

# Efficient Storyboarding in 3D Game Engines

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## Abstract

*Getting an accurate match between initial storyboards and the 3D layout is difficult, given today's reality of multi-site productions. While big studios have the luxury of re-iterating over the 3D layout of a shot, smaller studios with smaller budgets have limited attempts to get it right. Going back to make corrections is the difference between delivering on time or going over budget. Studios can avoid mistakes and deliver on time by storyboarding directly in 3D, with the help of game engines. Thousands of minutes of animation have been created in this way, for productions such as "Bob the Builder" and "Tree Fu Tom".*

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## 1. Background

The standard pipeline requires a manual transition from storyboards to 3D layout, which can be problematic: inconsistent scale between the drawings and the real 3D assets, drawing something that does not exist as an asset, or obstructing the camera view with real set elements. Using game engines, storyboard artists can access 3D assets in an intuitive way, controlling what appears on the screen. For tasks requiring quick feedback (e.g. animation) interactive solutions are preferred [LLL\*15]. Game engines offer real-time response with full production quality [Mor15], making excellent back-end technology for storyboarding in 3D.

## 2. The workflow

Game engines require low polygon assets. A model can either be optimised from a pre-existing high polygon asset, or an early version can be built, as an iteration of the design process.

### 2.1. Storyboard

Storyboard artists can explore the 3D set with a camera to find the best framing for their shot. After they have chosen a camera framing, they can place characters into the shot. Once these panels are approved by a director, the artists begin drawing details on top. The drawings provide information such as character poses, facial expressions and effects like fire. The final panels are exported and timed into an animatic by an editor. Storyboarding in this way is more accurate because storyboard artists create panels using assets that are a close representation of the ones used in the production, with a camera that matches the one used in the final render. Knowing where the set ends means avoiding pointing the camera towards emptiness; knowing where set elements such as trees are, means avoiding framing an obscured shot. It is also faster, as it is

no longer necessary to draw backgrounds, characters or props that can be represented by the 3D assets.

### 2.2. Layout

The 3D assets (in the game engine), the 2D drawings (drawn by the artists) and the timings (set by an editor) are the three elements needed to automatically create the first pass of 3D layout. Automatically exported to software like Autodesk Maya, camera information (cuts, pans and lenses) is accurate and the scale is correct. Creating 3D layout in this way means directors and artists can move on to the next scene or episode without looking back.

## 3. Conclusion

Leveraging 3D game engines for storyboarding, directors are empowered as they are able to control exact details such as camera lenses. Artists are empowered too, as they are confident that the final output will match their drawings. Moreover, the relationship between 2D drawings and 3D assets can have interesting applications, like automatic posing of models using storyboard drawings.

## References

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