


[Playbook](#)

The Wired World of Sports

[Previous post](#)

In-Chest Sensors Gather Data on NFL Prospects

By [Kyle Stack](#)  February 23, 2011 | 2:30 pm | Categories: [Apparel](#), [Data](#), [Training](#)



For years, the NFL Combine has been vilified as a host for a series of workouts that don't accurately measure a football player's impact on the field. Now, one company has potentially changed that with an electronic shirt that tracks everything from heart rate to g force of acceleration.

Somewhere between 10 and 30 prospects, including Heisman Trophy winning quarterback Cam Newton, will wear the Under Armour E39 compression shirt during [Combine workouts](#), which begin this Saturday. It weighs less than 4.5 oz and is made from the same material as the rest of the company's line of [compression-based apparel](#).

Yet just below the sternum, the shirt also contains a removable sensor pack called a "bug" that holds a [triaxial accelerometer](#), a processor and 2 gigabytes of storage. The information collected can be

broadcast via Bluetooth to smartphones, iPads and laptops so that scouts and trainers can view the power and efficiency of each athlete's movements. Heart-rate and breathing-rate monitors are placed on both sides of the sensor pack, helping to gather even more intel from the body's core.

“What we have is something very close to the body's center of mass that's measuring the accelerometry data from that center of mass,” Under Armour vice president Kevin Haley told Wired.com.

To incorporate the technology into the shirt, Under Armour partnered with [Zephyr](#), a data software company based in Annapolis, Maryland, which typically makes products for the defense and health care industries.

What Zephyr provided was a system that uses that center of mass to measure data. Although it [has been reported](#) that the E39 shirt uses electronic touch points to accumulate that information, Haley made clear that the touch points aren't the sensors people might think of as dotting various parts of a shirt — they're all located within the sensor pack.

The triaxial accelerometer inside the sensor pack measures acceleration and change of direction. It breaks down an athlete's movements along a [sagittal plane](#), which is a vertical plane passing from front to rear that divides the body into left and right sections. It provides a glimpse at how each side of the body is moving in sync — or out of sync — with the other during a sprint, for example.

Rather than rely on 10-yard increments as analysis for a football player's acceleration and explosiveness during a sprint, each player's stride can be dissected to assess where he excels and where he can improve to maximize effort.

Key to this is measuring a player's braking force, or the negative movements he makes which slows down his linear speed.

“If you're looking at acceleration or maintenance of top speed, one of the things that happens in the running mechanics is a period of time when your foot contacts the ground and you're braking — decelerating — until your foot gets through the hip, at which point you can re-accelerate,” Haley said, adding that 80 percent of acceleration is derived from the time the foot hits the ground until it's just behind the hip.

That's why it's so critical for an athlete *not* to decelerate during that motion, especially when the foot has contact with the ground. The accelerometer can feed data of these strides to an EKG-like chart on a computer which shows the braking and acceleration forces.

As an example, Haley cited one highly touted running back who was recently working out in Los Angeles in preparation for the NFL Combine. The speedster was running 20-yard sprints in the E39 shirt when his coach detected a deceleration between 10 and 20 yards. The player was taking the longest strides he could, with each foot braking as he attempted to use his other foot to catch up with the one in front of it.

The coach advised him to shorten his strides, so that each foot would hit the ground closer to the last one. “He was able to see a more consistent pattern of acceleration without having a braking force,” Haley said.

NFL Network plans to showcase several players who are wearing the E39 shirt. (E stands for Electric and 39 is the code from the first shirt Under Armour produced in the mid-'90s.) During Saturday's workouts, the network will follow one or two players at a time during various exercises, and viewers will be able to track a player's heart rate before, during and after a 40-yard dash, as well as go inside other biometric data.

Under Armour doesn't plan on making the E39 available at this time. After its debut this week at the Combine, the shirt will be made available to Under Armour's contracted athletes and schools, then elite trainers the company works with, followed by non-contracted teams that want to test the shirt.

Only then will Under Armour roll out a traditional retail introduction, capping a process that can take up to a year, perhaps in time for yet another round of NFL Combine's workouts.

Follow us on Twitter at [@kylestack](#) and [@wiredplaybook](#), and on [Facebook](#).

Photo courtesy Under Armour

See Also:

- [College Football Star Sports Next-Gen Shoe Tech](#)
- [Self-Cleaning Gym Gear Targets Bacteria, Sweat | Playbook](#)
- [Banned Shoes Bring Big Business to Basketball Startup](#)

126 retweet

Pages: [1](#) [2](#) View All

Tags: [biometrics](#), [Fitness](#), [Football](#), [NFL](#)
[Post Comment](#) | [Permalink](#)

Also on Wired.com

- [Alt Text: Not Everyone Subscribes to Apple's Plans for Domination](#)
- [Nerd Out on Next-Gen Noir, Win Memento Blu-ray](#)
- [Piracy Once Again Fails To Get In Way Of Record Box Office](#)
- [The Underworld Issue, Exposed](#)
- [Don't Expect The World's Navies to Save You from Pirates](#)
- [Apple's Vague Subscription Policy Sows Confusion, Doubt](#)