



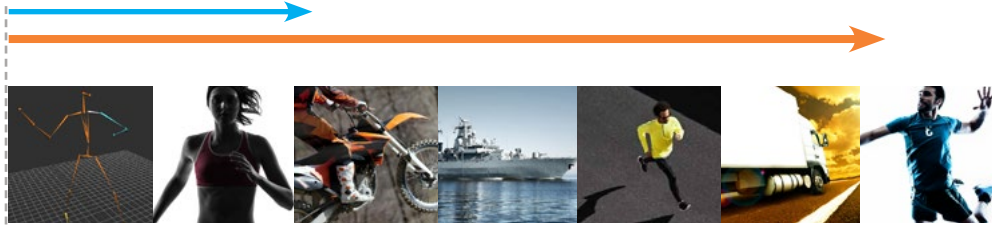
3-Space™
Inertial Motion Sensor



Case Studies

Yost Labs inertial motion sensor technology outputs fused motion data **300% faster** than existing solutions.

Our technology reduces IMU/AHRS latency, improves computational efficiency, and provides complete flexibility in data output format. And while we live and breathe motion sensor technology, **it's the innovative applications that allow these advances to shine.**



Guiding Drones

BACKGROUND

The US Department of Defense (DoD) produces seaborne target vessels—remotely piloted vehicles used for simulation and training exercises. These high-speed vessels must operate for over four hours at a time in a variety of punishing marine environments while maintaining precise orientation and attitude.

PROBLEM

The AHRS sensors that provide the necessary low latency and output accuracy have been very expensive. In addition, the DoD requires a specific calibration and wiring configuration for the sensors to interface with the other electronic components of their drones.

SOLUTION

Yost Labs designed a customized version of its 3-Space IMU/AHRS embedded sensor, including assigning a unique SKU (Stock Keeping Unit) to help streamline the procurement process for the DoD. Yost Labs' expert team provides ongoing tech support for DoD engineers.



Results

Yost Labs provided the DoD with a custom AHRS sensor that outperformed their legacy technology AND reduced costs by 80%. The Yost Labs sensor calibration and wiring configuration integrates seamlessly with the drone system.



Guiding Drones

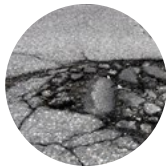
Protecting our Nation's Roadway Infrastructure

BACKGROUND

The Federal Highway Administration identifies America's aging road infrastructure as one of the key obstacles to safe, efficient transportation. To prioritize road maintenance, planners rely on a variety of road roughness measurement systems, from manual rod-and-level surveys to more expensive options.

PROBLEM

Manual collection of road condition data is labor intensive, time consuming, and expensive.



SOLUTION

Yost Labs is supporting a leading provider of smart roads technology with watertight 3-Space Sensors. These sensors are attached to the suspension of municipal vehicles and autonomously monitor bumps in the road—allowing potholes and other defects to be detected and tagged with GPS coordinates.



Results

With no cost or effort,
potholes are automatically
detected and crews are
dispatched to fix them.
Data gathered during
normal municipal fleet
operation enables cost-
efficient infrastructure
maintenance.



Protecting our Nation's Roadway Infrastructure

Going for Gold

BACKGROUND

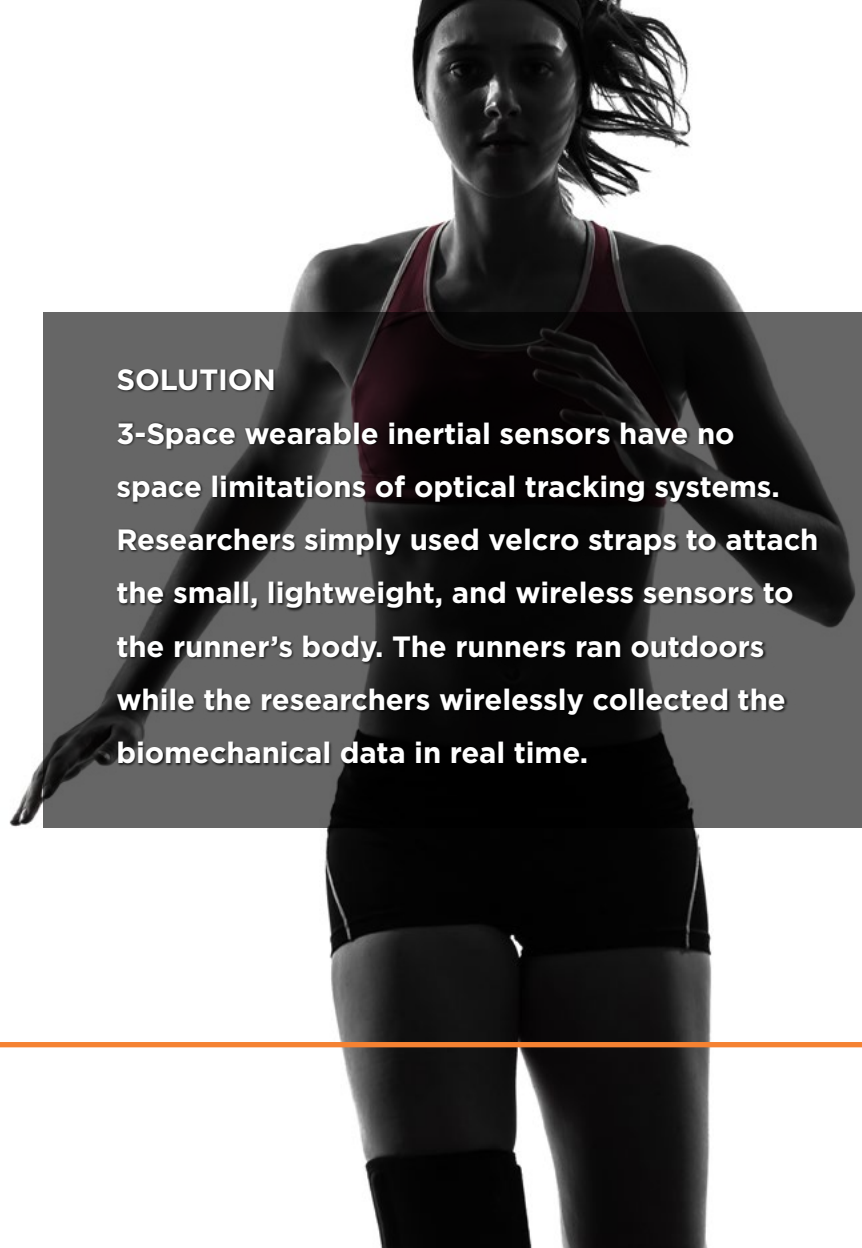
Improving athletic performance has become an increasingly scientific process. Since the 1990's, coaches and athletic trainers have applied motion capture technologies to digitally capture and study the biomechanics of movements. The motion capture rigs that have been used to study complex movements require special rooms instrumented with multiple cameras and therefore have limited application to movements that can be performed in small spaces, such as throwing and jumping.

PROBLEM

Marathon running requires a large space to settle into a steady-state endurance gait. Traditional optical motion capture studios are too small. In addition, any sensor that is heavy, bulky or has wires will affect the athlete's movements.

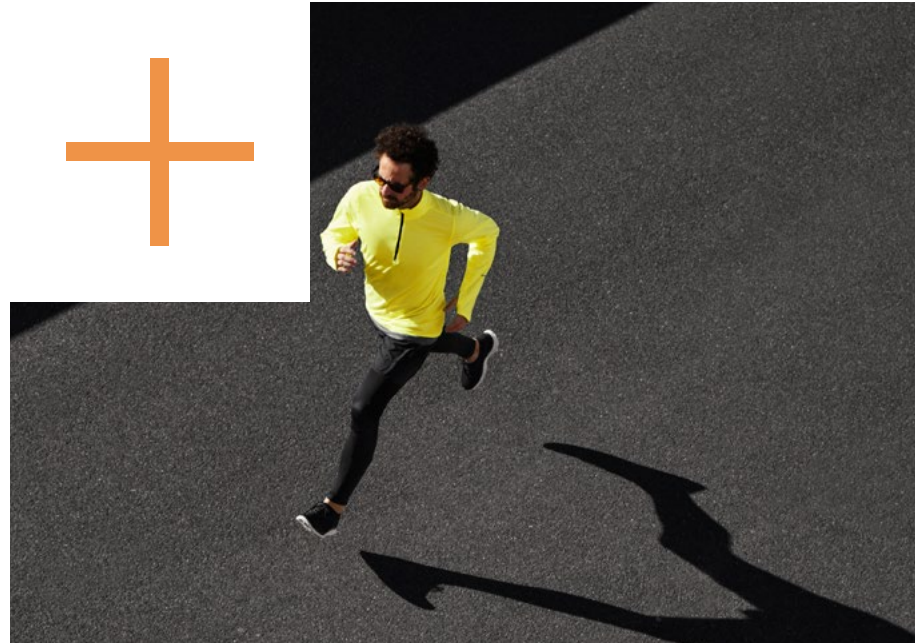
SOLUTION

3-Space wearable inertial sensors have no space limitations of optical tracking systems. Researchers simply used velcro straps to attach the small, lightweight, and wireless sensors to the runner's body. The runners ran outdoors while the researchers wirelessly collected the biomechanical data in real time.



Results

Coaches and athletic trainers were able to help competitors optimize their performance and minimize the chance of injury.



Going for the Gold

Studying Brain Trauma

BACKGROUND

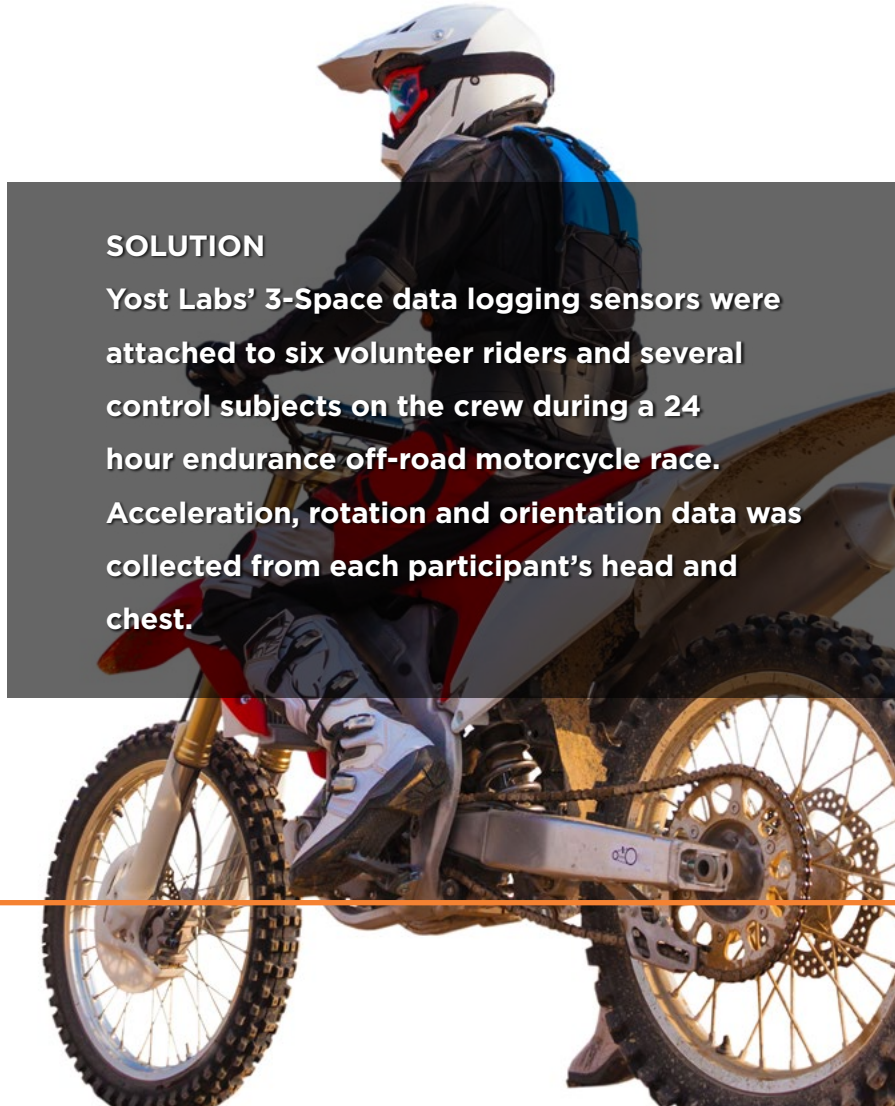
As awareness of the severe consequences of concussions and other traumatic brain injuries grows, researchers are taking a closer look at the biophysical risk factors that contribute to brain injury and chronic brain diseases.

PROBLEM

Off-road motorcycle racing exposes the rider to a variety of bumps and jolts. Previously, no study had quantified the magnitude of these impacts or made any evaluation of their clinical relevance. In addition, there had been no study of the role of fatigue in the rider's ability to maintain head stability during an endurance race event.

SOLUTION

Yost Labs' 3-Space data logging sensors were attached to six volunteer riders and several control subjects on the crew during a 24 hour endurance off-road motorcycle race. Acceleration, rotation and orientation data was collected from each participant's head and chest.



Results

The peak linear acceleration of the riders never exceeded 12gs—a level not known to be a clinically significant risk factor for acute or long-term brain injury. The riders had no significant decrease in ability to maintain head stability during the event. Yost Labs' inertial motion sensors played a key role in the first scientific study of the biophysics of off-road motorcycle racing.



Studying Brain Trauma

Bringing Life to Characters

BACKGROUND

The past 10 years have witnessed an indie revolution in video games, as small studios have created amazing titles in a variety of genres. Their interesting, innovative game experiences have transformed the gaming industry.

PROBLEM

For independent game developers, traditional motion capture has been unacceptable—it requires dedicated studio space, extensive setup, and is prohibitively expensive.

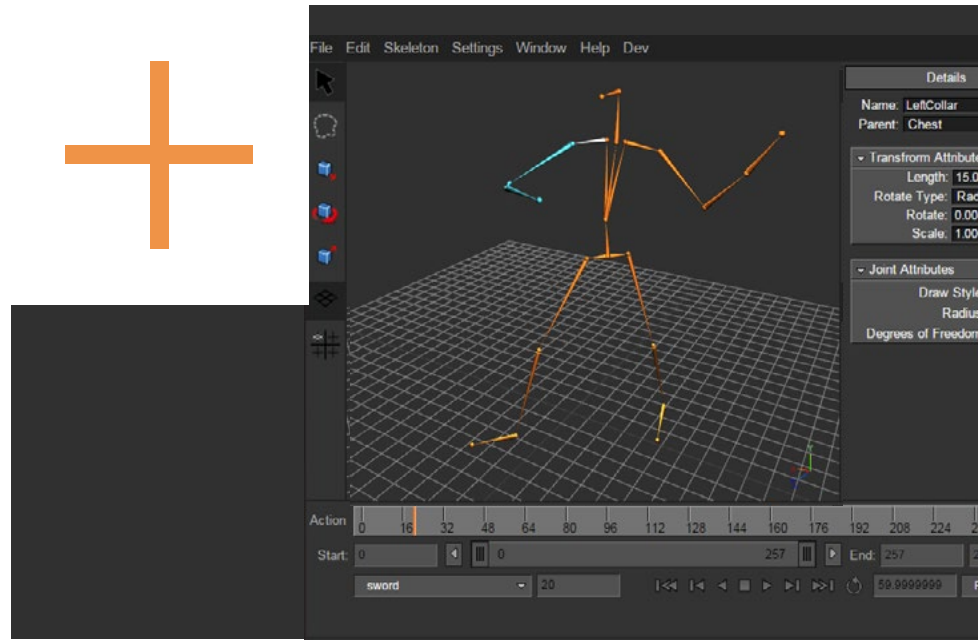
SOLUTION

Yost Labs created the PrioVR Dev Kit to break down the barriers to motion capture. For \$1200, developers obtain a full motion capture system that can be used anywhere—no studio setup needed—as well as free software to integrate mocap data into Unity, Blender, and other tools.



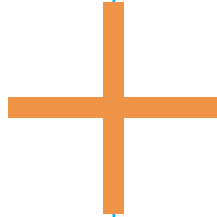
Results

With affordable, adaptable motion capture suits and software, any studio can bring lifelike motion to their games.



Bringing Life to Characters

Connect to Yost Labs



We're searching for innovative thinkers to take inertial motion sensors to new heights. If your project uses—or could use—IMU technology, we'd love to help. Through support and consulting services, our expertise is available to help you optimize the motion tracking capabilities of your project. Let us serve as an extension of your team. Learn more by visiting yostlabs.com or calling 614-219-6061.



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Made in USA. Patents:
8498827, 8682610, 9255799, 9354058.
Additional patents pending.

Sources:

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