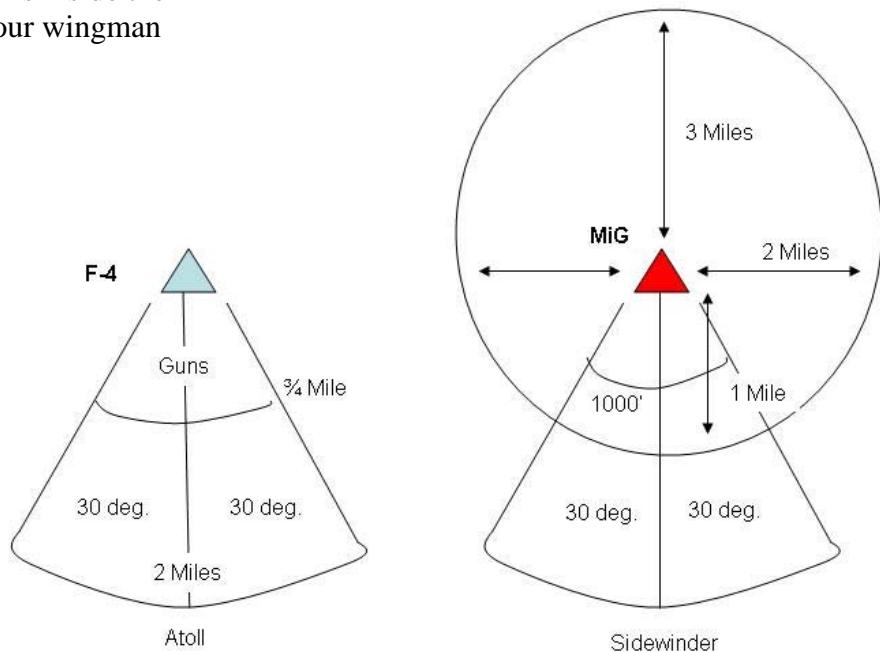
Inside of $\frac{3}{4}$ mile, he can fire his cannons. Remember, to shoot another aircraft down with guns is an extremely difficult task if the opponent is maneuvering his aircraft. To hit you with guns, he has to track and lead you. This means he has to put his center pipper right on you and keep it there. Any time you see your opponent's nose being pulled onto and ahead of you, you realize he is almost in a position to fire. VARY YOUR FLIGHTPATH. Never, ever give your opponent a predictable flight path. You have to pull G, but feed in aileron or rudder to change your flight path rapidly. Be very firm with your airplane and make him battle to try and track you.

The Lethal Cone

Be conscious at all times of (1) the area you have put your aircraft into to fire successfully and (2) the area the enemy has to get himself into to be able to fire at you. If an enemy is inside your lethal cone with his nose pointing at you, you have no option but to BREAK into him. On the other hand, if he is not inside your lethal cone then he can't hurt you at that instant. Therefore, a HARD turn will probably suffice, allowing you to keep your performance up.

Lethal Cones

Never, ever call a BREAK turn unless the enemy is inside the lethal cone of your wingman or yourself.



Problems of Equal or Inferior Performance Opponents

Fighting against an opponent of virtually equal performance, for example the MiG-21 or MiG-23, is in many ways easier than fighting against an inferior performance, but better turning capability aircraft, like the MiG-17. Against an opponent of equal performance you must bear in mind where your aircraft will perform best. Get below 15,000' in the dense air and above 450 KIAS and you can match the MiG-21's G and sustain it better.

Against an inferior performance, but better turning aircraft like the MiG-17, the problem is more difficult. Do not engage in a turning contest unless it is obvious right from the start that the MiG pilot is very poor. Keep your performance high, and keep your distance from the enemy to be able to bring your weapon system to bear. On initial engagement, if you have performance on, it is often a good idea to go up into the vertical plane. If he is aggressive and wants to follow you, he then has to turn a high G turn and raise his nose which is going to bleed off his performance.

Avoid flying curving flight paths like the plague. When you go for separation, use the straightest possible flight path. When you decide to come back into him, do so in the smallest radius and shortest time possible.

Introduction to 1 v 1 ACM

Before fighter crews can expect to make an effective loose deuce team, each must be highly skilled in one versus one, similar and dissimilar maneuvering.

Beat the aircraft and man combination; then kill him.

In a dogfight, you are winning, losing, or neutral. The following examines maneuvers available to you in the Phantom, in each of these situations.

Winning (Offensive)

Perhaps the most important tip to keep in mind in offensive BFM is to keep pressure on the bogey. As a rule of thumb, if you can keep the bogey within your canopy bow, he will be feeling the pressure and should remain predictable. Good offensive BFM (and BFM in general) requires fight control. Keep your nose close to the bogey. Keep reposition maneuvers small. Press the bogey into a predictable flight path; and then kill him.

The Phantom cannot turn with a low wing-loader like the MiG-17/19. Therefore, if entering a turn fight on the merge, an early turn should be utilized if available. To execute an early turn effectively, lateral separation is required. Be careful! An early turn can backfire, though, against a low wing loader if he flies his aircraft correctly. If, due to the bogey's turn capabilities and your initial range and aspect angle, he can't turn to bring you through his 3-9 line on his initial move, you should be able to remain offensive and fly basic offensive BFM. On the other hand, if the bogey gets you in front of this 3-9 line on the merge, go to neutral BFM and use your energy advantage to extend.

As mentioned previously, the F-4 requires speed in a combat environment. Therefore, you should be carrying enough performance to execute lag pursuit. The MiG-21 sustains approximately 11°/sec at 300 KIAS below 5000 feet. The F-4, on the other hand, sustains 10°/sec at 300 KIAS below 5000 feet, which means we're losing angles at this speed.

However, place the F-4 in a lag pursuit position aft and to the outside of the 300 KIAS MiG at 450 KIAS and low and behold the F-4's sustained turn rate is 11°/sec. Although the radius of turn is greater, the rate of turn is the same. This is the basis of lag pursuit maneuvering.

Lag pursuit deals in sustained turn and not instantaneous turn, so be careful; this is merely a transient condition. A rough gauge for lag pursuit positioning is a) put the bogey on your canopy bow, b) you are within 45° of the bogey's heading, c) outside 1 mile, preferably 1 ½ miles. To fly a lag type position at 1-2 miles you will need a bag of energy, usually 100-200 knots more than your opponent.

The advantages of lag pursuit are that a) it presses the bogey and forces him into a predictable flight path, b) it is difficult for the bogey to keep sight without forcing the bogey to use instantaneous G, c) it forces the bogey to use instantaneous G to defeat positioning, bleeding his energy, d) it allows you to maintain offensive positioning, e) it allows you to disengage easier, f) it allows you to maintain a higher energy level than your opponent. Remember, though, to check your belly; if you have a bogey in front you should assume that his buddy is behind you. Finally, watch for the bogey to apply instantaneous G and try to force an overshoot.

The final offensive maneuver to discuss is the high yo-yo. The high yo-yo is designed to stop closure, increase nose to tail separation, prevent an overshoot, and maintain offensive positioning. The most common mistakes are seeing closure too late, beginning the maneuver to close, elevating the nose too high or too low (too high=bogey can escape; too low=overshoot), losing sight of the bogey- use a quarter roll to maintain sight, and engaging the bogey in a slow speed fight after an overshoot. Keep the reposition maneuver tight, press the bogey.

Additional offensive maneuvers are available, including the low yo-yo (decrease separation), lag pursuit roll (maintain high energy state), and barrel roll attack (transfer high angle off, high energy position into an offensive start). The reader is referred to Shaw for additional information on these maneuvers.

Losing (Defensive)

Your primary goal in defensive BFM should be to get out of firing parameters of your opponent. All the fancy BFM in the world won't make a bit of difference if you are dead. Your second goal in defensive BFM is to create a neutral or offensive transition.

An attitude of aggressiveness is needed to fly defense with the thought in mind of negating the threat and staying alive.

The attacker has three basic problems when trying to achieve weapons parameters in the stern: range, closure, and angles. The defensive maneuvers discussed try to complicate these problems- create an overshoot, create high angles off, or destroy a guns tracking solution, while allowing you to get to neutral or offensive positioning.

An overshoot occurs when the attacker crosses the defender's fuselage reference line in any three dimensional plane. The intensity of the overshoot depends on the attacker's closure rate, range, track crossing angle, pilot's ability, and type of enemy aircraft.

A break turn creates high angles off. The decision whether or not to use the break turn is dependent on the bogey's closure rate, range, and track crossing angle. Be careful! If a low wing loader is stabilized inside your turn and you perform a break turn he will merely close the range and now you are in a world of trouble...

A high-G barrel roll is a difficult maneuver to execute properly and must be practiced. If you make a mistake, or the Gomer pilot is good, you may find yourself dead. A minimum of 350 KIAS is required.

The defensive roll-away was a tactic historically used against the MiG-17 due to the MiG-17's very poor roll rate; the MiG-17 has a roll rate of 136°/sec while the F-4 rolls at 250°/sec within the first second. This currently isn't modeled well in Freefalcon 5, but the tactic is provided for completeness or in the event the MiG-17 flight model is modified to bring it more in line with its real-world counterpart. Use against a MiG-17 in guns range only.

Roll away when the MiG-17 has closed to guns and is tracking by:

- Ensuring he is pulling lead.
- Perform a max rate roll away from the MiG-17 pulling no more than 2 G's.
- Wait 3-4 seconds (this will seem like an eternity) then reverse back into the MiG.
- Reacquire the bogey and do not reapply max G. Remember, you are trying to open up the range between you and the bogey. Max G will merely close the range. At 3-4 G below 10,000 feet the F-4's excess energy is significantly greater than the MiG-17, therefore you should open up the range.
- If the MiG-17 is still in guns range, roll away again as required.
- Be careful. If the bogey is out of guns range and you try a roll away, you may still get a missile up your six!
- Remember, this will only work against a MiG-17 due to its slow roll rate. Do not attempt this maneuver against other aircraft; it won't work.

The defensive spiral can also be used to create high angles off, limiting the aerodynamic missile envelope of the bogey trapped at your six. Remember, put your lift vector on the bogey and stay nose low. The winner is usually decided by who runs out of altitude first since it is difficult to gain an advantage from this maneuver.

The flat/rolling scissors is a defensive maneuver that can be used to create an overshoot. In the Phantom, to use the rolling scissors, it is best to refer to the 3 G rule:

- you are a **grape**
- you are all **guts**, no brains
- you can't afford the **gas**

Neutral

When drawing neutral, the Phantom's primary maneuver is an extension. Unload, stroke the burners, and gain two or more mile separation. A vertical reversal can be used to re-engage, or the extension used to disengage.

How to win- the bottom line

1. Cheat
2. Split into the sun
3. Split using afterburner
4. Use a wings level pull-up not to exceed 19 units AoA
5. Don't make a big move; conserve energy
6. Go for a Fox-1 head on
7. Take out lateral separation on the merge
8. Don't bury the nose
9. Unload at every opportunity
10. Cheat

Real world quotes:

“...The Phantom II pilots had visually sighted a MiG-17, low, at ‘ten o’clock’, and at a height of approximately 500-1000 ft. ‘Tally ho!’ Stillinger called, followed a couple of seconds later by Weigland’s, ‘Roger, Tally ho on one MiG-17!’ The section was in a starboard turn at about 3000 ft, descending and picking up airspeed, when the silver MiG was sighted.

Freckleton continued, ‘We knew it was going to be pretty much an energy fight since the MiG could easily out-turn the F-4. We had to use our speed and energy to climb, dive, extend and pitch back, as opposed to laying on a 6 G turn that would not get us inside the MiG’s turn radius’...”

Elward and Davies, US Navy F-4 Phantom II MiG Killers 1972-1973

“ ‘Never break into a MiG-17’, Cunningham remembered. ‘I couldn’t disengage. I used every ounce of strength I had and kicked the rudder (essentially performing a snap-roll) and got the nose down almost to into a defensive spiral or a high-G, nose-low barrel roll. I pulled and pegged the G-meter. I pulled the panels off the top of the airplane... You know what the MiG-17 pilot did? He rolled to the inside and rendezvoused on me! I had nothing left, so I radioed Brian. “Two, get in here. I’m in deep trouble”. I was scared’.”

Elward and Davies, US Navy F-4 Phantom II MiG Killers 1972-1973

“...The jet closed rapidly on Grant, who did not see the threat, and began firing his 37mm cannon at a range of about 2000 ft... ‘I was really impressed’, Cunningham recalled, ‘by the slow roll rate that the MiG-17 has. It looks like a butterfly because it goes so slow. The MiG was probably doing between 350 and 400 knots, and it must take a gorilla in there to turn that airplane, because Grant would roll and the MiG would roll, super slow. Rather than have him reverse, come back, and look, I told Grant to roll and not reverse, just unload. You could see the MiG roll and pull, but he still would never pull lead... Two rolls and Grant was able to push out quite a bit beyond the MiG’.”

Elward and Davies, US Navy F-4 Phantom II MiG Killers 1972-1973

TRAIN LIKE YOU FIGHT, FIGHT LIKE YOU TRAIN

Have a Bandit Day!





Your FreeFalcon WebSite

The FreeFalcon WebSite consists of various Forums in which you can join discussions, offer opinions, and both seek and offer help to the members and guests of the FreeFalcon Community.

Boasting over 3,000 registered members, the FreeFalcon WebSite boasts a 24hour a day, 7 day per week active membership.

Although no action is required to freely browse the site, in order to actively participate (*thru the posting of threads and polls, etc.*), you are required to freely register as a member. This will ensure you have full privileges.

The various public forums available include:

[FreeFalcon](#) [FreeFalcon 5](#)

- Ask questions or discuss features about the FreeFalcon
- Ask questions or discuss features about FreeFalcon5

[Ara's Support Forum](#)

- Mainly for **FF4.0 & Official Add-On** Support

[Open Development Library](#) [User Submitted Mods](#)

- Tools, files and things for Falcon development
- Download skins, mods etc submitted by the community!

[Training](#) [Falcon Tactics + TE's](#)

- Training videos, Tips & Advice
- General discussion about Falcon4 tactics + TE downloads

[Theaters and Terrain](#) [Cockpit Development](#)

- Discussion on new Terrains and Theaters
- For sharing info about making and editing cockpits in Falcon 4.0

[The Hangout](#)

- OT and friendly discussion

[Multiplayer Contact](#)

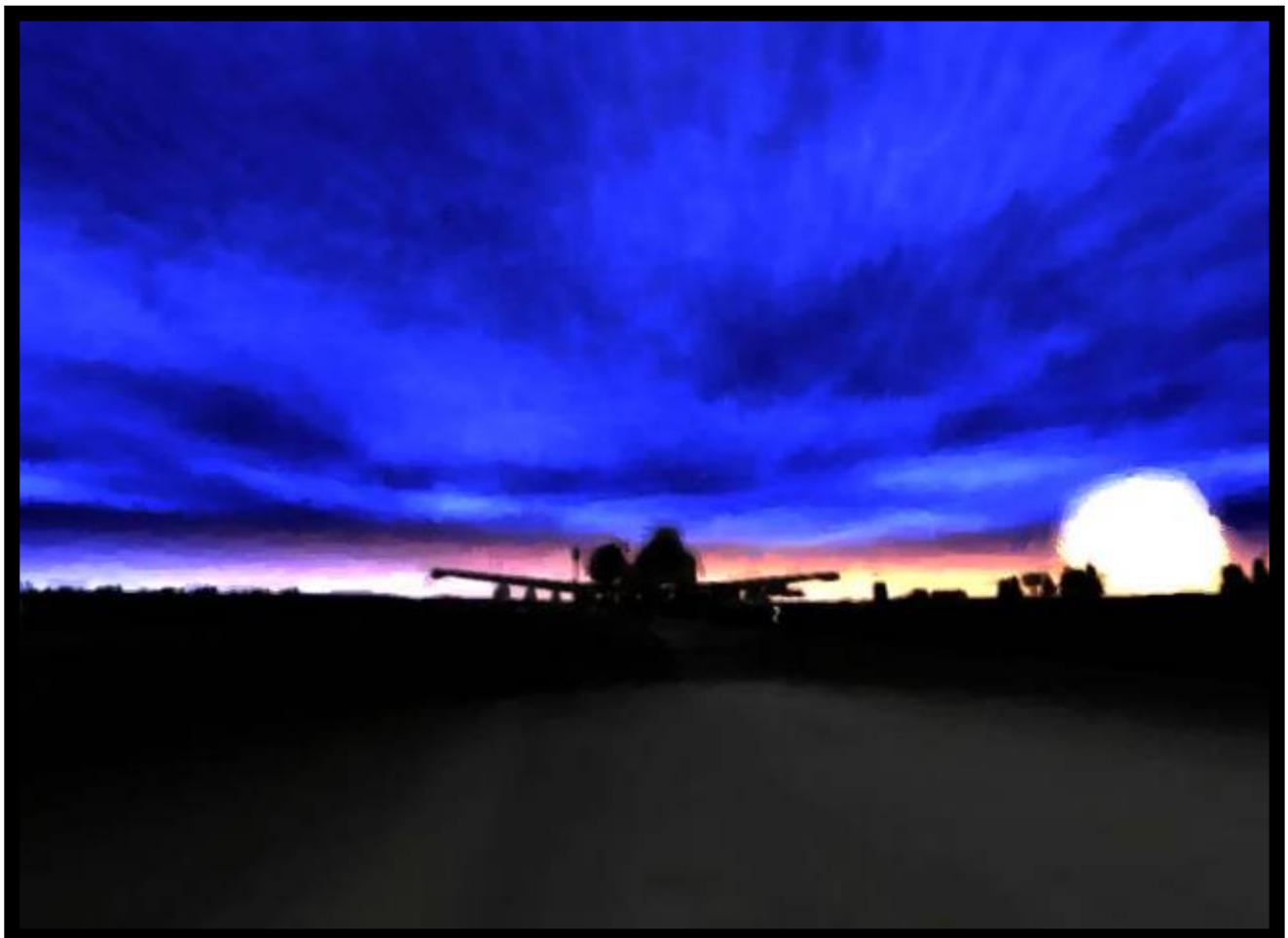
- Find folks to fly with online, or recruit for your Squadron

Those are ACTIVE LINKS....!

Click on them now and choose to open the Link in your Web Browser...!



FIRE EAGLE 5



A-10 WARTHOG



GORNY's ADVANCED TACTICS SCHOOL

SO - you wanna' be a fighter pilot...?

Stop flying Falcon4.0, and go join the military.

SO - you DON'T wanna' be a fighter pilot...?

Okay - listen up. I got some TACTICS to REIGN in the virtual skies.



Pt. I - AMBUSHED.

Wall of MiGs...! Archer inbound...! Flight of Flankers vectoring to your posit...!

What do you do....?!?!

Dive.

You just go FULL burner, and point your nose STRAIGHT at the ground.

And you just DIVE like a sunnavabitch. STRAIGHT DOWN.

At 1,000 mph straight down, the MiGs are soon gonna' lose you on radar.

The Flankers are NOT going to want to commit suicide.

By the time your wings get sheared off as you hit mach 5, the archer has been outstripped.

As a defensive bonus, the friction from the air will turn your jet into a molten ball of glowing metal, blinding anyone within a 10 mile radius.

Can you safely eject....? No.

At 25 G's, you won't be able to move your hands.

Also - you'll be blind, because you no longer have eyes.

Your eyeballs imploded about 5 G's ago.

(You'll probably have a nose-bleed, also. Keep a tissue handy.)

So - you may very well ask - what's the outcome of this...?

Simple.

You've evaded the MiGs; You've evaded the Flankers; You've evaded the Archer.

It's all good.



Pt. II - STEALTH APPROACH

Dead of night. Ext. lights are out. Instrument lighting is off. NVG is operational.

You're coming in low, using the terrain to mask your approach.

Target in sight. Suddenly - YOU'RE PAINTED....!!

KLAXON SOUNDS....! SAM inbound....!!!

What do you do....?

Two options here. Both involve diving.

The first option is probably the most straight-forward.

You just go FULL burner, and point your nose STRAIGHT at the ground.

And you just DIVE like a sunnavabitch. STRAIGHT DOWN.

You'll impact the ground within seconds, and the SAM will lose lock.

Well done. SAM evaded.

The 2nd option is a little more tricky, but - from a tactical point of view - far more effective.

You CLIMB as fast as your burners will allow. You just CLIMB like there's no tomorrow....!!

(Actually - as you'll soon discover - there will be no tomorrow)

Then - when the target is somewhere below you, push the jet over, and DIVE...!

You just go FULL burner, and point your nose STRAIGHT at the ground.

And you just DIVE like a sunnavabitch. STRAIGHT DOWN.

IF you have judged altitude correctly, you should impact the target at approx. Mach 6.

OUTCOME → You've evaded the SAM; you've taken out your primary target. ¹

It's all good.

¹ For an added touch of Irony, you may want to whip out a Marker-Pen and quickly write a witty little comment on your HUD. Something like "Special Delivery", or "This Buds for YOU". This is often stencilled onto ordnance, but – in this case – your ordnance will be disintegrating along with the rest of your jet. For a real witty dig, that's sure to have the North Koreans laughing into their kimchi, you may want to just draw a quick "Smiley Face" on your visor.



Pt III - ATC Woman

You're a dot. RTB. You're in the pattern.

Suddenly - that ATC chick starts bitching and yabbering about "going around" or summin'.

You've been flying the sim. for 10 years.

Frankly - you've fuckin' had ENOUGH of this bitch.

She's - like - all the worst parts of your wife made real...

What do you do...?

You just go FULL burner, and point your nose STRAIGHT at the Tower.

And you just DIVE like a sunnavabitch. STRAIGHT INTO THE TOWER.

OUTCOME → Bitch gets a steaming cup of STFU.

It's all good.

Pt IV - When NOT to Dive

Probably, the LEAST effective time to dive, is during RAMP Start.

IF you simply MUST dive at this time, try the following:

- i. Un-strap your harness
- ii. Pop the canopy (*or – if you're an attention-whore - jettison the canopy*)
- iii. Activate the Parking Brake
- iv. Stand on your AcesII Ejection Seat
- v. Dive from the 'Pit onto the RAMP (*it is important that you do this head-first*)
- vi. When you regain consciousness (*and assuming you haven't severed your spinal cord*), stand up and yell to the Ground Crew: "Did you see me...!? Did you..!?
Did you see what I did...?!"

OUTCOME → Everybody is really scared of you. They buy you beer.

It's all good.

Ara'



ORDNANCE

- *non ordinary*



- by JANHAS

Contributors Disclaimer:

None of the **CONTRIBUTORS** to this manual in ANY way endorse FreeFalcon, or any product, association, philosophy or action thereof.

The Contributors to this manual are in no way (necessarily) associated with FreeFalcon, it's members or any group thereof.

The Contributors to this manual have not (necessarily) ever downloaded, installed or used an FF product, or any derivative thereof.

The Contributors to this Manual had but one desire → to share their knowledge of Falcon4.0™, that it may help and assist the members of our community in getting the most out of this incredible simulator.

The FF Team is very grateful to all the contributors to this Manual.
As is – I believe - the entire Falcon community.

In Appreciation:

Akihiko Suzuki	Tom
Chewbakka	Dannycoh
DewDog	der Stef
Falstar	JanHas
Molnibalage	Toonces
The Norwegian	Qawa
Residual	RifleFighter
Snail	Wolfhound
Bat	Jaeger_301
Red1	Khronik



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- ✓ **DPRK TACAN**
- ✓ **FALCON TIME-LINE**
- ✓ **THE COBRA**
- ✓ **FM's**
- ✓ **VICTORY CONDITIONS**

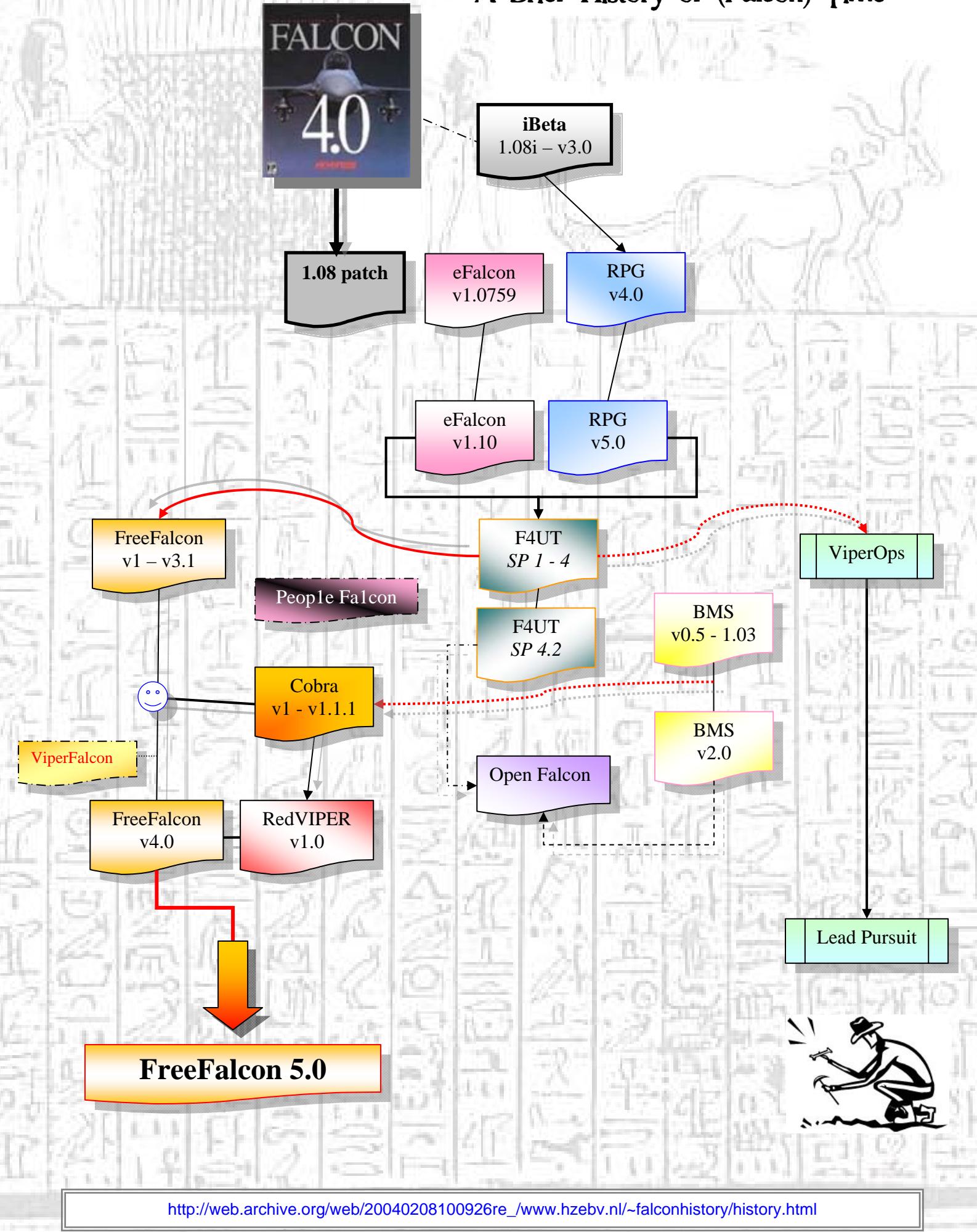


NORTH KOREAN TACAN CHANNELS.

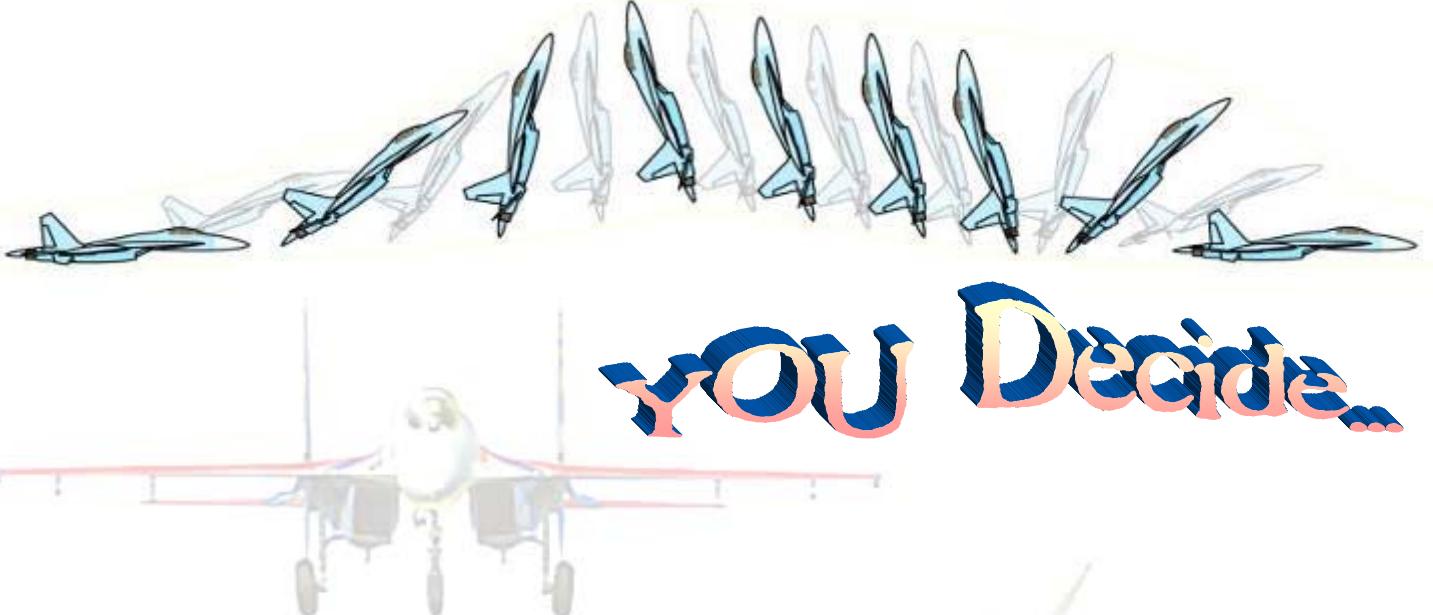
Airbase	Channel	Distance	Elev.	Caution Notes
Haeju	20x	50	40'	
Hwangju	21x	25	30'	
Hwangsuwon	22x	25	1540'	rwy 12/30
Hyon-ni	23x	50	1770'	rwy 02/20
Iwon	24x	50	40'	rwy 26
Koksan	26x	100	700'	rwy 23
Kuum-ni	27x	50	30'	rwy 05
Kwail	28x	100	40'	
Manpo	29x	100	930'	
Onchon	30x	50	40'	
Ongjin	58x	25	30'	
Orang	19x	50	30'	
Panghyon	31x	100	230'	
Samjiyon-up	50x	75	2950'	
Sandok	33x	25	40'	
Sunan	51x	100	70'	
Sunch'on	34x	50	110'	
Taetan	37x	25	10'	
Toksan	36x	100	220'	rwy 20
Wonson	54x	100	10'	



A Brief History of (Falcon) Time



http://web.archive.org/web/20040208100926re_/www.hzebv.nl/~falconhistory/history.html



"The 'cobra' maneuver... where the Flanker pitches [vertically] to over 100 degrees is not a stunt, it is a missile launch maneuver for a over-the-shoulder launch on a passing head-on target by an IMFIL missile, as briefed to me by the Director of TsAGI."

- *German Zagainov*

The maneuver consists of the pilot pulling the aircraft to a 90° – 120° angle of attack, then back down to zero. In a properly performed Pugachev's Cobra, the plane maintains a straight and level flight throughout the maneuver.

The vertical form of this maneuver is called a Cobra, named after the snake that behaves in a similar manner. Performing the maneuver on the horizontal plane results in the aircraft effectively stopping while the enemy overshoots, leaving the aircraft in a position for a straightforward missile attack on the enemy aircraft

- *Wikipedia*

First, the "cobra maneuver" and "super-cobra" can only be done without any armament and with less than 50% or half the fuel tanks.....

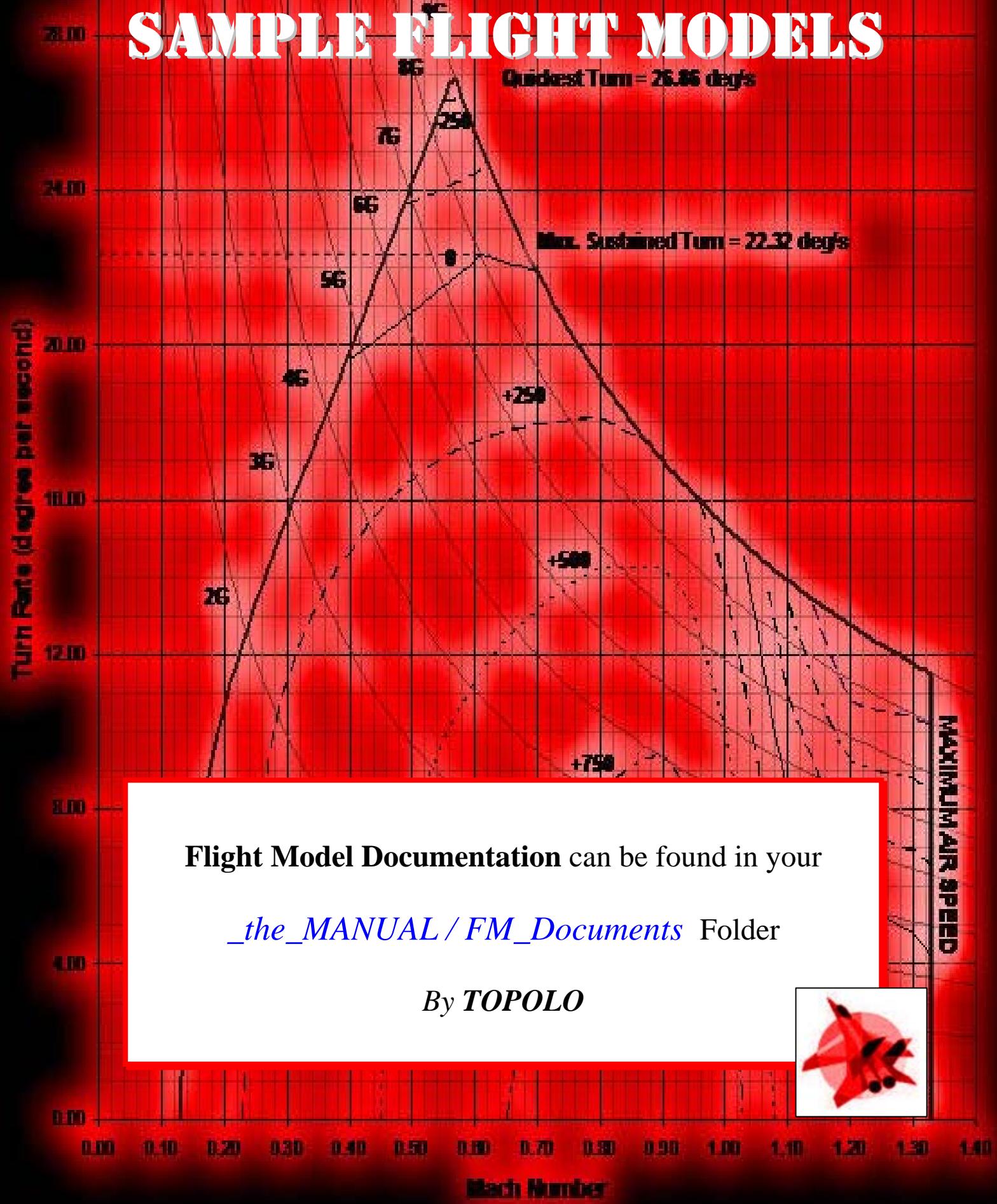
Second, the "cobra maneuver" and "super-cobra" performed in a wrong way can cause serious damages and in fact, has attributed to numerous deaths of pilots at 15g.

Thirdly, the "cobra maneuver" and "super cobra" is only effective if the interceptor is really close and does not pick it up

Fourth, the "cobra maneuver" and "super-cobra" slows the Sukhoi down so much that if the interceptor spots the maneuver early enough and adjusts there is absolutely no way that the Sukhoi can survive.

- *Seekerof; a member of AboveTopSecret.com*

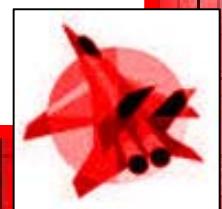
FREEFALCON SAMPLE FLIGHT MODELS



Flight Model Documentation can be found in your

[_the_MANUAL / FM_Documents](#) Folder

By *TOPOLO*



KOREAN THEATER VICTORY CONDITIONS



KOREA THEATER

Blue Forces winning conditions:

Capture P'Yongyang city, South P'Yongyang city and Wonsan city objectives.

Red Forces winning conditions:

Capture Seoul city objective.

Campaign will end on Day 14.



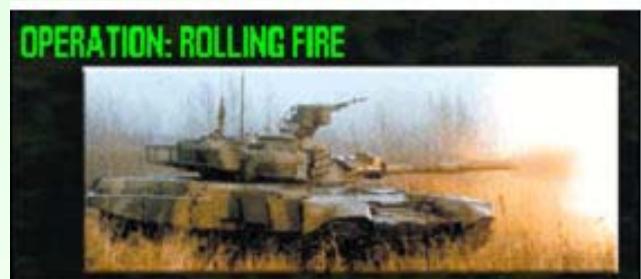
Blue Forces winning conditions:

Capture P'Yongyang city, South P'Yongyang city and Wonsan city objectives.

Red Forces winning conditions:

Capture Seoul and Pusan city objectives.

Campaign will end on Day 30.



Blue Forces winning conditions:

Capture Seoul and hold Pusan city objectives, or survive the 7th day.

Red Forces winning conditions:

Capture Seoul and Pusan city objectives



KOREA 2012 THEATER

Blue Forces winning conditions:

Capture P'Yongyang city, South P'Yongyang city and Wonsan city objectives

Red Forces winning conditions:

Capture West Seoul, Seoul Airbase, Kangnung city, Kangnung Airbase objectives.

Campaign will end on Day 30.



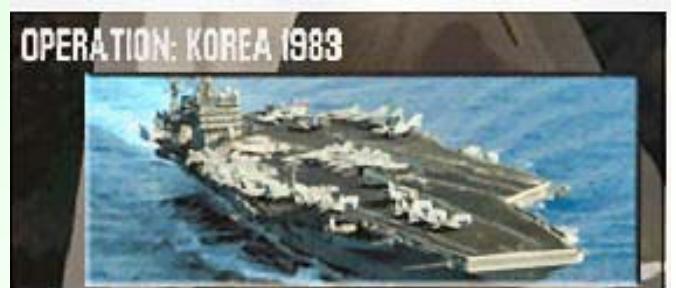
Blue Forces winning conditions:

Capture P'Yongyang city, South P'Yongyang city and Wonsan city objectives.

Red Forces winning conditions:

Capture Seoul and Pusan city objectives.

Campaign will end on Day 30.



Blue Forces winning conditions:

Capture P'Yongyang city, South P'Yongyang city and Wonsan city objectives.

Red Forces winning conditions:

Capture Seoul and Pusan city objectives.

Campaign will end on Day 30.





Answer to Pop Quiz:

* One would edit the “Contrails”.

* The value would be set to “0”

C R E D I T S

FREEFALCON:

*Aragorn
BaldEagle
ccc
Ddocg
Demer928
derStef
DewDog
Hustler → Coordinator
Lee
Molnibalage
NightFalcon
Pumpyhead
Radicaldude1234
Ranger822
Red1
Ripsaw
RP
Speaker
T-Rex
Topolo
Viking [128th vfs]
WaveyDave
Welsh "Xmas tree" Madman*

INSTALLER:

Khronik

BETA SQUADRON:

*DewDog → Squadron C/O
Jaeger_301
Amraam
-[ASG]-
Bluejay
cptmtge
Icebrain
Intruder
Joe "Falstar" Pilot
Jojo
Residual Effects
Snail [aka Mental]
Ram22
The Norwegian
Tom
Toonces*

ADDITIONAL :

Aeyes De Best

Buzzz157

Eole2

JanHas

OFP Dudes

Peled

Sakis "Monster" Giokas

STAGGOLEE

Steelbird



FRIENDS:

Aragorn
T-Rex

STANDING UPON THE SHOULDERS OF:

BenBen

Fibonaccov

Jetfighter

JimG

Nodo

Pegasus

Quake

Recker

Saint

Shatterer Of Worlds

Tomas "Ataribaby" Hamarcak

BMS
COBRA
eTeam
F4UT
iBeta
MicroProse
RP Group

THANKS:

[R] ed

The REDViper Team

BUGZILLA:

Wazoo

COMRADESHIP:

Hannes 'noname' Wagner

Kasper

Kim 'Winder185' Gowney

Maddog

SAAFOPS

PAPER A/C:

A. Suzuki's Paper AC Laboratory

<http://www.infosnow.ne.jp/~suzuki-a/>

SPELING ERORS:

Pumpyhead

DX 9 WORK:

JD

THEFT + DISHONESTY:

jeon

vIEWING and PRINTING this Manual:

This Manual has been optimised for PC Viewing.

It is best viewed at a screen resolution of 1024 x 768, with 32 bit colour.

The colours in this E-Book have been optimized for a CRT Monitor.

For viewing “backgrounds”, some tweaking may be required on LCD monitors.

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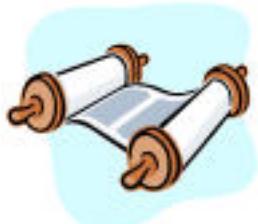
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No one's death comes to pass without making some impression, and those close to the deceased inherit part of the liberated soul and become richer in their humanness

- Herman Broch



DAN "DANN" NIELS
DAN "DANN" NIELS
DONN "GOOSE" SARTAIN
DONN "GOOSE" SARTAIN
STEVEN SHEPHARD
STEVEN SHEPHARD
LOU "YODA" MAYERS
LOU "YODA" MAYERS

Remembered Fondly...