

The Robots of LAIKA

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Figure 1: Animating the Giant Skeleton with motion control robotics

ABSTRACT

LAIKA, one of the world's largest stop-motion studios is also one of the industry leaders in robotic technology for film production. We present a talk explaining some of the ways we use our robots to move cameras, bounce sets, and generally work hand in actuator with our busy animators.

CCS CONCEPTS

• **Hardware** → **Electro-mechanical devices**; *Sensors and actuators*; *Safety critical systems*;

KEYWORDS

Animaton, Stop-motion, Robotic, Motion Control

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LAIKA is one of the world's largest stop-motion studios. Less well-known is that we are also an industry leader in the use of robotic technology for animated film production.

If you watch a LAIKA film and see a camera moving during a shot, or a boat being tossed in a storm, that camera or boat is being carried around robotically. That's the only way to get smooth camera paths over the many days it takes to animate a shot.

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We might call our machines “motion control system” – but robots are what they really are, and we use a lot of them. On any given day, we have more than 50 systems just moving cameras around.

Some of them are tiny, just big enough to sneak into a set to give a shot that “hand held” feel. Others are huge machines that fill an entire stage, giant legacy cranes built in the 90's to shoot enormous miniatures during Hollywood's golden age of practical modelmaking.

In addition to moving the camera around, robotic systems are all over the place helping animators with their workloads, allowing them to create shots that would otherwise be too extravagant for one artist to handle.

Often, this takes the form of bringing giant creatures to life. In *The Boxtrolls* we featured a puppet called “Mecha-Drill,” a steam-punk automaton puppet about 4 1/2 feet tall, and totally impractical to animate conventionally.

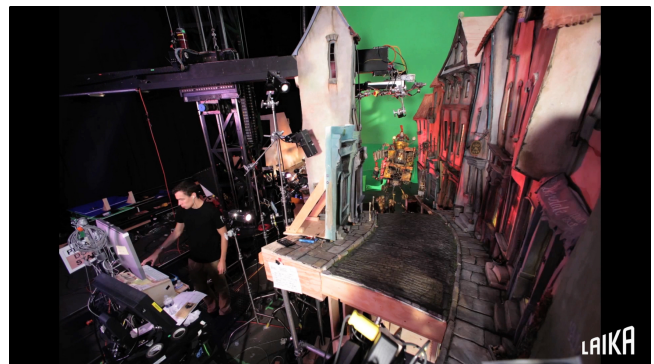


Figure 2: The Mechadrill from The Boxtrolls

To bring Mecha-Drill to the stage we built him a robot, which reached ten feet over the set from behind, carrying the creature and

moving it down the street, driven live by encoders manipulated by the animator.

We took this to the extreme in *Kubo and the Two Strings* with two of the largest stop-motion puppets ever photographed. One creature, The Giant Skeleton, stood over 18 feet tall and weighed more than 400 pounds. Though seemingly extravagant, building him full-sized allowed our animators to have hero puppets that physically interact with their nemesis.

Close behind was the creature from the “Garden of Eyes”. Another giant, even in puppet scale, this puppet was an eye the size of a beach ball on an eight-foot body.

Like the giant skeleton, Eyes had a robot to carry him around, controlled by an ‘anamorphic’ waldo for the animator. Unlike the skeleton there was no obvious precedent for what the input devices for a giant eye-on-a-stick should look like, so we had to use our imagination and made his waldo out of a bowling ball.

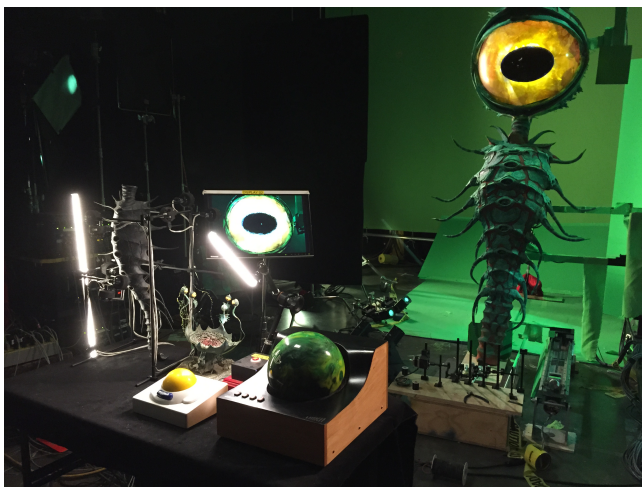


Figure 3: Giant Eye creature with bowling ball waldo controller

And not just cameras and creatures need to move. Often entire sets bound around to convey the motion of a boat in a storm or cart on a rutted road.

To accomplish this, we have built a fleet of six-degree motion bases. Developed entirely in-house, they employ the same hexapod technology used in flight simulators – just in a pint-sized scale.

This presentation will examine examples like these, where LAIKA uses robotic technology to advance the time-honored art of stop-motion animation.

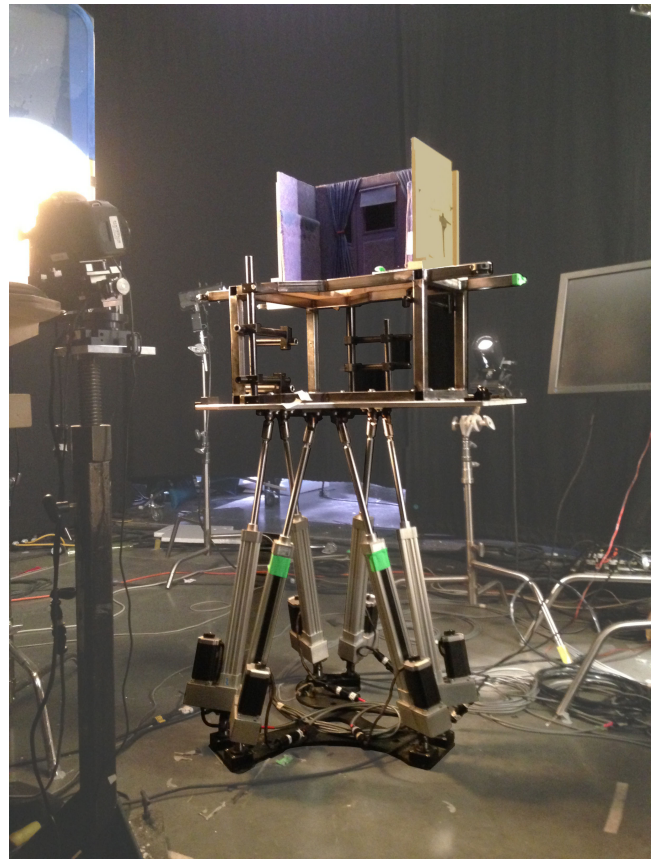


Figure 4: A miniature hexapod to simulate vehicle motion