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University of Idaho, Royal Veterinary College + University of Western Australia



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[Dr. Alexis Wiktorowicz, Royal Veterinary College](#)

Outdoor Motion Capture Kangaroo Studies



Challenge

Dr. Craig McGowan, from the University of Idaho, and Dr. Alexis Wiktorowicz, from the Royal Veterinary College in London are researching kangaroo movement. They aim to further understand how kangaroos change their body posture and hopping mechanics, with relation to their body size. Many species adopt more upright postures as they mature, reducing the mechanical demands on the musculature, which in turn increases their mechanical advantage.

As McGowan explained, "We're looking to understand how the mechanical forces – the loads that are acting on the body – shape the bones and the muscular skeletal structure. We've got some good data for a smaller group of animals up to 13lbs, and now we're extending that dataset to include animals that are as much as 66lbs."

In past research, Dr. McGowan and Dr. Wiktorowicz used regular high-speed light video to capture and analyze data for animal research. But their team was forced to hand digitize the markers on the animals in order to quantify various motions, which lengthened the research process significantly. Additionally, it was clear that to continue the study, they needed a more sophisticated system that could capture

and analyze data more efficiently and productively.

Solution

The research team partnered with Vicon, and set up a new system at the Alma Park Zoo in Brisbane, Australia. Their motion capture system was customized to include 12 Vicon T160 cameras with outdoor capability, Vicon Nexus software, and force plates to capture and analyze ground pressure at impact. The kangaroos then "hopped" through a corridor, and data was captured and analyzed.

Dr. Wiktorowicz explained some of the benefits, "Using a Vicon outdoor system is really beneficial and speedy. It lets me capture the force plate data and Vicon camera data as the animal is passing through the corridor, and automatically writes it to the hard drive for me. When I stop the trial, it auto advances to the next trial. The Vicon system is much easier. It can generate a lot of data, a lot faster."

Results

The Vicon system used by Dr. McGowan, Dr. Wiktorowicz and their team has created new avenues of research opportunity. Some of those benefits include a reduced workload, and the ability to analyze

real-time feedback of the forces acting on the body and the forces the animal generates, which gives them the ability to tell if they have great data almost immediately after capturing. Dr. McGowan concluded, "We've got a lot of really great data and with the help of Vicon we're going to be able to analyze it a lot easier."

The teams also had reservations about capturing quality data outdoors, but were extremely happy with their end results using Vicon T160 cameras with outdoor capability. Adding, "We were expecting the sun to be too bright to use an optical infrared system outdoors, but were really pleased the T160s handled it so well. We monitored the aperture and brightness throughout the day, but the cameras had a nice range to work with and flooding was never a problem. Data collection was excellent - the Vicon system exceeded our expectations!"

Technology Profile

Vicon T160 12 Camera System
Vicon Nexus Software

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