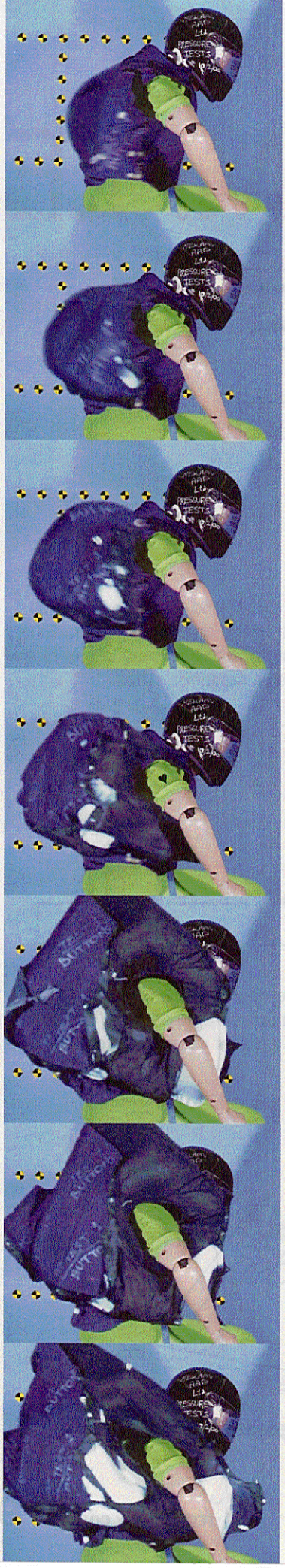

technology TODAY

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The Personal Airbag

EACH academic year, students of all ages engage in a science, technology, and/or engineering activity that involves protecting an egg from a sudden extreme force. In these scenarios, the egg usually represents a person who is about to experience an automobile crash or a sudden need to survive a fall from a great height.

Protecting people under extreme conditions is about to experience a new dynamic as the D-Air® vest is introduced all over the world during 2002. Many drivers will wear it as they partake in extreme motor-craft sporting events.

The initial engineering for this personal airbag originated with the Israeli engineering company Merhav AAP Advanced Airbag Technology. To bring their advanced airbag technology vest to the market, Merhav AAP collaborated with Dainese s.p.a., a company headquartered in Molvena, Italy, that is famous for its line of protective clothing for extreme sporting events. The sequence of photos shows this vest as it metamorphosizes into a life-saving personal airbag. To view a video clip of a D-Air® vest inflating, go to **www.dainese.com/E_profile.asp**, scroll down to the video camera icons, and follow Dainese's directions.

A computer controls the vest's STM (sensing, triggering, and memory) systems. Sensors that are located at key points in the vest collect data, which the vest's computer-control system interprets. The vest will inflate only if self-diagnosing software clearly detects the start of a crash. Activation is blocked if the sensors detect anomalous readings. The wearer of the vest has a display showing that the vest is functioning correctly and ready to fire its airbags in case of emergency.

When worn in an extreme motor-craft event, a piece of hardware connected to the motorcycle or other vehicle allows cross talk between the vest and the craft. This electronic wireless system serves the very critical function of telling the vest 3,000 times a second if the "values surpass established levels for the activity." In other words, the vest STM system will be told when the pilot is no longer safely attached or in control of the vehicle. To protect against outside interference, the vest's transmissions use individual security codes built to military standards.

The vest contains three separate automotive-type airbags that break predetermined vest seams as they inflate. These vest sections also have built-in body shields to protect the person's chest, hips, and back from the inflating airbags. Once fired, the vest's airbags protect the pilot's head, neck, back, hips, and chest as the rider hits the proverbial wall. The vest inflates in 30 milliseconds and holds its pressure for 20 seconds. Laboratory testing indicates that the vest inflates fast enough and stays inflated long enough to cover the critical time of impact. One can expect this safety system to move in time from the racetrack to your local sports warehouse.

Photos courtesy Dainese s.p.a.

The D-Air® vest, before inflation

Perhaps if Humpty Dumpy had on a D-Air® vest he might have survived numerous great falls, leaving all the kings horses and all of the king's men out of work again and again.

Recalling the Facts

1. Explain how the D-Air® vest operates.
2. How fast does the vest inflate and how long does it stay inflated?
3. In extreme motor sports, why does the vest need to communicate with the pilot's vehicle?