FUTURE CATS

Big Machine's Emmy-winning approach shows big cats' future on Nat Geo Wild.

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Effective animation often calls for innovation, but the groundbreaking visuals featured in National Geographic Wild's Future Cats, required exceptional creativity and technical know-how. The result is a documentary that pushes programming to a new level.

Burbank, Calif. -based Big Machine produced Future Cats, a nature documentary that uses imaginative visual effects to show how big cats would adapt to four different world changes, including ice, floods, desert and the merging of continents. Led by co-creative directors Ken Carlson and Steve Petersen, the Big Machine team used Cinema 4D, After Effects, ZBrush and other software to do all of the design and animation work for the show.

Animals in Future Cats were sculpted in ZBrush and imported into C4D for texturing. Landscapes and backgrounds were created using poly reduction tools and pulling points to get the flat-space low-polygon effects on the landscape.

The stunning, virtual world was realized through the team's use of a pipeline normally associated with feature filmmaking that allowed for real-time lighting and interactions with materials, including a hybrid rendering system and a super-computer capable of handling complex calculations.


Big Machine's animators used C4D's character animation tool to bring the robotic cat to life.

Their groundbreaking approach, which included creating matte paintings and a miniaturized world filled with lifelike carvings of animals and environments, earned Big Machine an Emmy award for Outstanding Graphic Design & Art Direction. "The stuff we do always has a heavy design hand in it, whether it's integrating effects into live action or coming up with new ways to shoot live action, and we're always trying to use new technology," says Petersen, who served as creative director on the project.

On the Leading Edge
Big Machine has always been on the leading edge of the technology necessary to keep it a step ahead, working with stereoscopic 3D and virtual-reality video before many of its competitors. Carlson and Petersen founded the company in 2003 as a motion design studio/editorial shop specializing in film trailers and promos, as well as graphics packages for broadcast. Over time, they have added a live-action department with a producer.
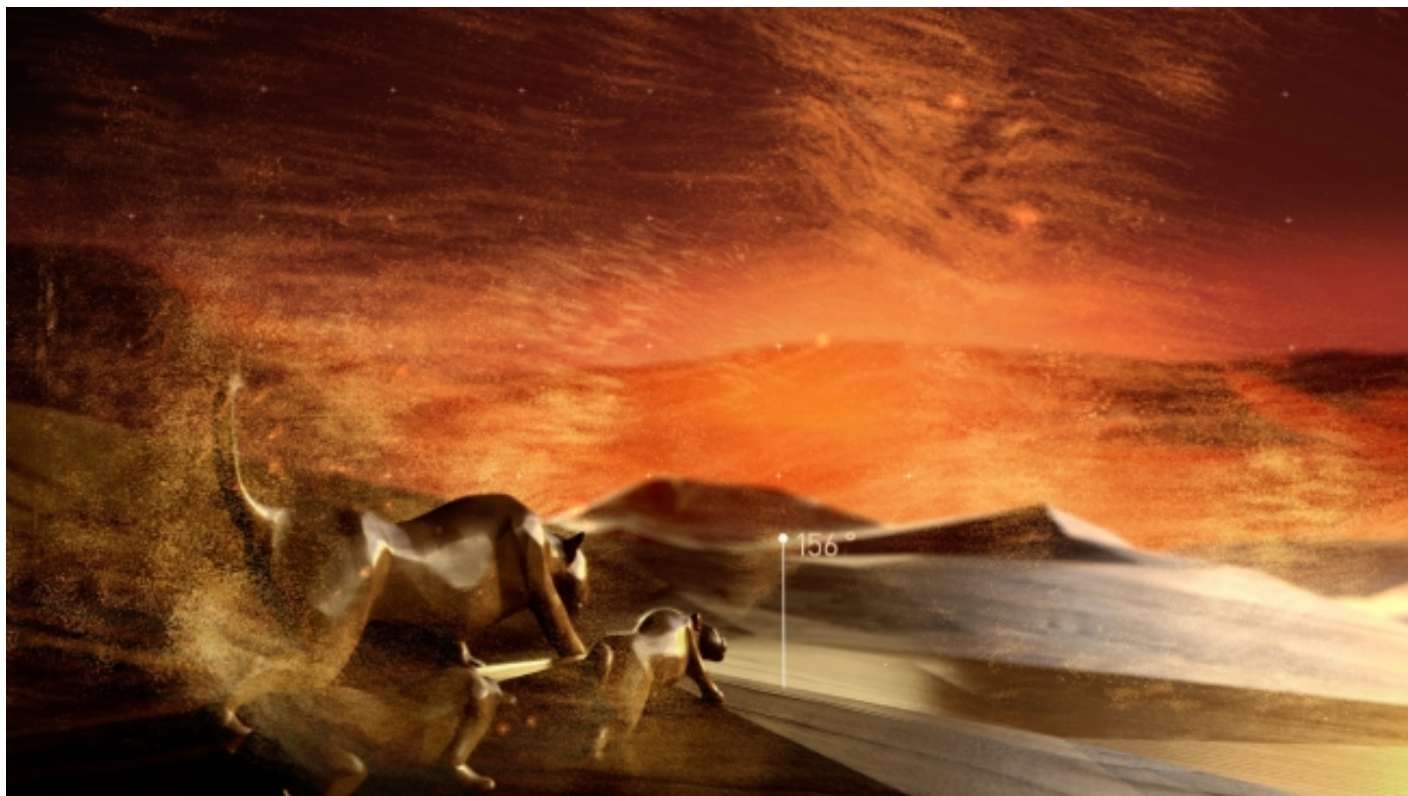
Big Machine used C4D and After Effects to build particle systems that allowed them to create the various environments seen in Future Cats.

Big Machine is also unusual among motion design companies in that they're represented by the William Morris Agency. Having already done previous shows for Discovery and National Geographic, the team was tapped to do a show for National Geographic Wild's annual Big Cat Week.

"They have all the archival footage you can imagine, but the one thing they'd always wanted to do, but couldn't, was a show about the future of the big cats," Petersen recalls. "They thought we could design a show that would allow viewers to visualize what big cats will be like in the future."

Dramatic lighting created using C4D and rendered in Octane helped reinforce the diorama-like look and feel.

Set in a polygonal diorama of sorts, the animals they came up with range from lean, muscular tigers that resemble woodcarvings to a metallic robot cat whose body was made by "kit bashing," or using bits and pieces from various models. Big Machine's modelers created a unique head for the robot cat and combined it with a mechanical body modified from an existing tiger model.

In tandem with Cinema 4D, Big Machine used super-fast OctaneRender, which has not yet been used very much for motion design and visual effects because it is new and has very specific hardware requirements. True to form, Big Machine had been using OctaneRender since it was in beta, and they were anxious to bring it onboard for this complex project.

The leopard's wood-like skin was textured in C4D with procedural modeling done in OctaneRender. Patterns on the skin were made using Octane's shaders.

"When we started using Octane it was mostly being used by architectural firms and car makers," says Carlson. "But doing something a little more abstract and design motivated let us bring Octane into a new area and gave us looks we hadn't seen before."

A Hybrid Approach
Big Machine explored a lot of different ideas for Future Cats before settling on a wood-carved, low-polygon hybrid look for a lot of the 3D work in the show. "That was perfect for blending what we knew how to do in Cinema with the looks that were achievable with Octane," Petersen explains. "It pushed the realism of the materials, lighting and the depth of field."
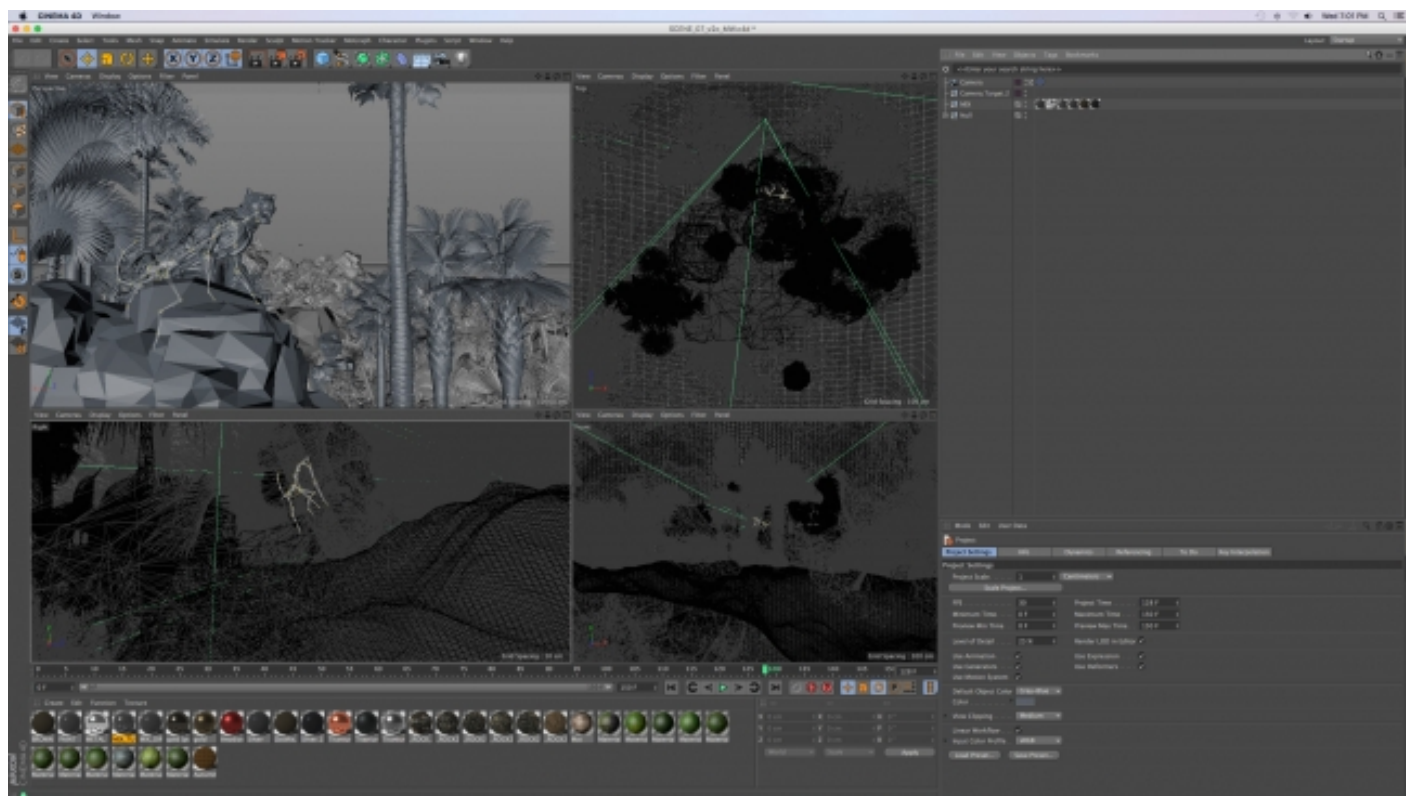
The robotic cat's head was modeled from scratch in C4D, while a series of touch renders tweaked the lighting on the typeface to give it the textural quality of brushed metal.

The team purposely stayed away from the photo-realistic style that's become the norm in 3D, especially when it comes to animating animals. Using Cinema 4D in conjunction with Octane, with After Effects for compositing, gave Big Machine's artists flexibility and allowed them to stay on a tight schedule, ensuring that 45-minute program would be completed in four months.

"The sheer amount of deliverables we had to do was bananas, literally hundreds in a very short amount of time at a high level of quality," says Petersen. To handle the unusual rendering needs of the project, Big Machine built a Frankensteinian computer, knowing that heat and power considerations would make an off-the-shelf PC unable to do the job. They dedicated multiple GPU cores to rendering, along with a custom-built power supply and ventilation system to keep the machine cool.
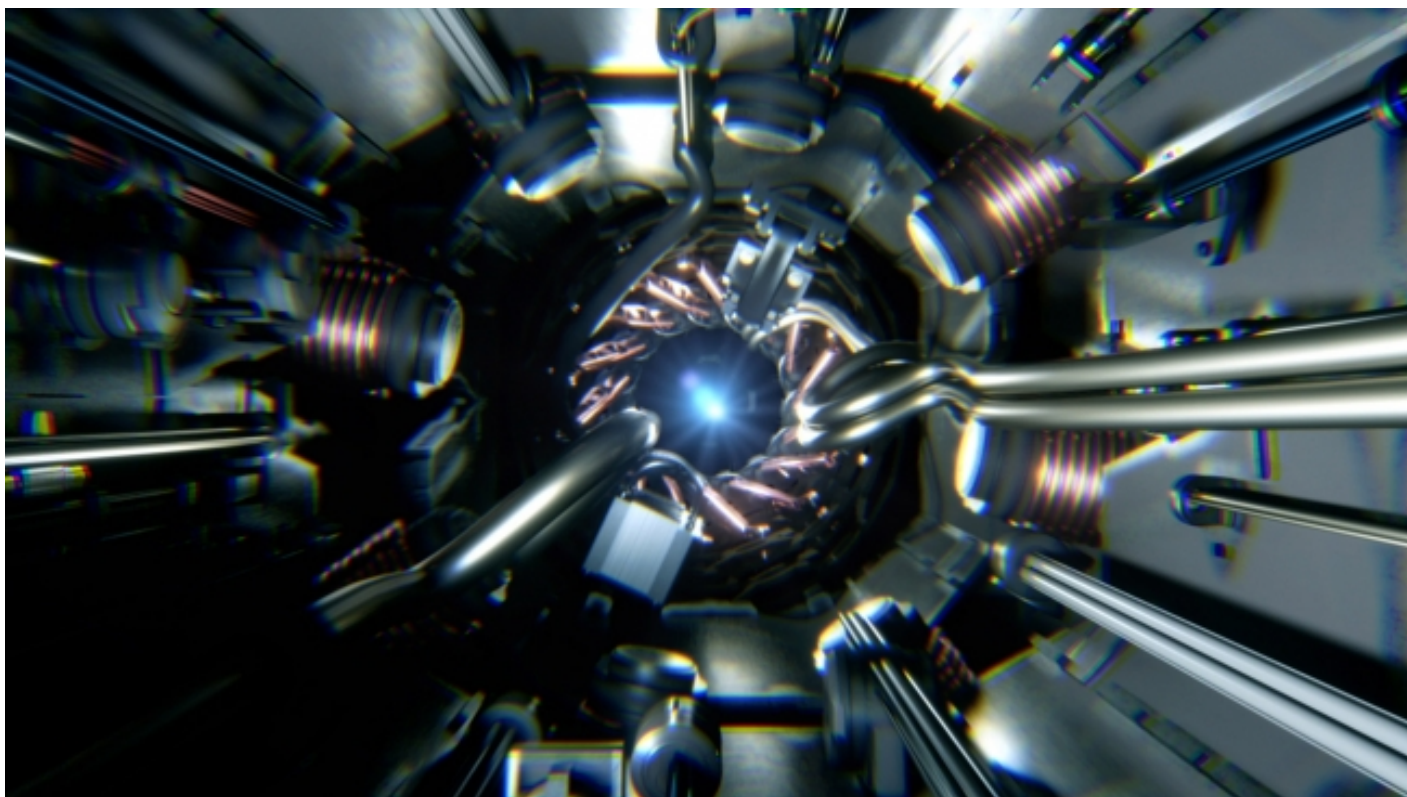
The show's title sequence ends with an immersive shot that moves out of the eye of a robotic cat into a resolve of the show's logo.

"In a traditional pipeline, you have to set everything in the view port and then render, and that takes a long time," Carlson explains. "With the workflow we set up using Octane, we could have our designers show Steve different looks, basically in real time, so we could dial in exactly what the quality of the lighting was going to be or what the different color palettes would look like."

That approach allowed the team to use unconventional elements to add depth to the show's look. About 10 percent of Future Cats used traditional matte paintings that were filmed in 3D and integrated with CG elements. "Having that painterly look up against these beautifully rendered CG scenes worked really well," says Petersen.

Since Future Cats, Big Machine has kept busy with an array of high-profile projects, including graphics for NFL Network's coverage of Super Bowl 50. As with every project, they are always innovating. "Hardware and software are always evolving," says Petersen, "but we always seem to find a way to max it out."

Dan Heilman is a St. Paul-based writer and editor.

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