

Dynamic Origins*

†

Dhruv Govil

Sony Pictures Imageworks
Vancouver, British Columbia, Canada
dhruvagovil@gmail.com

ABSTRACT

In this talk, we present our methods for dealing with increasingly large world scales in production shots.

Our method described here dynamically moves our world space origin around a driving character. This mitigates many floating point precision errors occurring throughout production, saving render time and creating a more pleasant work flow for artists.

For example a shot where characters are fighting on top of a cargo plane can take place simultaneously at the origin and at an accurate world space.

CCS CONCEPTS

• **Computing methodologies** → *Animation*;

KEYWORDS

Animation, Scene Management, Pipeline

ACM Reference Format:

Dhruv Govil. 1997. Dynamic Origins: . In *Proceedings of ACM Woodstock conference (WOODSTOCK'97)*, Jennifer B. Sartor, Theo D'Hondt, and Wolfgang De Meuter (Eds.). ACM, New York, NY, USA, Article 4, 1 page. https://doi.org/10.475/123_4

1 GENERAL OVERVIEW

When dealing with shots in feature films where characters move through great distances, even within single shots, it is common to encounter problems as the camera and actions move further from the world origin.

This can lead us to encountering some major issues:

- (1) Large distances are prone to precision errors where the computer is unable to represent units to a reasonable degree of accuracy causing points to jump around or simulations to fail.
- (2) Artists have to keep their scene setups tracking with the character or object, which can waste user time or cause frustration

*Produces the permission block, and copyright information

†The full version of the author's guide is available as `acmart.pdf` document

Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for third-party components of this work must be honored. For all other uses, contact the owner/author(s).

WOODSTOCK'97, July 1997, El Paso, Texas USA

© 2018 Sony Pictures Imageworks. All rights Reserved.

ACM ISBN 123-4567-24-567/08/06...\$15.00

https://doi.org/10.475/123_4

While we have been able to work around issues like these in the past, the ever increasing complexity of production requirements have required us to look into new solutions.

1.1 Alternate Solutions

To work around the above issues, we evaluated common techniques like:

- (1) Changing world scale on a per shot or per film basis.
- (2) Breaking shots apart into subsections

However when investigating we often encountered workflows where dynamic scaling introduced confusion or retooling. Additionally none of these solutions helped our artists who still had to adjust their work to a fast moving target or encounter even more scene management.

1.2 Our Solution

To handle the needs of our scene, we've developed a technique that will recenter the world on a per frame basis.

Our proprietary software handles recentering dynamically for artists as they work. At all times, our camera views maintain their offset to the characters so the process is largely transparent to any artists.

Since we always record an accurate true world space as well, true world space positions can then be restored at render time or on an on demand basis. We can continue to share layouts and other elements that happen in a world space, while allowing our scene itself to use a per frame moving origin.

2 RESULTS

As a result of our work, we are now able to handle scenes of much larger scales than we have traditionally been able to process.

Our existing tooling did not have to be modified as the new additions work within existing systems where possible and we can continue to work at a convenient unit scale.

Artists are also able to choose to toggle whether they want to work at the origin or at world space on demand. This is especially advantageous for simulation heavy departments who can choose to perform their intensive simulations in the new character space or in the actual world space.

This method has been a critical part of over 7 feature film projects at Sony Pictures Imageworks and will see more work in the future to become integrated into a more general workflow.