

# Lockheed Martin Prepar3D

## The story so far

### PC Pilot

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## An inside look at the simulation's development

*Visually, Prepar3D is miles from where it came from; the addition of HDR lighting has helped.*

**J**anuary 22, 2009. It had been two days since Barack Obama was sworn in as the 44th President of the United States. It also happened to be the day that Microsoft announced that the development of its Flight Simulator platform would end - a sad day for many in the community.

Just a few weeks later, the global aerospace and defence giant, Lockheed Martin, announced it had negotiated a deal with Microsoft to purchase the rights for the ESP platform (essentially the commercial version of FSX), which, to the relief of many, meant the sim would live on in a different form under the name Prepar3D.

In the following article, we interview Adam Breed - the Engineering Project Manager for Lockheed Martin's Prepar3D, who discusses how he started out on the project and also tracks its development over the past 12 years.

### The beginning

"Welcome to Lockheed Martin's conference call system, please enter your pin and hold," Adam Breed picked up the line...



*Adam Breed,  
Engineering  
Project  
Manager,  
Lockheed  
Martin  
Prepar3D.*

After starting out at Lockheed Martin working on tank gunnery trainers, Adam said he had always wanted to work in simulation, "flight simulation specifically," so when Lockheed Martin acquired the rights for Microsoft's ESP platform, he says: "I jumped over to that scene and that's what eventually became Prepar3D."

But what motivated Lockheed Martin, a global aerospace giant, to buy what was essentially a game? They did it because they wanted to use it for training. Traditionally,

Lockheed Martin used the aircraft's systems to do the simulation and training, which resulted in very high associated costs.

So, when Lockheed Martin looked towards the gaming industry it saw a cheaper, more affordable and quicker way to accomplish its goal, explained Adam. "One of the big drivers was leveraging game space technology to do training that was better than was traditionally done in the defence industry."

One thing I've always wanted to know was where the name Prepar3D originated from. According to Adam, it was an internal Lockheed Martin competition which allowed all the employees to submit a name for the new tool they were developing, 'Prepar3D' was the name that came out on top. As Adam said: "If you want to be prepared, use Prepar3D."

### The first few days

Speaking about the first few days of development, Adam said: "Those were some long nights; fortunately Microsoft was helpful. We did have a few of the team members come and join us, who

are still with the team to this day. “ Praising the Microsoft development team, Adam said: “To be honest, it was a complete engineering marvel. Some of the code is still unparalleled in the industry, especially the terrain system. It’s remarkable to this day how they did all that.”

The first few days of development were used to set up inside Microsoft’s ‘complex’ build environment and then translate that across to something that Lockheed Martin could work with.

“The big things were getting it to compile in Visual Studio, making sure SimConnect still worked, checking that the SDK was still functional, but the first step was making sure it ran with all the new changes.”

## Release Day, V4

Version 4 of Lockheed Martin’s Prepar3D was released on May 30, 2017. In describing the atmosphere of the day, Adam said: “It’s a little bit high anxiety, you worry about the things that are out of your control.

“Lockheed uses these releases as big deals. We gather all the stakeholders and people who’ve been involved and launch it live.”

The fun part comes when the team switches over the website and makes it live: “We throw confetti, play music, eat pizza; we make it a big deal here,” he said.

As quickly as it all happens, it’s all over: “And then it’s straight back to work,” Adam continued.

## The move to 64-bit

Ever since starting the development, the team was bombarded with users asking when a 64-bit version would be coming; this, for example, would eradicate the regular Out of Memory (OOM) errors that frustrated users regularly.

So, when in May last year, the 64-bit version of Prepar3D was finally released, it was a relief to many. Referencing the time it took for the transition, Adam said: “It took a while because there was so much backward compatibility that we had to be aware of; we didn’t want to break anything. It’s just a long process of changing thousands and thousands of variables and verifying it still works.

“We wanted to make sure our ecosystem and all our third-party developers had enough time to modify their code. When we released V4, we definitely didn’t want to just release it and then have the third-parties fall behind,” explained Adam.

He went on to say: “The move to 64-bit was something we’re very proud of and you’re going to see big changes like that moving forward.”

## Future capabilities

Transitioning Prepar3D to 64-bit was a big change. It does, however, leave the community asking what will be next on the list of future capabilities.

One of the things the development team is excited to harness the power of, is Virtual Reality: “VR is now a seamless experience”, said Adam.

“We’ve been experimenting a lot with the HTC Vive Pro, which has been a great update. The high resolution means you can now sit in the cockpit and read the multi-function displays.”

For VR to be a pleasant experience, the sim needs to run at around 90FPS, which meant there were a considerable amount of performance improvements in the latest update which benefited everyone, not just VR users.

A new capability which is linked with VR is voice recognition. Adam said the team is actively looking into adding a voice control feature that would allow the user to control elements of the sim using their voice.

He said: “The voice recognition capabilities are something you may need in VR because potentially your hands are obscured, even saying things like, ‘change the weather, make it rain, make it snow,’ are all simple things that really help



*Virtual cockpits in Prepar3D look extra special with the addition of HDR lighting.*



*Another Lockheed Martin aircraft included by default is the F-16 Fighting Falcon.*



*Prepar3D includes, by default, many Lockheed Martin aircraft, such as this F35-A Lightning.*



*As Lockheed Martin manufactures a lot of military resources, many of the default aircraft are military-based - including this Fury 1500.*



*Prepar3D is used as the base for simulators of different scales across the world.*



*The latest update to Prepar3D, V4.3, includes six new flyable default C-130 vehicles.*

the user access to the programme.”

Adam also acknowledged that the sim itself can act as a barrier to the user: “We don’t want to teach people how to use Prepar3D, we want to teach them how to fly,” he said.

All ESP-based flight simulators have a certain look to them, which is understandable because they all use the same rendering engine. So the only way to drastically change the look of the sim and bring it into the 21st century is by taking on the mammoth task of changing the rendering engine.

This is unlikely to happen any time soon, as Adam said: “The development team will continue to make rendering engine improvements,” and version 5 would be “prime grounds to experiment with new rendering engine technology.”

A technology that would move the sim forward visually and can be added without needing work on the scale of a new rendering engine is Physically Based Rendering (PBR). This allows shadows and textures to be

made visible in real time to the user and greatly increases the fidelity of the sim.

Adam said: “I’d say that’s a more immediate thing we’d like to address. That will be coming sooner rather than later because we know how important it is, especially for content generation.”

The development team is going to start investigating the use of PBR very soon and then work to incorporate it as fast as possible, he said.

### Third-party development

It’s often said that the scale of third-party development for a flight simulator platform usually dictates whether it’s a success or failure.

Prepar3D has a thriving third-party development ecosystem, which Adam attributes some of the success of the platform to. He said: “I think they’re one of the biggest reasons for our success; we work closely with pretty much every developer we

can. Obviously Lockheed Martin spends a considerable amount of investment making sure this platform is the best it can be but really the third-parties are what drives a lot of the high-end content developed out there.”

Prepar3D offers developer licences that he says are “extremely affordable”, which encourages development. Adam said: “Prepar3D would not look the way it does today and not be as successful as it is without third-party development.”

### Things you might have missed

Prepar3D is a complex tool with many thousands of features and capabilities. Two tools you might not be familiar with, that you’re definitely “missing out on” if you’re not using them, are SimDirector and SimOperator.

SimDirector allows users to create scenarios using Prepar3D. “It’s used a lot for our training systems,” Adam said. You can script things like start-up engine procedures; it’s a very powerful tool.

“It allows you to step through a checklist and highlight objects and change cameras and instruct them how to do everything in the aircraft using the tool.”

It’s sister-tool, SimOperator, Adam explained, “is basically an instructor operator station using the same technology as SimDirector. It allows you to manage multiplayer groups in real time. You can drag a target out and publish it to all the players.”

### Conclusion

Lockheed Martin was a surprise entry to the flight simulator space. What they’ve achieved in the time they’ve been here is astonishing and having heard about all the future capabilities of the sim, the future looks bright.

**By Thomas Haynes**

# Flight Sim Q&A

You've got the questions? We've got the answers!

By Richard Benedikz

## FSX and Windows 10 PC PILOT #117

Dear *PC Pilot*

Many years ago, with your help, I set up FSX on my Windows 7 computer. At the time I had to ensure both service packs, SP1 and SP2, were installed before loading any add-ons.

I have recently purchased a new computer with Windows 10 and I would like to run my simulator from it. Can you provide me with some guidance on how to install FSX and related add-ons on the new PC? For example, do I still need the former SP1 and SP2 service packs?

**Kindest regards,  
Dennis**

*Below: Make sure service pack 1 and 2 are installed before loading third-party add-ons.*

*PC Pilot*

**Hi Dennis,**

The setup process for FSX on Windows 10 is the same as on Windows 7 (and those service packs are still needed). If you use the following guidelines you should be fine:

- Firstly, check your user account has full administrative privileges. In Windows, go to Settings > Accounts > Other People. From there, make sure your account is listed as 'Administrator' rather than 'Standard User'.
- Find the FSX setup application, right-click on it and select 'Run as Administrator'.
- Install FSX in a custom folder, not in Program Files. For example, C:\FSX or D:\FSX depending on your drive

configuration. The reason for this is that Windows 10 has built-in security in the default folder structure that can cause communication issues with SimConnect. When inserting the first FSX setup disc, there is an 'Options' tab right on the bottom of the splash screen. Click on it and you should be able to change the path from there. In addition, the following is some helpful advice received from Richard Stummer, which was published in Issue 113, on activating FSX on Windows 10. On some systems FSX Acceleration fails the activation process and requires a small change to a registry entry:

- In Windows, click Start, click Run, type 'regedit' and then OK. Expand the following registry key: HKEY\_LOCAL\_MACHINE\SYSTEM\CURRENTCONTROLSET\CONTROL\CLASS\{4D36E967-E325-11CE-BFC1-08002BE10318}
- Double-click Upperfilters on the right side
- Change the value from 0 to PartMgr, and then click OK. It may say CLEANBOOT on one line and PartMgr on the next; just remove one line leaving PartMgr as the value. Make sure you change it to PartMgr' (upper case), rather than 'partmgr' as registry entries are case-sensitive.
- Close Registry Editor and reboot and then try to use the activation wizard.

Finally, a word of caution. I should emphasise that you should not change registry entries unless you know what you are doing and always make a backup. It is also worth noting that FSX: Steam Edition comes with the Acceleration pack and it is compatible with Windows 10.

**Cheers, Richard**

