Software & Hardware Guide for FSX

Tips and tricks compiled by Kosta (11-2012)

SOFTWARE GUIDE

Version updated 25. August 2012
This guide was created to answer many questions that are repeating on the forums over and over again. I'm not attempting to write yet another tweaking manual (although I will be covering many tweaks), but rather cover all the questions that pop up on how I'm setting up my machine.

Many wonder why I have no problems with performance, so I wanted to share my settings and also explained a bit why I set it like I set it.

And before you ask: no, I am not getting 30fps always, I also fly heavies, and I have sometimes FPS below 30s and I then do have stutters occasionally.

IMPORTANT: If you feel like going through this guide and set up my tweaks, I strongly suggest you start doing that on the clean FSX, meaning clean fsx.cfg, no mods like ShaderMod 3, no other tweaks, especially not tweaked FSX.cfg through Venetubo tool (not saying Venetubo is bad, only that this is a different approach).

The numbers you are seeing in each of the tweaks are my own settings.

FPS measurement references in this guide are done with FRAPS, not with an internal Shift+Z counter.

Let me also point out that these tweaks are most probably going to work best on the Sandy Bridge system. I have no idea how well they will do on the lower systems, but you are welcome to try and report!

ABBREVIATIONS USED

FFTF - Fiber Frame Time Fraction
SGSS - Sparse Grid SuperSampling
AA - Antialiasing
AF - Anisotropic Filtering
IQ - Antialiasing and Anisotropic Filtering, IQ is basically everything that falls under this category, whatever is making the picture look better (smoother edges, jaggies and shimmering elimination etc.)
HT - Hyper Threading
TBM - Texture Bandwidth Multiplier
TML - Texture Max Load
BP - Bufferpools
SB - Sandy Bridge
AM - Affinity Mask

Let's get going:

Tweaks/Mods

[BUFFERPOOLS]
Poolsize=0 / Usepools=0 (all the same) - referenced as BP=0

This tweak bypasses the internal FSX bufferpool, and sends the data directly from the CPU to the GPU.
Benefit: higher frames, Downside: possible artifacts. **A very good balance with locked FPS is required!**

Water Effects must be High 2.x or higher, otherwise you will get flashes.
Often seen in combination with other tweaks, especially with RejectThreshold:
In the Bufferpools section, if BP=0 is used, nothing else is required or should be in there.

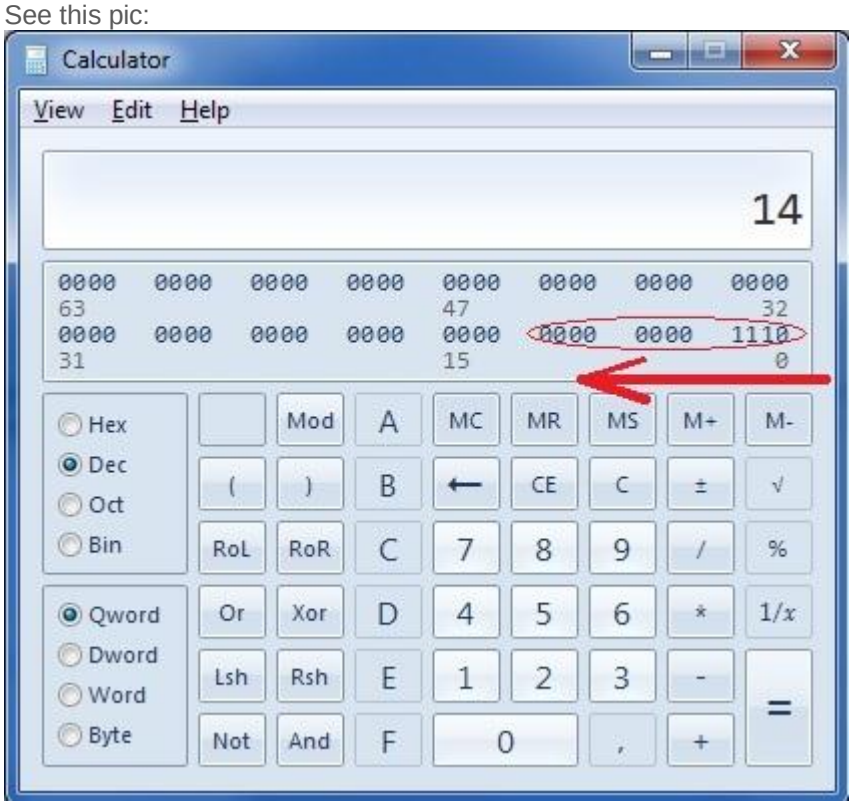
If you get flashing and artifacts with BP=0 tweak, it would be a good idea to check what the GPU is doing - running a GPU at 100% is a source of artifacts, flashes, driver crashes and BSODs. As the CPU sends the data directly to the GPU, and GPU is not able to handle the incoming data, you will get flashing and artifacts, as already mentioned. The only way is to lower the settings, cloud resolutions, or anything basically that is going to give the GPU more headroom, including buying a faster GPU.

[JOBSCHEDULER]
AffinityMask=14

This tweak, on a quad core, moves the FSX onto the Core1 (2nd core), to basically split fibers and main thread. It is good because Windows is usually having its processes on the Core0, so moving to Core1 is giving FSX more breathing space. It is also sacrificing one texture thread, since all that comes after Main Thread are Texture Threads. This means FSX is running with Core0 - Fibers, Core1 - Main Thread, Core2+3 - Texture Threads. That's OK like that.

For a quad core running HT off, this should be 14.
For a quad core running HT on, this should be 84.

How to calculate AM:
A modern day SB CPU has Cores. Depending if you HT is on or off, you are going to have 4 or 8 cores or even 6 or 12 cores on the 6core CPU.
Now, a quadcore has: Core0 (being the first core), Core1, Core2 and Core3. Cores always begin with 0.
AM is being calculated easily in the windows calculator. Open and then choose programmer view.
The binary code is shown below, and it corresponds to cores on the CPU. **But you have to calculate backwards**.
This means, lower row, far to the right, the numbers represent cores.
See this pic:



An example:
For a quad core running HT off, this should be 14. Type in 14 into the calc.
Observe the numbers in the binary change. Now remember: they are backwards.
So it displays: …. 0000 1110, meaning cores 1,2,3 are used.
Same for 84 (if HT on):
…. 0000 0101 0100 meaning Core 1,2,3, and no HT cores are used, also Core0 is not used.

If you wish, you can test whatever you like here, just change the 0 to 1 or vice versa with the mouse to assign active core to FSX.

[GRAPHICS]
HIGHMEMFIX=1

A must have tweak. Don't ask much :) (Thank you Jesus!)

[DISPLAY]
TEXTURE_BANDWIDTH_MULT=40

I haven't seen any benefit of going any higher. There are some posts saying you should set it to 80, 90, 100… I keep it at 40, which is also a default.

Another possibility here is to calculate this number according to some posts.
These formulas have been assembled by FSX users and in no way confirmed by Microsoft, so use at your own risk. As it is with all tweaks, it's worth a try.
FSX Tweaks Demystified

Basically:

----- MAX_TEXTURE_DATA -----
(GPU Memory Bandwidth * 24) / Target Frame Rate = Maximum Bytes per Frame
24 is used for GDDR5.

----- TEXTURE_BANDWIDTH_MULT -----
(Maximum Bytes per Frame / Global Texture Resolution) * 100 = Texture Bandwidth Multiplier

The important thing here is to think about the Global Texture Resolution: do you have 1024, 2048 or 4096 in your CFG, so what are you going to put as a divider? Taking 4096 is going to give below 40 result. Also do you set 4096 when you have no 4096 clouds installed, or not... NGX has 4096 textures etc. I went with 40, and personally saw no real benefit from calculating this. As always, YMMV.

[GRAPHICS]
TEXTURE_MAX_LOAD=4096

This is a tweak telling FSX what is the max resolution texture it *can* load. Remember: *can*. If you are running absolutely no 4096 textures, there is no reason to have it set to 4096, *but also no harm done*.
It is no performance killer if you are not using 4096 textures. Examples are LevelD McPhat HD textures, 4096 clouds…
Beware that using 4096 clouds with high levels of Anti Aliasing like SGSS is going to kill the GPUs, especially 560Ti. Even my overclocked GTX 580 is being extremely hammered by such high resolutions and IQ. I am currently using 2048 clouds, as they offer a good inbetween. Depending on the GPU, you might be better off by 1024 or 2048. If DXT5 or not, I don't know. Saw really no performance difference and no difference in VRAM usage. I opted out for no DXT5 and got into no troubles.
This value is likely to get reset if you enter and confirm FSX settings in-game.

[DISPLAY]
UPPER_FRAMERATE_LIMIT=30

Many are using external limiters, many are using internal.
I found out (and got it recently confirmed) that external limiters cause blurries and more stutters.
The fact is that internal limiter is as smooth as FSX can get, if FSX achieves the limited FPS without a problem.
If you combine this with the BP=0 tweak, you are going to get even better smoothness.

30 is not a magic bullet for everyone, although it's probably the most used setting. Doesn't mean it's going to work for everyone though. If you have older hardware, you might be forced to go lower, 20-25 even. It's all about what your machine can handle, considering both hardware and settings. The best though would be to aim for 30fps, due to the new VSYNC tweak.

Setting higher FPS is a bad idea and should not be done, much same like running unlimited.

VSYNC TWEAK - FULL SCREEN

A thing worth mentioning here is a new discovery on the Hardware Video Forums about new Nvidia VSync. This tweak brings unparalleled smoothness with the locked frame rate at 30fps.

In short:
1) identify your monitor refresh, and if it's 60hz...
2) set locked 30fps in FSX FPS and see that you get it!
3) set Nvidia Inspector like mine when it comes to VSync - ½ refresh rate

This tweak only works in full screen. It does not work in windowed.

ForceFullScreenVSync=1 in FSX.cfg is not used in my configuration.

Source for more details:
Link

VSYNC TWEAK - WINDOWED MODE

If you are a windowed mode user (multiple screens for example), then you will be please to know there is a "fix" for Vsync in the windowed mode.
Previously, when Vsync in windowed mode was activated in FSX.cfg per **ForceWindowedVSync=1** line, the FPS would always run at refresh rate dividers... 60, 30, 15... meaning, it was never able to run 25fps, or 23... from 30, if system could not maintain, FPS would drop to 15. And that led to quite a lot of stuttering. There is a fix now: after FSX has been started, an Aero restart is required, which in return fixes the normal Vsync operation in windowed mode.

To enable Vsync in windowed mode add following to your FSX.cfg:
[GRAPHICS]
ForceWindowedVsync=1

To restart Aero, there are more possibilities, choose yours:

1) manually - quit dwm.exe (task manager, Desktop Windows Manager), it will restart itself, and Aero will be enabled

2) create a batch file containing:

@echo off
start "" "E:\FSX\FSX.exe" *(insert the link to your FSX.exe)*
net stop uxsms
net start uxsms

and run it. FSX is going to start, Aero is going to get started after FSX, and voila...

3) elegant solution, through FSUIPC (only works with registered version):

a) create a batch file containing:

net stop uxsms
net start uxsms

set the FSUIPC to run the batch file automatically, edit the FSUIPC.ini and enter:

[Programs]
Run1=HIDE,"E:\FSX\FSX.bat" *(insert the link to your FSX.exe)*

This solution is going to do everything silently. No CMD popup windows, only visible Aero activation.

Reference post:
Link

TWEAK FOR SHARPER DISTANT TEXTURES

[TERRAIN]
LOD_RADIUS=6.500000

This tweak basically extends the sharp texture radius around the aircraft. It takes a toll on performance and memory load.

This setting should NOT be set over 6.5. This is a known source of OOM errors, and even 6.5 can cause it, if you are not careful. Max FSX default is 4.5. And it is going to reset to 4.5 each time you enter AND confirm the settings screen in FSX.

And important tweak that goes along with higher LOD is the ZOOM. More you zoom out, sharper the textures are going to get! I am using default of 0.6 zoom in **all** my views.

[DISPLAY]
WideViewAspect=True

This should be used if you have a widescreen monitor, which I think everyone has nowadays.

[Main]
FIBER_FRAME_TIME_FRACTION=0.1

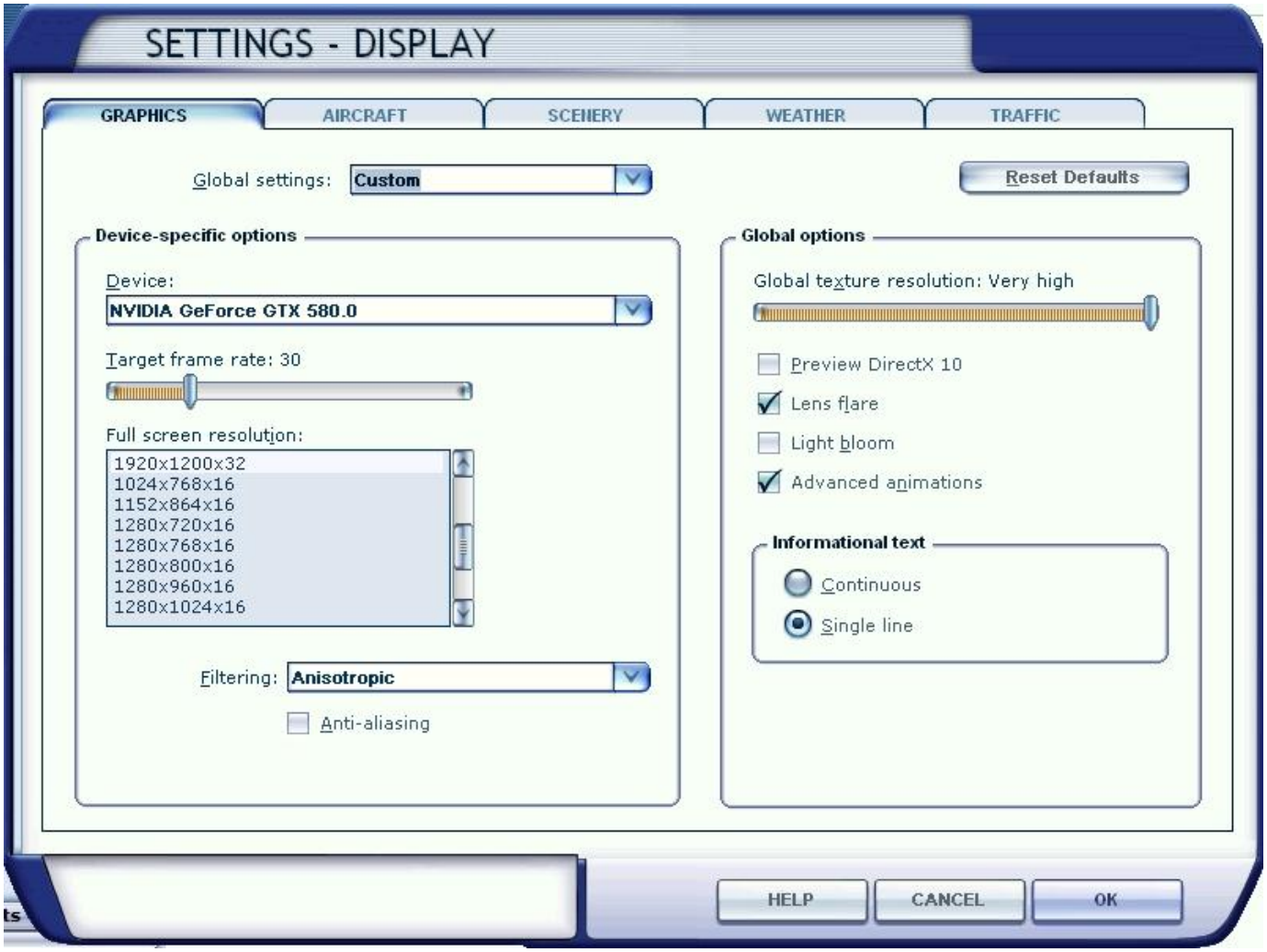
FFTF determines the fraction of the CPU time given to the scenery loader in relation to the time spent rendering. Basically it's a relation between the scenery loader and faster FPS. Run it lower, you get more FPS. Run it 0, you give CPU no time to load scenery, if your FPS is below locked. The faster the CPU, the lower this number can be, because less fraction of the CPU clock is required to successfully load the scenery.
This tweak is also dependable, much like the BP=0 on the balance of the system. Meaning overloading the system and hoping that FFTF=0.1 or lower is going help you bring the FPS up is a misconception. It's very hard to explain what an overload means, but if you look at my cloudtest, that is a clear example of an overload (even my Windows seem laggier if I run that in windowed), even though the FPS I get are around 26fps.

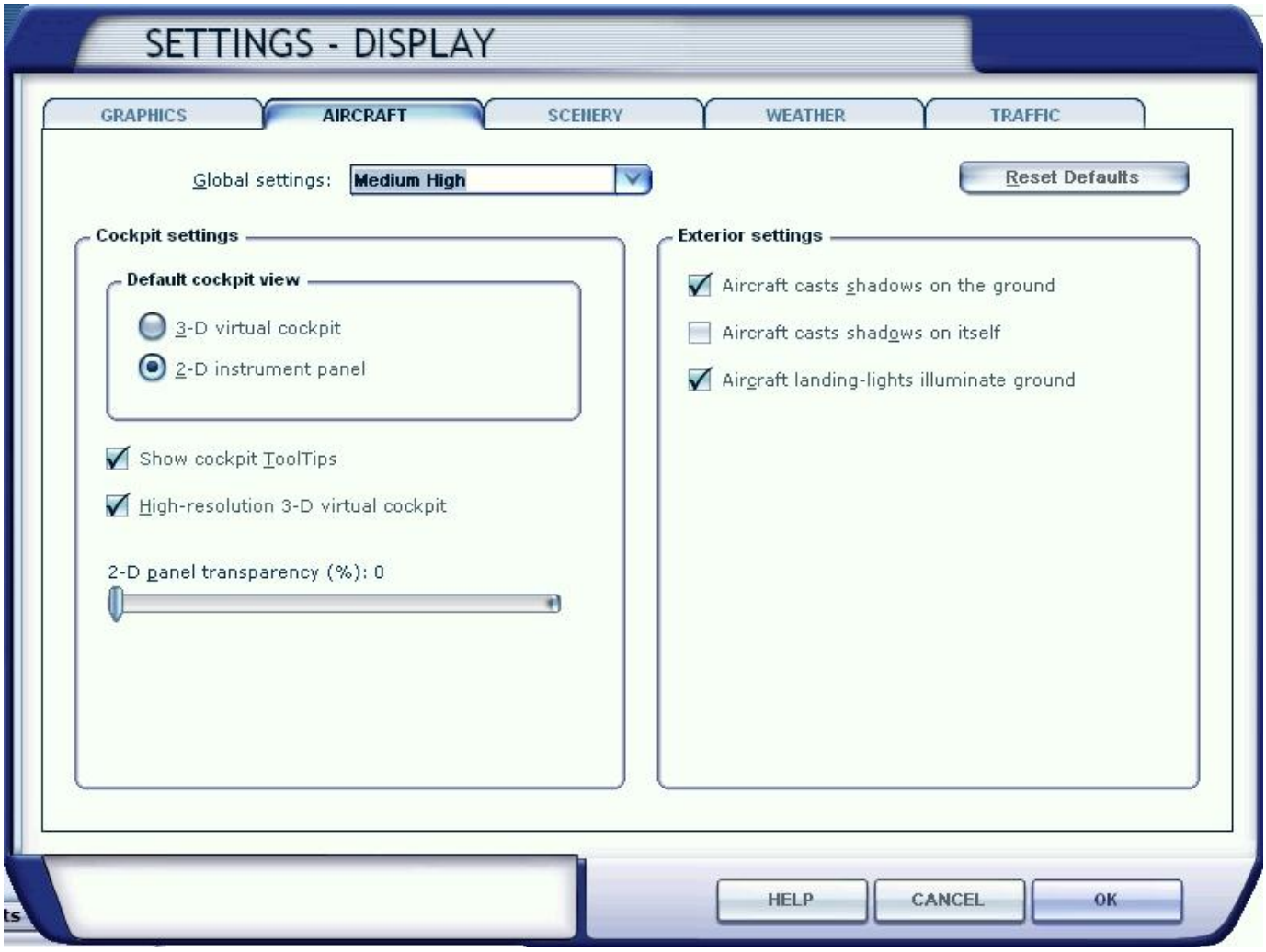
So in short:
Default is 0.33. The lower the number, the better the FPS, but also more danger of blurry textures and autogen loss.
DO NOT set it to 0.
You can experiment with this tweak; mostly used settings are 0.1-0.25.
ORBX lands are usually going to need 0.2 or higher, anything less and texture loading will greatly suffer. Outside ORBX you are probably be able to run as low as 0.1. Experimenting is the key here.

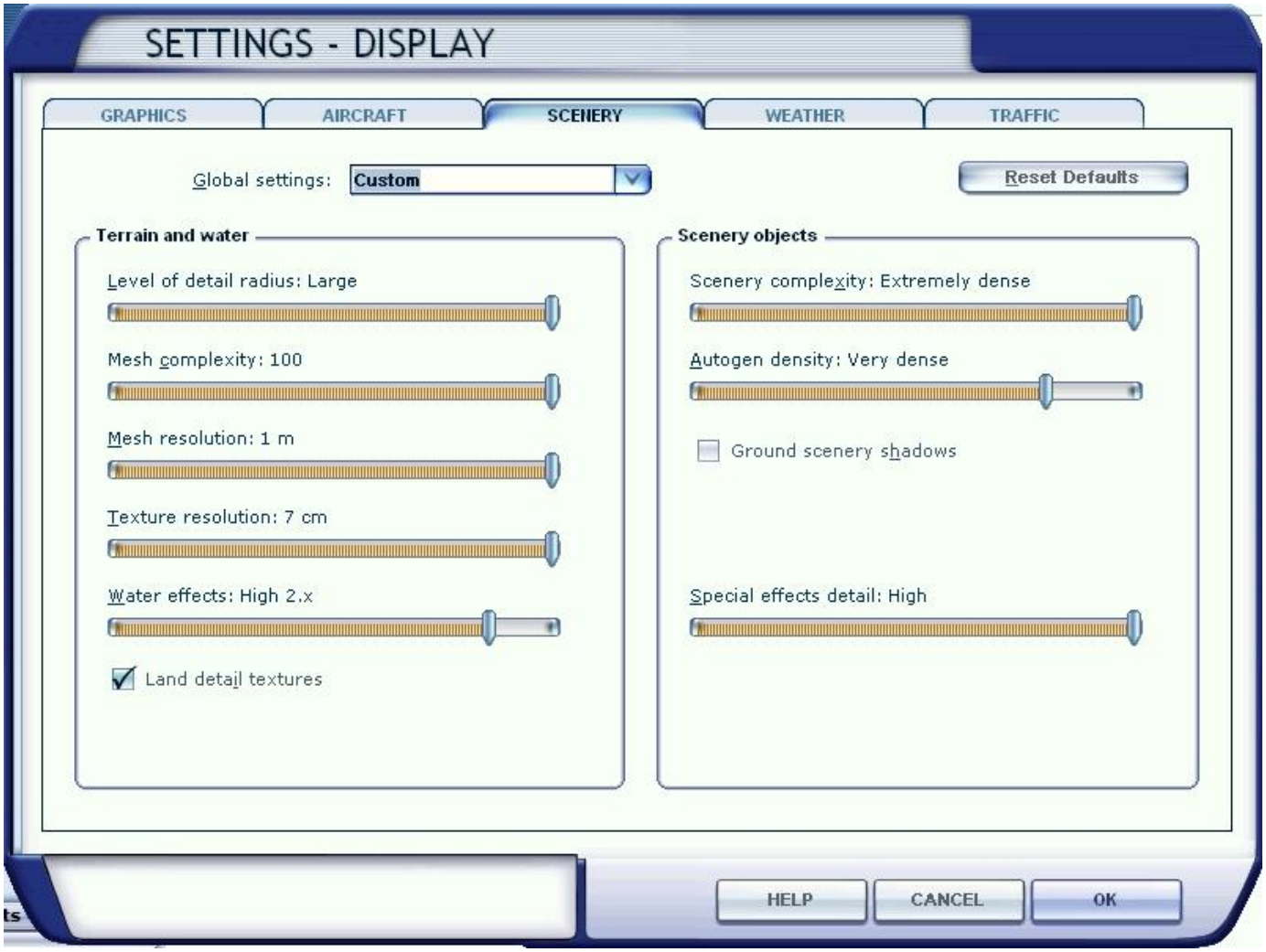
VIDEO DRIVER LINE IN FSX.CFG
[DISPLAY.Device.NVIDIA GeForce GTX 580.0]
Mode=1920x1200x**32**
Anisotropic=1

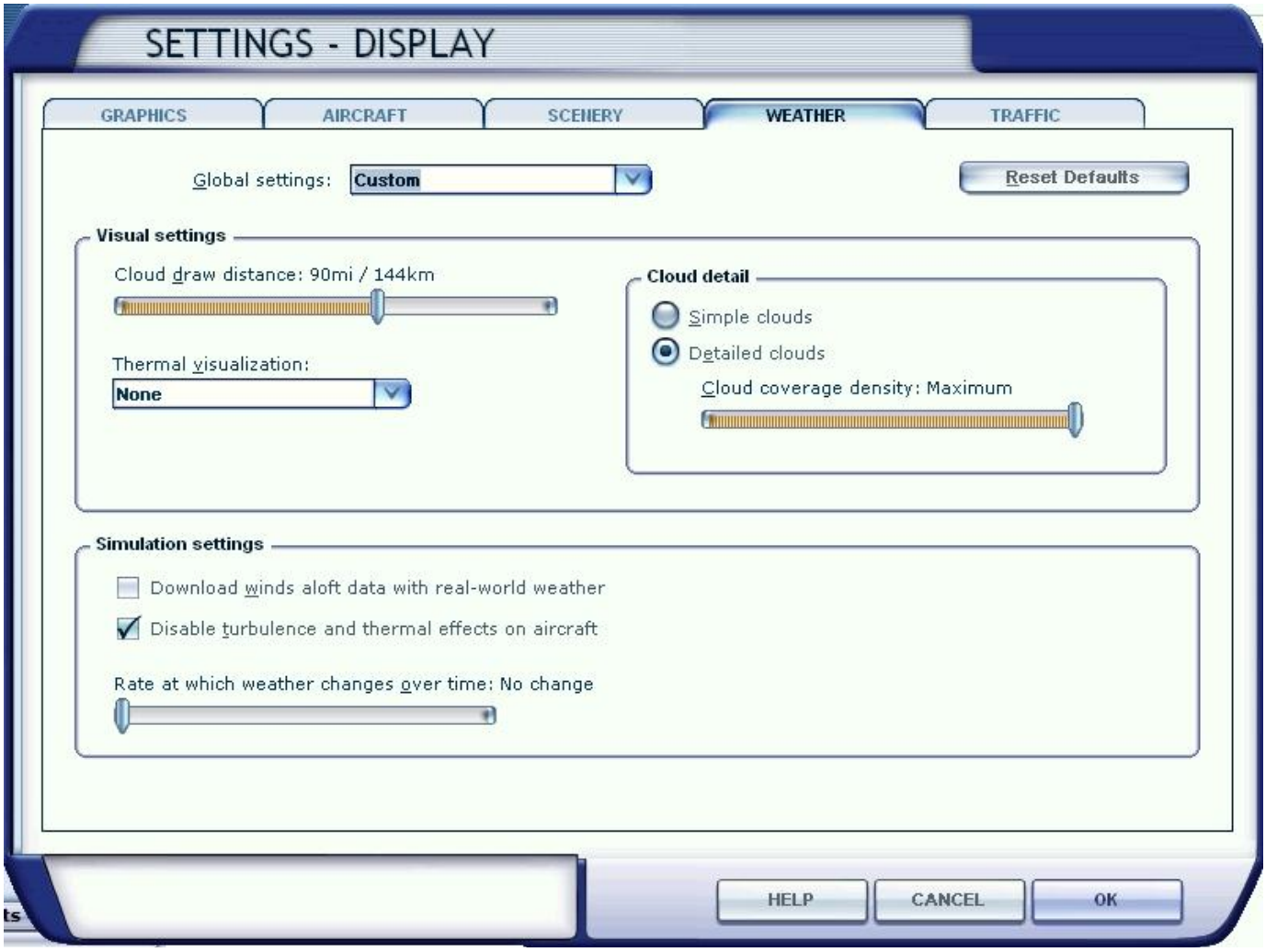
The line DISPLAY should appear ONLY ONCE per Display in your FSX.cfg (if you have one display, once, if you have two, twice etc).
If you have more lines (and only one monitor), delete fsx.cfg and let FSX recreate a new one.
The Mode= end number should be 32 (NOT 16).
Anisotropic Filtering should be on in FSX.

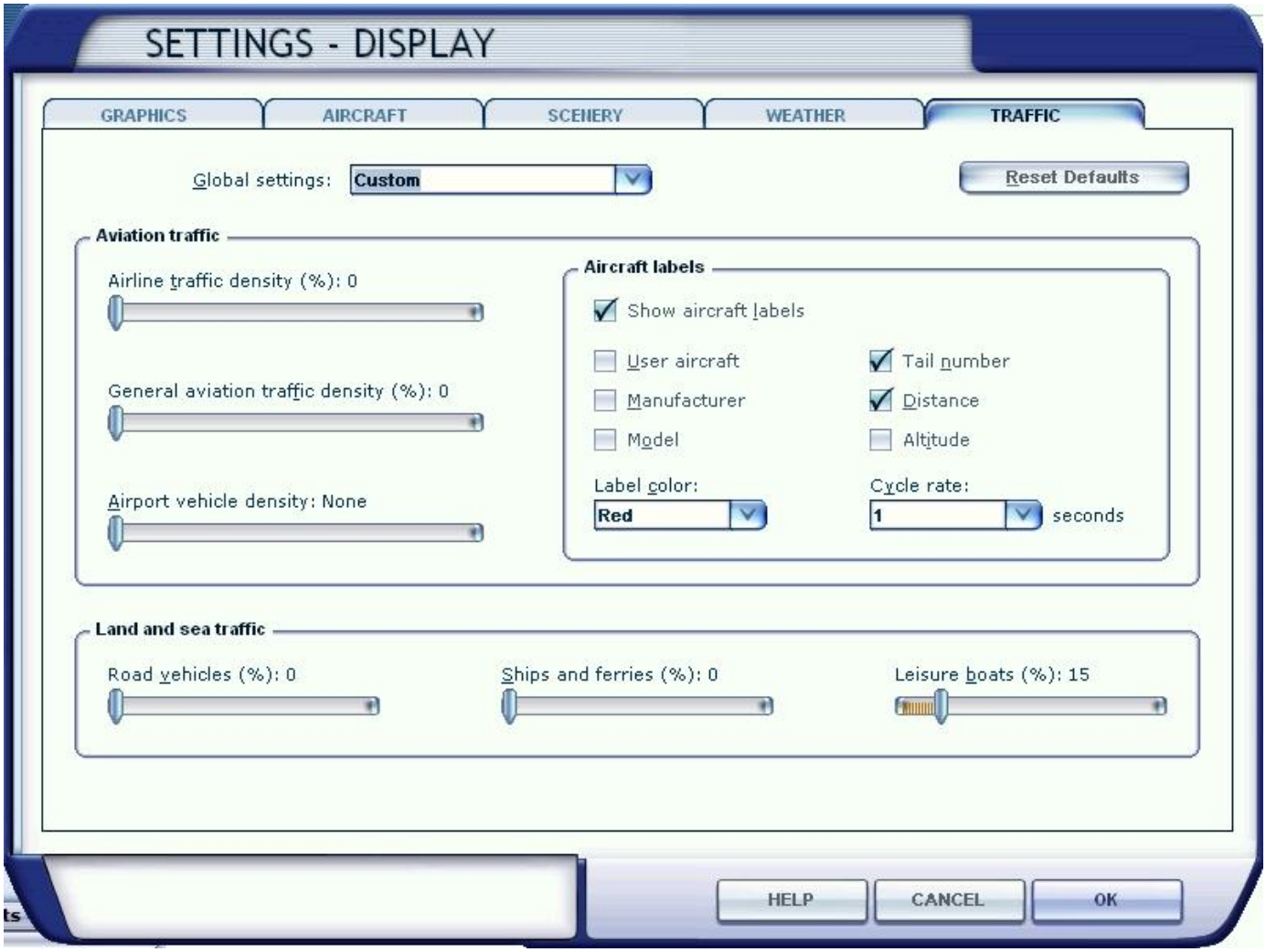
Now, what does this combo of tweaks do FOR ME?
First of all, I tested which settings in FSX do the most damage to the FPS, and I removed those.
Rest I put almost to the max. I'll just post my settings here, and let you do the math.




SETTINGS - DISPLAY
GRAPHICS
AIRCRAFT
SCENERY
WEATHER
TRAFFIC
Global settings:
Medium High
Reset Defaults
Cockpit settings
Default cockpit view
3-D virtual cockpit
2-D instrument panel
Show cockpit ToolTips
High-resolution 3-D virtual cockpit
2-D panel transparency (%): 0
Exterior settings
Aircraft casts shadows on the ground
Aircraft casts shadows on itself
Aircraft landing-lights illuminate ground
HELP
CANCEL
OK


SETTINGS - DISPLAY
GRAPHICS
AIRCRAFT
SCENERY
WEATHER
TRAFFIC
Global settings:
Custom
Reset Defaults
Terrain and water
Level of detail radius: Large
Mesh complexity: 100
Mesh resolution: 1 m
Texture resolution: 7 cm
Water effects: High 2.x
Land detail textures
Scenery objects
Scenery complexity: Extremely dense
Autogen density: Very dense
Ground scenery shadows
Special effects detail: High
HELP
CANCEL
OK


SETTINGS - DISPLAY
GRAPHICS
AIRCRAFT
SCENERY
WEATHER
TRAFFIC
Global settings:
Custom
Reset Defaults
Visual settings
Cloud draw distance: 90mi / 144km
Thermal visualization:
None
Cloud detail
Simple clouds
Detailed clouds
Cloud coverage density: Maximum
Simulation settings
Download winds aloft data with real-world weather
Disable turbulence and thermal effects on aircraft
Rate at which weather changes over time: No change
HELP
CANCEL
OK



I am not using any AI since I exclusively fly on VATSIM.

I combined BP=0 tweak with the FFTF successfully, giving me the best ratio in performance vs. quality (means no blurries) and least stutters.

BALANCE TWEAKING!!!

So, after going through my tweaks, I would like to come back to something I have to explain again and again: People are reporting very often that some tweaks are not working, especially that BP=0 is stuttering, that you get artifacting. While systems might differ, and they most certainly often will do, I had one sole experience on most of my systems.
If I manage to balance my system well, I will get no problems from any of the above tweaks.
What does this mean:
It means that before you even put the single tweak into the FSX, you make sure it runs well in the basic setup. Important to understand is that first comes the good balanced setup and then comes the tweaking. I'm not saying you must get 30fps in the NGX VC in the KJFK, but you should see that your settings reflect your system, turning off those FPS killers like bloom, cars, extreme autogen etc. As you noticed, I run all scenery details on max, except autogen and clouds. I did simple tests to see what diminishes performance in FSX at most, and I removed that. As I posted on one thread, if you put enough FPS killers together, it's gonna kill your FSX, but it also applies the other way. Also do think about those beautifully looking 4096 clouds.
Using 2048 or 1024 are not as bad, and won't hammer the system as hard. This is GPU dependant.

SKIDMARK TWEAK

There is one uncharted tweak in the FSX community. An skidmark tweak.
If you do a simple test, you can easily confirm it:
Set FPS unlimited for this test. Go to a default good performing airport.
Take a default aircraft, slew in for landing and land. Change to external and look behind aircraft. Note the FPS.
Now rename/delete fx_skidmark.fx in Effects folder. There is no visual difference for me, maybe someone can show me visual difference here, but more important for me:
Repeat the above test and note the FPS when looking behind aircraft. My FPS was way higher.
I tested this on completely default untweaked FSX and had it confirmed.
There is something with this file that makes the FPS drop a lot after you land and you turn to spot view. It was even more obvious when landing in the heavy airport, where FPS really mattered.

HOW TO LOAD TML 4096 and LOD 6.5 WHILE IN-GAME

One thing that I use quite often is a configuration save/load feature in Graphical Settings.
Say you change something in the settings, if you have custom LOD and TML, you are probably gonna see a reload with LOD 4.5 and TML 1024.
As this can be impractical in flight, there is a way to reset those settings:
Save settings to a file. Open the file in notepad to edit it, set your LOD and TML data back to your settings, save the file and then load it in FSX. FSX is going to load these settings, along with your newly set settings.
This can be done with one file only one time. You can't save/load one file two times in a row. That is why I have two such config files, you can alternate them while FSX is being open.

G3D.DLL CRASHES AND FIX

Pete Dawson, a maker of FSUIPC utility for FSX, has implemented a g3d.dll crash fix into his product.
You should install (and actually buy) the latest module from his website.
More details here:
Link

MENU CRASHES AND FIX AKA UIAUTOMATIONCORE.DLL-FIX

There is a know bug in originally installed FSX, when you click into menus a lot, or click around the cockpit, or right click, that FSX is going to freeze and/or crash.
The problem is known to get fixed by saving a Vista UIAutomationcore.dll file into FSX folder. Just by placing it there, FSX seems to use that file and not crash FSX any more by those clicks.
Link to the file

FPS Limiter: Internal or External

Now, I read all those posts claiming how the external limiter is great, and way better than internal FSX limiter. I changed 3 computers since I had FSX; I tested external limiters on all 3 computers and found that all 3 behaved in the completely same manner – way worse than an internal limiter. Thus it's very hard to believe there are computers out there that behave differently. My only explanation is that the internal limiter wasn't set up correctly. I feel bashing coming now, but that's how it is.

To test the limiters, situations must be set up to reflect the test you are trying to make.
An example: how to test a stutter? Do you go flying around and judge by the feeling? Do you count how many times it stuttered? Did you turn slower or faster? Did you also pull on the stick?
There are too many factors here, and most users do that. I don't blame them.

One of the correct test situations, which I figured were the best for me for stutter testing are like this:
I have a saved flight with a 737 on the runway at KSEA, setup with parking brake on, and full throttle, paused.
I load the flight, press S to change to external view over left wing and then just press p. No winds are set.
As it's running down the runway I observe the buildings. I can clearly judge here if a driver is bad, if external limiter is causing more stutters (it is…) etc.

I have similar situations for blurries, clouds (some have already tested it).

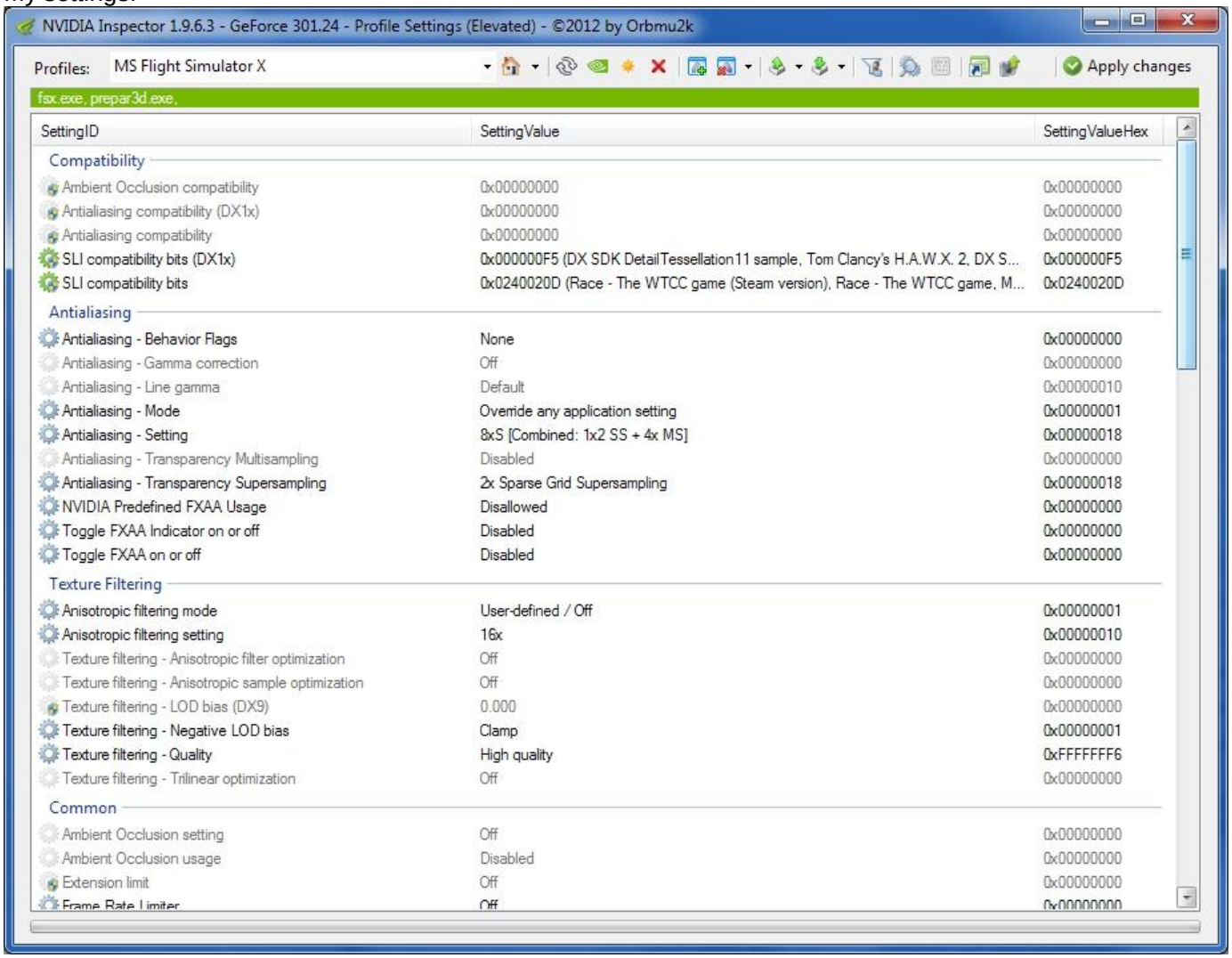
I have done this test numerous times and if anyone wants, give me a bump and I'll put the files onto the server.

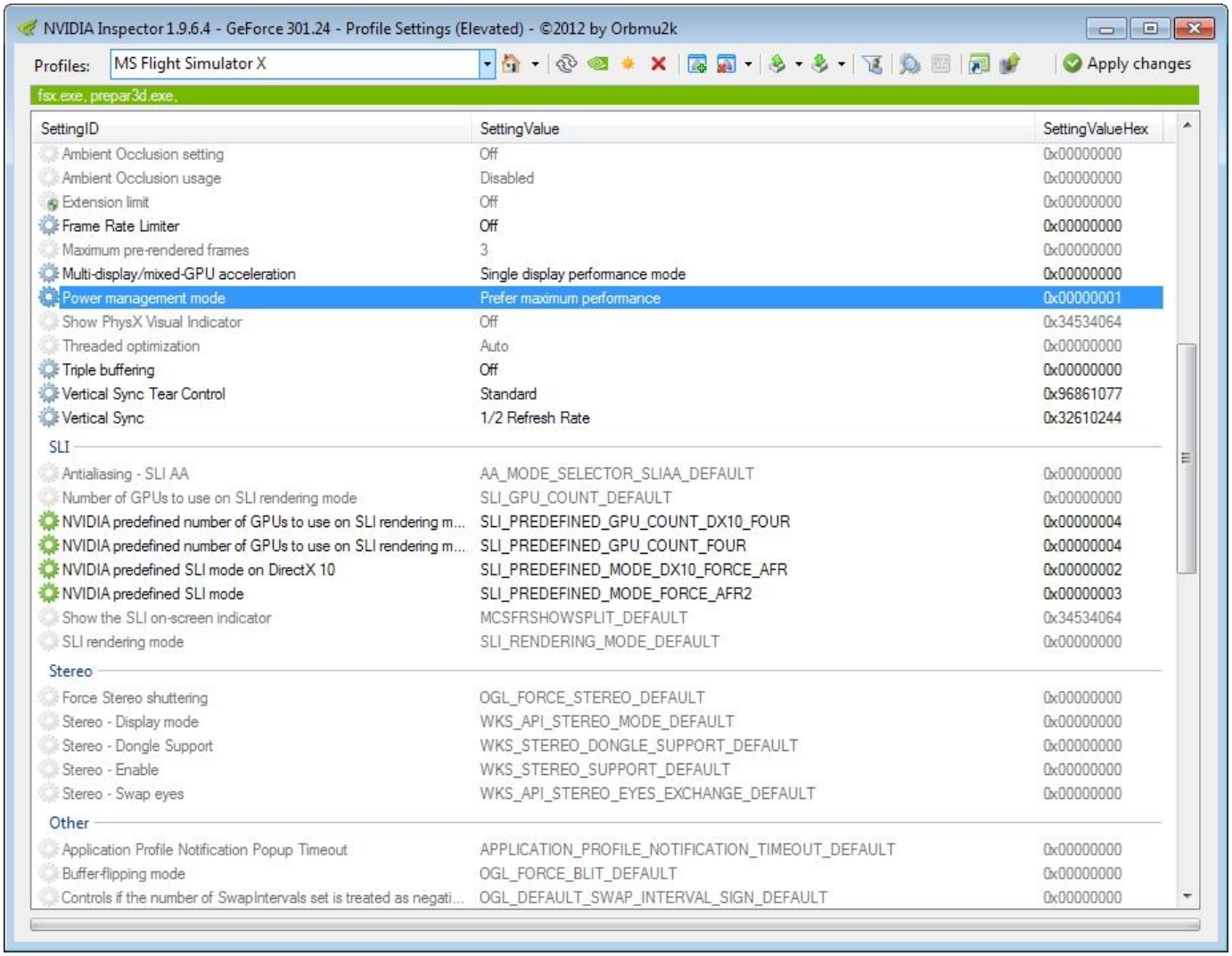
I have confirmed for myself that an internal limiter with a correct FFTF combo is doing way better job than an external limiter.
Also another user has the same thing, and I believe this is with everyone, just that it's so unnoticeable, that everyone is just living with it:
Link

Settings Nvidia Inspector:

Installation:
As I've seen this too many times on the forums as of late, users being clever only unzipping the nvidiainspector.exe from the zip and not the whole package, you will have missing descriptions. **Make sure you unzip the whole package into a separate folder.**

My settings:





Thanks to Ryan (Tabs) in PMDG forums, we have come pretty close to some conclusions, but there is in my opinion a missing link:
Sparse Grid Supersampling.

Now, if you google and read about it, you'll find out that it's very hard on the system but it provides unprecedented quality. One thing everyone is so annoyed by, shimmering, it solves most of shimmering in cockpits and trees/autogen:

2x SGSS not as hard on the system (shimmering reduced greatly)
4x SGSS very hard on the system, especially cloudy situations (absolutely no shimmering)

Now, when it comes to hardware, most middle-to-high end GPUs perform similarly when it comes to FSX. They do not perform similarly when it comes to IQ (antialiasing).

What settings in NI for AA are correct is also dependable on which Nvidia GPU you have.

Hardware-wise, there have been various discussions through the course of more months on which GPU is the right for the FSX.

There have been those who were yelling 560Ti, then some for GTX570 and then some for GTX580. I was one in the last group. Of course, there were some yelling ATI, but let's not mix here these two, as Nvidia is generally accepted as a FSX GPU.

Until recently, I didn't really know, or better yet, I was speculating. I was only going according to specs and

some of my tests compared to others, but nothing really comparable (there were no tests ran on couple of systems loading one and the same file).
The worst thing though, that our own setup, the FSXMark11, was not able to test this.
I'm talking about the IQ; the relevant settings in the NI.

Now, some maybe have read the latest posts in the forums where we discussed 560Ti, my cloud situation and the GTX580.

It has been proven, through one simple test, which has so many clouds, that GTX580 performs roughly 33% better than the 560Ti in the same cloudy situation when using 2x SGSS, a setting that many came to recognize as a good middle ground for non-shimmering versus performance.

Now, some might argue if this is worth the roughly double the price of the card. I say yes, because if you think about it for a second: NGX into big airport, cloudy situation: GTX580 30fps, 560Ti 20fps. Of course, these are estimates, but this is one scenario how it could play out: Smooth versus non-smooth.

Now the GTX680 is here, but we still have no idea what it's going to do for the FSX world.

HARDWARE GUIDE

There are many threads, and always new ones created, with a typical question, what should I buy for the FSX.
FSX is a resource hog. If Battlefield 3, Mass Effect 3, or any other current game is running great, this does not mean that FSX is going to. FSX is an old code, it needs raw CPU power and it needs quite a lot of GPU if you want no shimmering (high IQ)! People tend to forget how important GPU is when getting hardware for FSX.
There is this huge misconception that GPU is not important for FSX and I hope that my previous explanation under Nvidia Inspector managed to shed some light on it.

In this part, we'll be discussing those hot thread questions like "Build for FSX", "What is good GPU for FSX" and alike.

CPU

Budget oriented: 3570K, 2500K...
Quite OK overclocker, good all-rounder.

Performance: 3770K, 2700K...
2700K is a great overclocker, need to turn off HT though to overclock.
3770K has a temperature problems, thus able to overclock less than 2700K, but with improved performance per clock, it reaches same performance like 2700K with slightly lower overclock.

Ivy Bridge:
Currently, there is no reason to buy an Ivy Bridge processor if you already own the Sandy Bridge CPU for the FSX. Performance boost is negligible. They are running way hotter due to the thermal paste between the heat spreader and the CPU, thus letting you only achieve lower overclocks with same cooling solutions.

But if you are new system builder, then Ivy Bridge is the way to go. No reason for old tech.

The awaited PCIEx3 is also not a boost in FSX some were expecting it to be.

Check this to get an idea how the performance scales:
Link

Overclocking

This is very important part when it comes to FSX and should be considered when building a computer for FSX. Get a chip that can be overclocked well and get a decent cooling.
Some good sites for overclocking Sandy Bridge CPUs:
Link1
Link2

Most users are running their SB chips around 4.5-4.8. Take that as a pointer.

DISCLAIMER: You and solely you are responsible for your hardware when overclocking.

Temperatures

One of the most asked questions on the forums is “how hot is too hot”.
While everyone is going to have their opinion, there is probably one number that most agree about: Sandy Bridge should not go 24/7 over 80c (synthetic Prime95 test).
That said, max. operating temperature for the CPU is about 100c, so you should really get worried if you cross 90c, but the hotter it gets, the worse it is for the CPU.
If your synthetic benchmark is going up to 80c, you are most likely not to cross 70c in FSX usage. FSX is never going to load the CPU as high as synthetic benchmarks.
I personally believe that if you keep the CPU cool enough, and if you pump quite a lot voltage into it, you’ll be fine (*disclaimer here that this is only my personal opinion, nothing more).
The usual accepted numbers are up to 1.4 Vcore on the 2500k/2600k/2700k and up to some 80c. (*80c is measured with CoreTemp at high load with Prime95/Linx in a stress test over 1 hour).

Cooling

Be sure to get known and high performing products.
Good overclocking coolers are:
Corsair H100, Noctua NH-D14 (good for high overclocks on air)
Custom Watercooling (best cooling for home use, short of LN2 and alike solutions)
Scythe Katana 3 (cheaper than those above, for those not wanting to overclock as high as 5.0GHz)
(here open for more suggestions)

As described above, cooling is not something to look over with ease. Think about it as a way to the high performing computer for FSX.

DO NOT FORGET: a good CPU cooler also needs good supporting case fans. It’s no use if the CPU cooler is good, and it’s fans “cool” the CPU with the hot air stagnating inside the case. See the part about the case cooling.

MOTHERBOARD

Not a hard choice, currently Z77 series, something like:
ASUS P8Z77-V
Asrock Z77 Extreme4
MSI Z77A-G45
...

Whatever takes your fancy. All these boards are good, all are going to fullfill the mission. ASUS is to be said to be a great overclocker, take a look at what the board offers in terms of slots and connectors, and see if it's enough for you. ASUS Deluxe even offers a front bay...

RAM

Budget oriented:
8GB recommended
1600 MHz / CL7

Performance:
8GB recommended
2400 MHz / lowest CL possible / higher RAM clocks

It's actually very little difference between these when it comes to performance in FSX.
There have been many tests on this topic, and results have shown that RAM has very little impact on FSX. Some say it's about microstuttering, yet I couldn't find any proof that the RAM I tested (second) was any faster or caused any less stuttering than the current one I have.
The fact is, if you keep above 1600 MHz and accordingly with the latency, you shouldn't have any problems.

Make sure though that you get two sticks and not four. More sticks you have, more does the memory controller on the CPU have to work, making more heat, and making your overclocks harder. It has been proven through some tests that the systems were much more stable by usage of 2 sticks when overclocking.

Besides, FSX doesn't use more than 4GB in any case, and 4GB including all the FSX apps is more than enough for Windows. 16GB is only going to be needed for things like video cutting, professional photography...

GPU

This is a huge topic. It has been partly covered in the part with Nvidia Inspector, so I won't go into much depth here.
Recommended GPU for FSX is currently Nvidia.
Mostly used GPUs are GTX560Ti, GTX570 and GTX580.

Budget oriented: GTX5 560Ti
Performance: GTX 580 / GTX 680

GTX570 is kind of a middle runner; there are not many tests on this one.

There is very little difference when it comes to performance of these GPUs in geometrical sense of FSX. If you check the FSXMark11 results, and find comparable results with similar CPUs but different GPUs, you'll notice very little difference between these GPUs.

Yet my cloud test that was run on couple of computer, confirmed that these cards scale with up to 33% FPS performance differential.

Here is the link to the cloudtest:
Cloudtest
Unrar this and load in FSX. Press S ONCE to enter external view. Do not unpause.
See what it reads in FRAPS. As a reference, my computer, full screen (settings from above): 26fps. You can use this is as a reference to the cloud performance, which often takes the toll on performance while landing in the bad weather.

That said, it's up to you to decide which GPU is best for YOU.

A discussion on IQ and a comparison 560ti versus GTX580 with the same IQ:
Link

A rough estimate is that the 560ti performs the same with 8xS + 2xSS like the GTX580 with 8xS +

2xSGSS (when it comes to IQ!). As I said earlier, 2xSGSS is going to get rid of most of shimmering, something no other mode is going to do. I've done too many tests on this one to be proven otherwise.

GTX680:
Conclusion is, as usual, that in geometric sense, the 680 has no benefit for FSX.
Also in the IQ sense the card is pretty much the same as the GTX580.
There is no direct or high benefit of going 680 over the 580 on the Sandy Bridge platform.
Some users are reporting higher smoothness with the 680, though knowingly, this is very hardly measurable.
Ivy Bridge offers PCIEx3 in complement with the GTX 670/680, but it provides no real boost in FSX.

Temperatures

As I have my GPU watercooled, I can hardly report on any normal GPU temperatures or fan speeds. My watercooled GPU never goes much over 45c, even on hard overclock.

STORAGE

Now, this is a huge moot point on the forums. And with right it is.

One thing stands: you should have two harddisks in your system. One for windows and one for FSX.

Budget oriented: HDD
You are going to get the best price/GB ratio. Also if you decide going the HDD way, the best solution right now is the Western Digital Velociraptor 600GB HLHX. It's big and it's fast.
Other possibilities include:
Western Digital 1TB Black
Samsung 1TB F3

Performance: SSD
You are going to get the best performance there is.
The biggest plus for the SSD are the loading times. There is virtually no difference while flying. Some say snappier texture loading when changing views, but that's all there is.
SSD is NOT going to improve your FPS and SSD is NOT going to improve blurries.
Recommendations are OCZ Vertex 3 or 4, Samsung 830, Intel 520… GB? Basically what you can afford, which brings me to…

Most users afford themselves a 128GB one, some more wealthy 256GB ones. And some that really have the dough, ranges of 512GB.
Now, think carefully how big your FSX is, how fast you are going to fill it, and how long until you need a bigger one.

Another point to consider: most users are mentioning lowering the loading times.
One thing to consider here: if you are loading the same area again and again (when tweaking for instance), HDD vs SSD performance here is going to be the same.
Only if you load after windows boot or you are loading different areas each time, this is also where SSD is going to shine.

When deciding if to go SSD, take into consideration the price and what's important to you.

A word on RAID: According to some tests I read, RAID setups need to have very good (=expensive)

controllers and also fast disks. It has been tested and seen they don't do much for FSX, in terms of speed. It remained a fact that a single disk, like a Raptor will do much better in FSX than RAID. Not even mentioning SSD. On my own, I never did do any RAID testing.

COMPUTER CASE

Do not underestimate a good case. If you are building an air cooled computer, a good case is of big importance.
The airflow is very important and having big and good quality fans for intake and outtake is of essence. You must consider that when cooling the computer, it is not only enough to cool the CPU, GPU and the main components, but also the mainboard parts, so good airflow over the mainboard is needed.
Thing to consider too is that the case should have some kind of wire management – an ability to hide the cables behind the mainboard, allowing for better airflow.
Recommendations for the cases are:
Corsair Obsidian 650D (medium tower)
Cooler Master HAF 932 /X (full tower)
…and possibly some other comparable cases (open for forum suggestions)

PSU

You need a good PSU. You are building a good computer, saving on the PSU might only bring you troubles.
If overclocking and a strong GPU are planned, consider getting at least 750w.
If buying a system with two GPUs, consider 850w+.
Also do think of getting a modular PSU, so that you connect only the cables you need, allowing for better airflow in the computer.
Also not a bad idea is to get a PSU with an 80+ Gold certification.
Good PSU companies include Corsair, Seasonic, Cooler Master, SilverStone…

After covering the hardware part, some additional info on some settings:

HYPERTHREADING

FSX has no benefit of it and it should be turned off in BIOS.
If you need HT for some other applications, by all means, use it, but do set the correct Affinitymask to force FSX to use all cores but Core0, and no HT cores.

END

I hope to be able to update this guide through our shared efforts to make our simming experience a better one, will update it as new hardware becomes available and as long as I see fit.
Suggestions about useful sections are welcome.

I also wish to thank everyone who invented and brought some of these tweaks to light (names left out intentionally). I'm just the dude who figured some things out and put it all together.

CHANGELOG

Corrected NI setting to prefer maximum performance.
Added Abbreviations section.
Corrected [BUFFERPOOLS] section ("Poolsize=0").
Corrected **VIDEO DRIVER LINE IN FSX.CFG** for two or more monitors.
Added explanation in the [BUFFERPOOLS] section about the GPU overloading.
Added ZOOM setting into [TERRAIN] section.
Updated cloud resolutions text under [GRAPHICS], TML.
Updated VSYNC section for "no windowed" and FSX.cfg tweaks.
Updated AM section with an explanation.
Updated TML section with an explanation.
Updated LOD RADIUS section with an explanation.
Updated Nvidia Inspector section with Installation instruction.
Updated 680 section in GPU. 21.04.2012
Updated CPU coolers section 27.04.2012
Added G3D.dll fix section 28.04.2012
Added Motherboard section 14.05.2012
Updated CPU and GPU sections with Ivy Bridge status 17.05.2012
Updated VSYNC section with a new windowed tweak 04.06.2012
Added UIAutomationcore.dll section for menu crashes 15.06.2012
Updated FFTF section to explain why 0.2 in some scenarios, updated CPU choice 25.08.2012