

It's Good to Be Alpha

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Figure 1: Alpha from *Up*. ©Disney / Pixar. All rights reserved.

Alpha, villain Muntz's deadly lieutenant, leads a pack of dogs to find a rare and elusive bird in Disney / Pixar's *Up*. Alpha was always imagined as the ideal of a dangerous canine. To implement this concept, Alpha went through a series of challenges, including his highly stylized geometry, caricatured articulation, sleek groom, and graphic color and illumination. We discuss our challenges and solutions, across multiple disciplines, in addressing this design.

1 Modeling and Articulation

The modeling and articulation approach to Alpha was challenging since we had to cater to both his stylized look while still incorporating believable, organic dog anatomy. Some of the anatomy challenges included clavicle-skin interaction and directable small and large muscle group flexing. Unlike most past Pixar characters, we modeled Alpha's muscular anatomy directly into the topology. For example, we structured the layout to support from primary muscles down to tendons and small facial details. This allowed us to articulate the muscles and sculpt them into the appropriate deformers.

Another challenge was integrating a new three-limb IK solver with specialized controls for animating IK segment rigidity. Animators could then transition between various action poses and stationary poses such as sitting or kneeling, as well as sprinting or running

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with local control over each bone. Since animation could control the amount of muscular deformation, they effectively blended between stylization and realism.

2 Grooming

The show's stylization also presented a set of challenges for grooming. We grounded the clean simplicity of Alpha's design by developing as much micro detail in the groom as possible. This emphasized the simpler detail in his coloration, while keeping him from appearing flat. Simplified markings using bold shapes, such as the triangular patterns on his chest, helped keep the fur's geometric complexity within the stylized world of *Up*. We pushed the directional turns within the hair to support these designs, but still maintained a naturalistic flow where possible.

Hair quality, while sleek and clean in keeping with the character of Alpha, also needed to be slightly coarser to support the "chunkified" *Up* world of oversized materials. In addition, Alpha's smooth form was in danger of looking too perfect, so we slightly broke the profile on the backs of the legs and ears with longer hairs. This, along with a careful plan of hair flow direction, balanced stylization and naturalism to support the geometry and animation.

3 Shading

Likewise, Alpha's shading found areas to both punch up the alpha dog caricature, while grounding as much as possible in an organic realism. Alpha was designed very graphically, with sharp transitions and bold contrasting colors. To idealize the concept of a Doberman, the character needed to feel as black as possible while still readable in a dark tepui jungle. To shape his fur, we tinted the kajiya specular and diffuse strongly blue. We added a system to allow the groomer paint tinted illumination response to control this effect. This also separated Alpha out from the rest of the pack, even from large distances.

Secondly, to avoid flat areas of solid colors, we added a paintable per-hair color randomization system. This allowed areas of simple color to have a subtle micro-variation. The groomer painted zones of randomization, choosing where to keep colors soft and constant or where to add more per-hair blend dithering. Finally, while Alpha is 90 percent covered in hair, the additional elements of his shading help him remain true to the *Up* design. Mouth, eyes, and collar are all over-sized and caricatured in color, pattern, and illumination.

4 Conclusion

Alpha's difficulty came from making a series of subtle choices that would emphasize the character's strong stylistic design. A team effort, he portrays his role as lieutenant and consigliere with his powerful form, graphic colors, and sleek grooming. We provided a set of controls across all disciplines that blended between the defined stylization and the demands of realism.