

You've Got a Lot of Friends, Charlie Brown: Creating Crowds in *Peanuts*

Mark Adams, Greg Mourino, Mason Evans, and Kevin Edzenga*
Blue Sky Studios

Late this fall, Blue Sky Studios will release *The Peanuts Movie*, based on Charles "Sparky" Schulz's iconic comic strip *Peanuts*. Schulz's distinctive style created a wonderful challenge for us, the Crowds department, to re-imagine exactly what constitutes a crowd character. Every part of the crowds pipeline had to be adjusted for greater character directability. The usual crowd concerns such as terrain adaption, flocking movement, and large crowd groupings didn't apply. However, staying on model relative to the camera, cycles animated on 2's, and tracking the stylized "drawn" action lines that turn off and on within a cycle are just a few of the new concerns the crowds team faced on this film. The resulting system was one where we could easily micromanage individual characters, while still simulating large numbers of characters matching the Peanuts aesthetic.

1 Assets, Cycles, and Cameras

The hero character assets consisted of two base rigs, male and female, and each variation had additional "component" rigs including garment and hair rigs. This allowed for 111 variations, more than we ever had for background characters in a Blue Sky film. Some contained more than 1200 joints, hundreds of blendshapes, and custom deformers not supported in the crowd deformation system. Stripping down the rig to a manageable crowd asset, yet still maintaining the same fidelity of deformation as a hero asset, was a daunting task. In the end we were able to bring the average joint count around 135 joints per asset. Deformations lost through this simplification were recreated using a combination of corrective blendshapes and overall, per-frame blendshapes at render time.

To make cycle creation more efficient, we created "Uber" rigs that combined all components with the respective male and female base rigs, resulting in a single rig for each. Using visualization switches, the animator could animate a single male/female character. This streamlined processing cycles into our crowds data file format, because we were only processing two rigs. To further increase cycle efficiency, we created cycle isolation groups that allowed us to separate a section of the rig for modification. Targeting the head or whole section of the rig, we could mix and match animations from two different cycles in post simulation. This increased the amount of apparent cycle variations available, while keeping the total number of cycles to a minimum.

Style guides, called "character views", were developed to help build a language that described the character's orientation to the camera. There were three character views, each with left and right poses, to recreate Schulz's original drawings: Sparky (front view), Profile (side view), and Behind (rear view). Since each view was achieved through unique posing, animation would deliver the three left poses for each cycle and we would then mirror these to give the same views for the character's right side.

* e-mail: {marka,gregm,masone,kedzenga}@blueskystudios.com

2 Simulation and Post Simulation Edits

We based our simulations on a series of rules for the Peanuts style provided by the animation and design departments. This included how to cluster characters in identifiable groups, when to move in unison, and how various energy levels can affect the way the characters react to their surroundings and story beats. Following these rules, we created a system where the artist could assign simple playlists of cycles, to achieve a unison behavior or quickly distribute differing cycles through predetermined groupings. For greater control where timing was a necessity, the artist could use a state machine through our custom PyQt interface to Houdini. Navigation was also reworked to allow the use of a single curve for multiple characters to "ride the rails" where the last in was the first out, or direct each character individually with its own curve for more precise control. The use of obstacle avoidance had to be very subtle, as our range of motion was limited due to the restricted angles from which we could view the characters.

One of the biggest challenges with maintaining the Peanuts style was always keeping the character on model relative to the camera. Character location would vary widely in a scene, but the very distinct character views only allowed a few degrees of off-axis rotation before they appeared obviously incorrect. For extreme cases like high camera angles, we would lean the character to be perpendicular to camera to appear on model even if, in some cases, they were almost parallel with the ground. A joint override system, initially designed for our inverse-kinematics solver, was re-purposed for aiming character heads, and sometimes bodies to the camera in a post simulation pass. After selecting a character head for an override, we would limit the head's rotation based on parameters set by the artist. The result was similar to a 2-D sprite system, where each character view would be analogous to a sprite. The camera alignment allowed for some user defined rotational deviation, which ensured that the crowds felt organic and maintained eyelines.

3 Conclusion

These methods were used in over 100 shots and allowed the freedom of control needed to tell this new story and stay true to the beloved Peanuts style at every step of the process.



Figure 1: © 2015 Twentieth Century Fox Film Corporation. All Rights Reserved. PEANUTS © Peanuts Worldwide LLC. Not for sale or duplication.