

FSX Mission Building Tips Part I: Designing Great Missions

By Paul Lange

As the Lead Game Designer on *Flight Simulator X*, part of my job was to lead the team that designed and built the missions that shipped with *FSX*. Working on the missions was very rewarding: each mission provided plenty of opportunity to be creative, solve problems, and have fun. If you've already started building missions for *FSX*, you know what I'm talking about. If you're thinking about building missions, fasten your seatbelt! It's quite a ride.

The Mission Creation Software Development Kit (SDK) explains the technical details of creating missions. It can be installed from Disk 1 of *FSX Deluxe*, and an update to the SDK can be found on fsinsider.com. In this and the following article, I will share some thoughts and tips that expand on the technical information provided in the SDK.

There's a lot of information here, so you might want to print it out to read at your leisure. I hope you find it useful.

Know Your Audience

In designing a mission, it's important to keep in mind that *Flight Simulator* fans are a diverse crowd. What one person finds interesting and exciting, another might find completely boring. *Flight Simulator* models reality, and in the real world of aviation there's something for everyone. Your first challenge as a mission designer is to figure out who your audience is, and then give them what they want.

When we make a new version of *Flight Simulator*, we start by examining who our customers are. After a lot of research we've found that, in general, there are a few different categories that most members of the community fall into. To be sure, there's crossover between these categories, but most seem to identify with one of these types. If you're designing missions, this is useful information!

If you're a *Flight Simulator* enthusiast yourself, you'll probably want to design missions that YOU find interesting. So one way to know your audience is to know yourself. Which category do you fall into?

FS Fans

- Will consume anything related to *Flight Simulator* at a voracious rate, and keep coming back for more.
- Will try just about every mission, and, if they're reasonably well-executed, will enjoy them all.

- Have different skill and experience levels, so beginner through expert missions are ALL reasonable for them.
- Like real-world details, but not as much as hardcore pilots (see below).
- Generally prefer to get in the air quickly, rather than methodically performing real-world checklists (though they may find abbreviated checklists interesting).
- Enjoy “eye candy” as long as it deepens their immersion in the environment.
- May want to use the mission compass and pointer as a quick “cheat,” but are just as likely to turn it off to increase the challenge.
- Want a high-level overview in the briefing, and a detailed map to go with it.
- Value realistic audio voiceovers in which multiple characters interact.
- Get satisfaction from completing a goal (regardless of how realistically they do so) and from flying on the fringes, doing things real-world pilots would or could never do.
- Enjoy replaying missions to improve their own (or someone else’s) performance with each attempt.
- Are willing to invest time in a long mission, but have high expectations that there will be some kind of payoff at the end: exciting events, unexpected AI activity, cool rewards, and so on.

Hardcore Pilots

- Demand realism above all else, whether they are real-world pilots or experienced simulator pilots.
- Are not likely to try or enjoy hoop courses or any mission that includes a fantasy element.
- Are less likely to try missions labeled as tutorials, as they may feel that such missions are below their skill level.
- Are attracted to advanced or expert missions.
- Want all the checklists and systems-related details to be accurate and presented in a realistic fashion.
- Say they don’t care about “eye candy,” but appreciate it when scenery objects enhance the realism of a mission.
- Usually don’t want to use the mission compass/pointer at all, since that would be “cheating.”
- Want a detailed briefing that provides all the information a real-world pilot would get prior to a flight.
- Want a real-world chart by which to navigate, probably without any course lines at all.
- Get satisfaction from completing a flight with exacting precision and as few mistakes as possible.
- Enjoy replaying a mission if it supports skill-building and procedural training, but don’t focus on competition.
- Don’t really care about rewards—but if there are none, some of these users will be disappointed.
- Want real-world scenarios that will keep their flying, navigation, and decision-making skills sharp.

Explorers

- Care less about the aircraft and its systems and more about the journey.
- Generally have less skill and interest in dealing with complex challenges, failures, or precision maneuvering. Scenic tours or animal spotting trips may be more to their liking.
- Enjoy AI objects that move around realistically and do interesting things.
- Enjoy “eye candy” that fits within the environment and theme of the mission.
- May be willing to invest time in a longer mission if there are interesting things to see or learn in the environment.
- Enjoy finding new things, flying around the environment with relative ease, and reaching a destination successfully.
- Value rewards related to what they saw during a mission.
- Don’t enjoy replaying a mission if it means discovering the same things all over again, but can be motivated to try again if there are hidden surprises to be found.
- Enjoy searching, finding, and puzzle-solving as mission themes.
- Need detailed briefings, easy-to-read maps, good audio directions, and the mission compass and pointer to complete a mission.

Casual Flyers

- Have short attention spans, or limited time to commit to flying a single mission.
- Want short missions that are fun, but not too challenging.
- Want a quick sense of success.
- Prefer missions that focus on a specific phase of flight (such as takeoff or landing), a brief competition-style event, or some kind of failure scenario.

Get Inspired

The easiest missions to create are those that simulate real-world scenarios. Fantasy or fiction missions can work (we created a bunch ourselves!), but it’s a little harder to pull them off successfully.

Look to real aviation throughout history for inspiration for your mission designs. Read the paper, watch the news, read aviation books, or peruse aviation websites and portals to find gems that can inspire your next great mission. There’s no shortage of ideas, and even very similar missions can provide unique experiences depending on how they’re designed and flown.

Use real-world checklists and procedures whenever possible. You can find checklists and reference information for all of the default *FSX* aircraft on the kneeboard (press **SHIFT+F10** to display) and in the Learning Center. If you need more information, search the Web or post on a forum to see if someone else has the information.

Don't hesitate to draw on pop culture for mission ideas. Many movies, books, and other popular sources can provide opportunities for creating interesting missions (especially for those who fall into the "FS Fans" category).

Make Things Challenging

As a general rule in game design, if you don't challenge the gamers flying your mission, they'll find the experience boring. Too much challenge, though, and the experience will be frustrating.

Once you've determined what the appropriate challenge level should be for your audience, increase the challenge slightly as the mission progresses. If the mission increases in challenge too quickly or suddenly (such as in an emergency situation), the mission is more likely to be frustrating than fun.

If you're building a beginner mission, then it should have beginner elements throughout, and may not even require a landing (which is generally the most difficult part for beginners). If you're building an expert mission, however, too much beginner level material at the outset of the mission may cause your audience to lose interest early on and abandon the mission altogether.

One way to increase the challenge is to introduce something unexpected. Equipment failures are an obvious example, but other options you could try include landing at an alternate airport or flying through inclement weather that wasn't part of the original route. When you include these types of surprises, be sure the new challenge level you introduce is appropriate for your intended audience.

Another reasonable option is to introduce optional high-difficulty challenges using the menu prompt ("Do you want the extra challenge of rescuing the fallen climber, or would you rather return to base?"). As long as your audience isn't punished if they opt not to take the extra challenge, this is a good way to manage challenge within a mission.

Provide Rewards

We all react favorably to praise and rewards and seek them out, whether consciously or not. In game design, players should be rewarded in some way for every challenge they overcome.

Within *Flight Simulator*, the most obvious reward is the use of the "Grant Reward" action to give virtual pilots a permanent reminder of their success in their Pilot Records. All the missions we shipped with *FSX* have at least one reward, and some have two or three. Users can review the rewards they've acquired and brag about their achievements with friends by posting screenshots of their rewards online. Don't overdo the post-flight rewards, though, or they'll lose their value.

Getting the challenge level/reward balance just right is so important that you may want to enforce some rules, so that if users change their aircraft or make other modifications to make the mission easier (for instance, changing the weather) they won't get whatever rewards they earned. This is why we included the "Allow realism changes during missions" checkbox on the mission screen so that users can make changes if they want, but don't get rewards if they do.

You can also reward a user within a mission itself by providing unique and interesting scenery objects, and by using voice-over dialog to create characters who offer praise when a task is performed well. Remember, too, that sometimes rewards are less obvious, such as a stunning view, an unexpected flyby of another aircraft, a catastrophe averted.

In most games it's fun to discover something that's hidden, or which requires extra effort or special skills to uncover. *Flight Simulator* is no different in this respect, and with the entire world at your disposal, objects and items can be hidden in all kinds of interesting places.

A hidden object can be a "real" scenery or AI object, or it can be an event that triggers a unique experience or grants a unique reward, or it could be a trigger that opens up an entirely new branch to the mission.

Tell a Story

Like a good novel or a movie, compelling missions need to tell a story. The key is that, in general, the user needs to be the protagonist of the story! In creating the missions we shipped with *FSX*, we found that members of the *Flight Simulator* community weren't interested in hearing stories about other people—they wanted to be in the stories themselves! So don't spend a lot of effort developing complex back-stories for characters that appear in your missions, or writing stories that the user only hears about on the radio. Save your energy for creating compelling stories in which users can take part. When they complete your mission, you want them remembering (and talking about) what THEY did, not what some characters did.

Give the user something to anticipate, look forward to, or worry about. Maybe it's a sense of how beautiful it will be where they're going, or how bad the weather is between here and there. Or maybe it's something a bit more sinister, evoked by anxious dialog. Good story elements can provide a reason to keep going and stay engaged until the end.

Your stories doesn't need to be complex. A mission that makes a novice the hero of a story can be as simple as, "Land the plane!" See the "Swiss Outing" mission for a good example.

Story-telling exists in all cultures, and has been around for as long as there have been people communicating. Don't underestimate its power. We've found that even the most hardcore realists enjoy a good story. If the gameplay of a mission is a realistic IFR flight from point A to point B, why not wrap it in a good story to keep things interesting? Real-world pilots love flying for its own sake, but we still come up with all sorts of reasons to take to the sky. Heading out for a \$100 hamburger at an airport restaurant 50 miles away is a lot more interesting than just executing a VFR cross-country flight from here to there.

If you're interested in this subject, spend some time learning about story development. There are many good books on this topic.

Provide a Back-Story

If a back-story—character history or events that happened prior to the mission—is important, the best place to convey it is usually in the mission description or briefing. It can be as simple or as detailed as you want. Note, though, that very few users have the patience to read page after page of text before they start a mission.

A good back-story can also be conveyed via a few lines of voiceover dialog by a character at the beginning of a mission. Sometimes, though, it makes more sense to tell the back-story later in the mission, as we did when we explained the true nature of the “Tokyo Executive Transport” mission once it was appropriate to do so.

Keep the User Informed

Your audience will begin your mission with only the information you provide in the description and briefing. If it’s going to be unclear, make sure you provide information about what’s going on and what to do as the mission progresses. The best way to do this is via audio voiceovers, preferably from a realistic character who’s in the plane with the user or on the radio.

Keep blocks of information as short as possible while still sounding natural and providing the necessary information. Most users can’t retain more than a few sentences of information at a time while they’re flying.

We've learned that all missions need to have some introductory voiceover dialog to give the user some context and get them going. There are a few default missions where we didn’t do this, and we’re finding that users are consistently confused about what they’re expected to do.

If you have secret stuff in your mission and want to provide clues, consider doing it with ancillary dialog between other pilots and air traffic controllers or a dispatcher.

Synchronize Audio and Visuals

Try to synchronize AI objects and events in the mission with voiceover dialog. If elements are out of sync, the scene can be confusing and the user can get disoriented. This can also make your mission seem more amateurish.

If other pilots are supposed to be flying around in AI aircraft (or other objects), attempt to synchronize the dialog with the objects’ locations in the world. If the user wouldn’t ever normally see the object anyway, you can get away with having voiceover dialog from other pilots without actually using AI objects to represent their aircraft. In real-world flying, you’ll frequently hear other pilots on the radio without ever seeing them.

In the interest of reducing visual complexity and increasing PC performance, we recommend that you not create AI objects unless they are or will be in close proximity to the user, or will be close to a recognizable landmark. Two examples where we did use AI objects that matched the voiceover dialog

are in the “Denali Base Camp Charter” and “San Juan Island Run” missions, because the other aircraft were in close proximity to the user.

If you do choose to create AI objects to represent the aircraft or vehicles of voices the user hears, try to synchronize what is heard and what is seen. If someone says, “I’m just east of you,” make sure there’s a plane or a vehicle or a person there. If there’s an audible explosion, make sure the user sees a related effect.

React to the User’s Actions (or Lack Thereof)

You can’t anticipate everything users might do in a mission, so it’s difficult to plan how to react to their actions. That said, there are some events that you should pay attention to and provide feedback on.

For instance, if the user is flying a retractable gear aircraft, it’s easy to identify the state of the landing gear with a property trigger. If the user has the gear in the wrong position for a given phase of flight, play a voiceover line that addresses the issue. Don’t overdo it though. If you really need to address the issue more than once, use different lines of dialog to accomplish it.

If the user is flying in the wrong direction, or is far off course, you should probably say something. There’s nothing worse than flying for 30 minutes in the wrong direction without being told about it. If you want people to succeed at and enjoy your missions, provide some help when it makes sense.

Ideally a narrator or co-pilot will speak up if checklist items aren’t being carried out, if proper procedures aren’t being followed, or if the user is exceeding limitations imposed on the aircraft or flight (engine handling, icing, etc.). You can monitor all of these factors with property triggers, and doing so can enhance immersion if you handle it well. Most of the missions we shipped include a co-pilot, so these sorts of notices come across as just the sort of thing a real co-pilot would notice and comment on.

Don’t pester the user with a lot of negativity (“You’re too high,” “You’re too fast,” “You’re too low,” “Don’t you know what you’re doing?”). That sort of pestering comes across as annoyingly obnoxious after a while, and only provokes a user to end your mission before completing it. If you do point out an error, make sure it’s clear what the error is and how to correct it. “Watch your altitude!” is not helpful. “You’re too high! Better descend back to three thousand feet,” will give the user a better experience.

Add Randomization

If you’re going to introduce system failures or have a search and rescue scenario, consider using the Random action so that the mission plays differently depending on which random branch is played.

We didn’t use the Random action very much in the default missions, but it can add a lot of replayability to a mission and make it more interesting for the user (though at the expense of greater mission complexity).

Use Weather and Time Consciously

In real-world aviation, weather is a significant factor in many flights and can test a pilot's skills, knowledge, and decision-making abilities. In *Flight Simulator*, weather can transform a boring mission into an enjoyable and challenging one.

The time of day can also be a factor in the amount of challenge a mission provides, and can help highlight visual effects as well (for instance, an engine fire at night might be more exciting than in daylight). Both weather and the time of day can also play an aesthetic role in mission design, as you literally paint the sky for the user. For example, you can time a mission so that the sun is setting behind a gorgeous bank of clouds just as the user arrives at the destination from the east.

Note that users can reduce cloud density without any restrictions from the mission system (on the Weather tab of the Display Settings screen). So while you can certainly use clouds, the only weather you're sure your audience will experience exactly as you created it are visibility layers, precipitation, and wind. Be sure to set the wind direction appropriately for the user's intended takeoff and landing directions. Things can get confusing if voiceover audio is telling an experienced pilot to land downwind!

Think About Performance

As better computer hardware becomes available, performance won't be as big an issue as it is for some *FSX* users today, but it should always be a consideration in designing missions. Without careful forethought, your best intentions to fill a mission with fabulous scenery can turn a fun mission into a slideshow.

When placing mission scenery objects, set the complexity level so that scenery objects which are critical to the mission experience are visible at the lowest scenery complexity settings (Very Sparse), and evenly add the other scenery objects so that more are introduced as the complexity is turned up by the user.

Missions that require quick and agile aircraft aerobatics should not be built in performance-hungry cities. Although the "Jet City" mission that shipped with *FSX* is fun, it takes place in Seattle, which has lots of performance-hungry scenery objects. In retrospect, we probably should have moved this mission to a different location, considering the type of flying expected of the user in the mission. It's hard to fly an obstacle course with low frame rates.

Clouds aren't as big a performance factor in *Flight Simulator X* as they were in *Flight Simulator 2004*, but if the mission takes place in a complex city, you may want to use clear skies to get a slight advantage in performance. Meanwhile, dawn and dusk may be the most beautiful times of day, but they're also the most performance-intensive.

Given the wide variation among *Flight Simulator* users' hardware configurations, it's always a good idea to test your mission on a variety of different machines if possible.

For more information on improving performance in *FSX*, see FSInsider.com.

Raise the Quality Bar

In real-world aviation, pilots often talk about “flying like a professional.” Even if you’re a low-time private pilot renting an airplane, there’s no reason why you can’t fly as mindfully as the pros. The same is true in the world of *Flight Simulator* add-ons. Many users will dismiss as amateur creations any add-on aircraft, scenery, and missions that seem slapped together. So, while your missions may be low-budget, there are some things you can do to create the aura of professionally-produced work.

Good audio can make a film look better, and the same is true of your missions. Of course, the opposite is also true: bad audio can turn a great mission into an embarrassment. The challenge here is two-fold: you need a good script and good voice actors. Most amateur mission builders are not trained writers or actors and don’t have the budget to hire them. So, here are some tips.

As a general rule of thumb, use pilot-speak for any dialog that is supposed to be realistic. If you don’t know how pilots and air traffic controllers speak, there are lots of books on the subject. A good one is *Say Again, Please: Guide to Radio Communications* by Bob Gardner. Another good source of pilot/controller dialog is pilot instructional videos such as those produced by [King Schools](#), or audio or video recordings of real-world flights that you can find on the Web. Best of all, get a real-world pilot to help you write your dialog!

Differentiate voices. If you’ll be using multiple characters, try to limit it to three. More than three and the user will likely get confused about who’s talking and what they need to pay attention to. Make sure different characters sound as if they are all talking through different radios or intercoms (which you can create using audio post-processing filters, something that is beyond the scope of this article). Using different accents, ages, and genders also help to make it clear that different people are talking. And don’t have male voice actors pretend to be female or vice versa, unless they’re really good. We did that for placeholder audio when we created the *FSX* missions, and it sounded terrible. Hilarious at times, but terrible!

Many new mission builders hold online auditions for voiceover work. If that isn’t an option, consider contacting a local theater group to see if any of the actors would be available to read some lines. They may be willing to help you out, and if they charge for their services, it may not be very expensive. If you’re going to record professional actors, be professional and be prepared. Last-minute script changes are frustrating and expensive.

The briefing is another important area, since it will be the first impression the user has of your mission. Tailor the content for your audience, and keep the material focused only on what they need to know. Use maps whenever possible, and make it very clear what and where the objectives are. Write carefully, and check your spelling.

Using Add-on Aircraft

If you use add-on aircraft in your mission, many users won’t have an aircraft you want or need to use (either user-flyable or AI). If they don’t, when they start the mission another aircraft will load, or (in the

case of an AI aircraft) the mission won't load properly. So, if your mission is dependent on an add-on aircraft, be sure to make that clear in your download description.

While many add-on aircraft are free to download, that doesn't mean they can be freely re-distributed. If you want to include a specific freeware aircraft or scenery object in one of your mission packages, be sure to ask permission from the author first. Many authors just want recognition for their work, which you could include in your briefing or in the download description.

If you're catering to members of the Hardcore Pilot category (especially real-world pilots), you may want to use an add-on payware aircraft with complete systems modeling for your mission. Consider contacting the company that created the aircraft in question and see if they'll host your mission on their forums. Readers of their forums will be more likely to have the aircraft installed and can use your mission (which features one of their favorite aircraft) as designed.

That's it for Part I of this article series. In Part II, I'll share some tips for actually building missions.