

## Wearable airbag

24 February 2017

What is a standard in the automotive industry could also become common in our daily routine – at least for seniors and for people performing (action) sports with a high risk of falling.

Wearable Airbags could be a great step for seniors to live independently for a longer time. According to **CDC** each year, 2.5 million older people have to be treated in emergency departments due to fall injuries. Over 700,000 patients a year have to go to hospital because of a fall injury – mostly because of a head injury or hip fracture. Besides the restrictions in daily life, the treatment resulting in falls can cause enormous costs. And not all of them are covered by insurances.

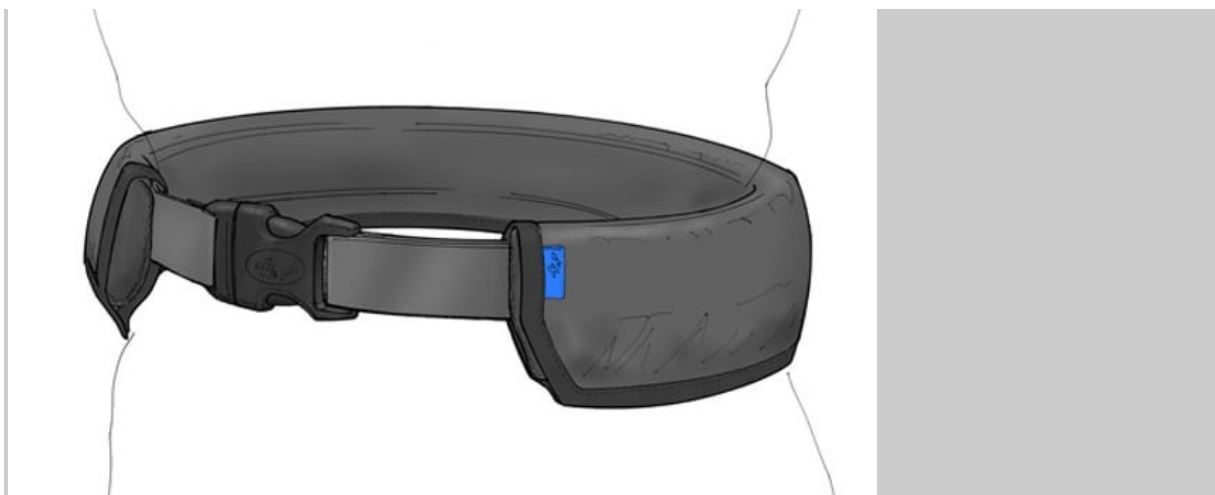
Several companies are developing a wearable, washable motion sensing belt which should be available soon, costing between 400 -800 \$

### 1. Wearable airbag designed to protect seniors when they fall

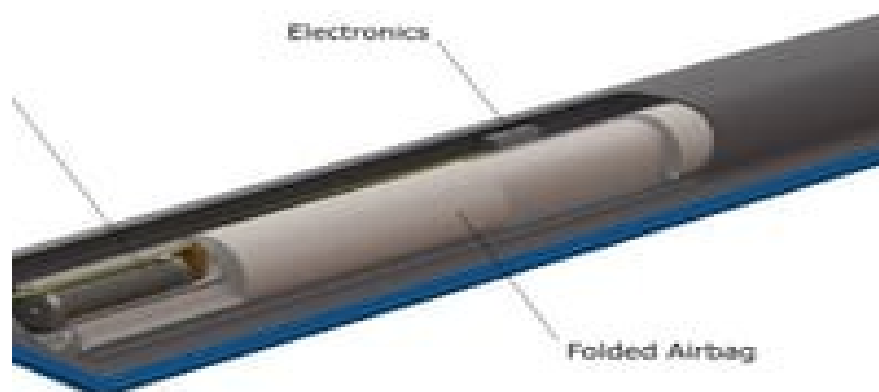


Ben Coxworth  
January 14th, 2015

<http://newatlas.com/wearable-airbag-hip-protection/35594/>



The Active Protective airbag (pictured above) reportedly reduces impact to the hip bones by 90 per cent.

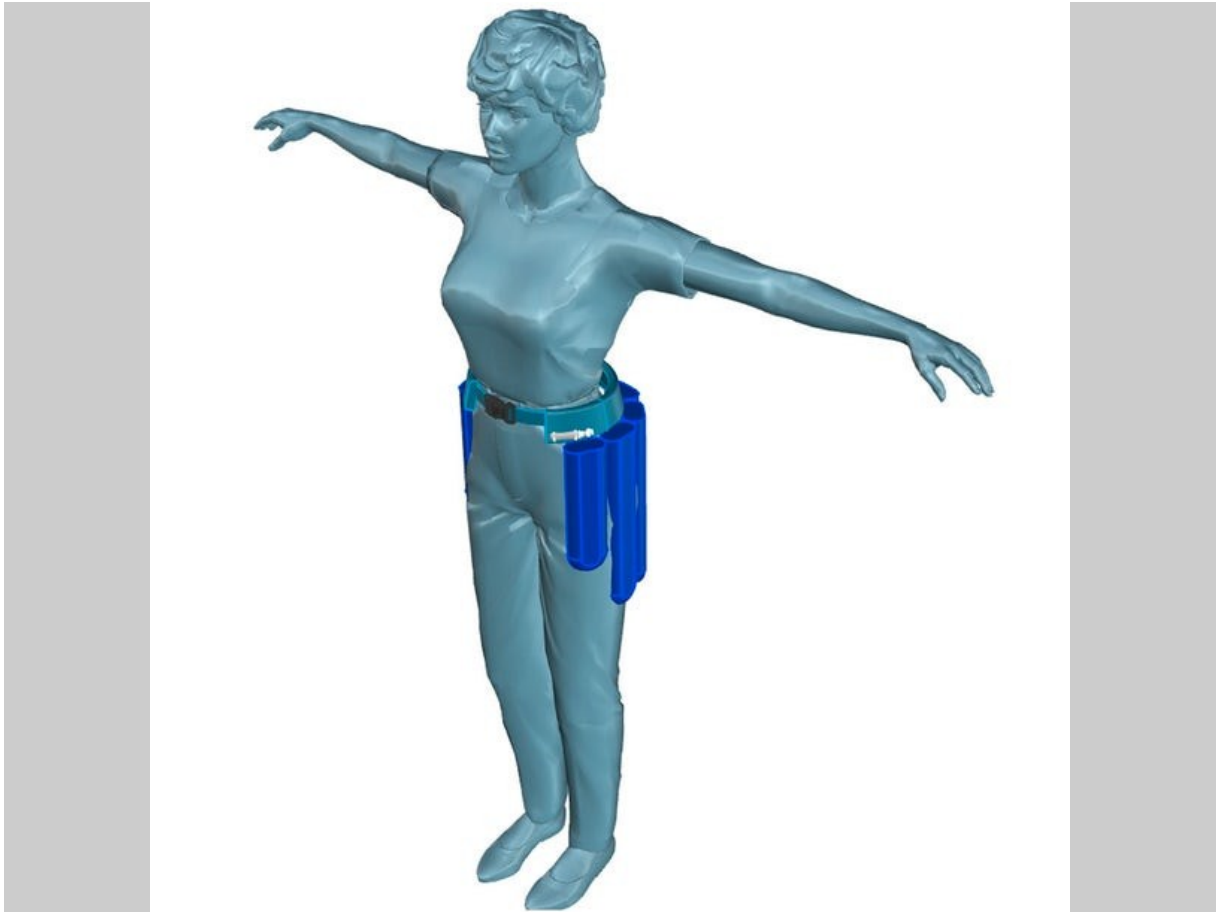


For anyone who uses a car, collisions are an ever-present danger – that's why vehicles are equipped with safety features such as airbags. For senior citizens, however, simply falling down can also result in life-changing injuries. With that in mind, Pennsylvania-based

company ActiveProtective is developing a wearable airbag that deploys in the event of a fall, to protect seniors' hip bones.

ActiveProtective's Chief Technology Officer, Dr. Robert Buckman, first came up with the idea when working as a trauma surgeon. He noticed how many elderly people were being brought into hospitals with broken hips due to falls, and how they often never entirely recovered from the injuries.

The resulting airbag is designed to be worn like a belt, either on top of or beneath the clothing. When its onboard 3D motion sensors detect atypical motion that's unique to falling, it uses a cold gas inflator (the same type used in seatbelt-mounted airbags) to deploy a slab-like airbag that runs down the sides of the hips. When the wearer hits the ground, the bag reduces impact force to the hip bones by a claimed 90 percent.



Functional testing of the device is taking place at Operative Experience, a Maryland-based business also owned by Buckman that builds human cadaver simulators used for teaching combat casualty and emergency trauma surgery. Testing of the airbag has already begun, using a replica of a 90 year-old woman.

So far, the results have reportedly been very promising. The company tells us that human trials are scheduled to begin this year, with commercialization planned for the end of 2016.

Source: ActiveProtective via Free Enterprise

## **2. This Wearable Airbag Protects The Elderly When They Fall**

<https://www.fastcoexist.com/3040932/this-wearable-airbag-protects-the-elderly-when-they-fall>

Developed in the Netherlands, the Wolk personal airbag is meant to offer protection. Containing an accelerometer and a gyroscope, it senses when someone falls and inflates quickly to offer a cushion. It's a lot like the ones in cars, except the elderly wear it like a belt.

Van Hellenberg Hubar stresses the Wolk still needs work. The company doesn't expect to have a device in stores until the beginning of 2016, at the earliest (the target price is about \$470, or 400 euros). "We have a prototype but we haven't done technical testing yet," he says.

Making the bag as inconspicuous as possible will be key, he says, because something bulky will make people feel awkward. "It needs to be ergonomically designed so it's easy for people to wear. It's important that there's no stigmatization and it doesn't affect their shape too much," he says.

The Wolk isn't the only airbag of its kind. Pennsylvania-based Active Protective is developing something similar, as you can see here.

## **3. A You tube video**

<https://www.youtube.com/watch?v=IOY40pWbqnA>

## **4. ActiveProtect Smart Garments to Defend Elderly from Falls (Interview)**

<http://www.medgadget.com/2013/10/activeprotect-smart-garments-to-protect-the-elderly-from-falls-interview.html>

**ActiveProtect Technologies**, a Philadelphia company, is developing novel technology directed towards protecting the elderly from harmful falls. We had

the opportunity to speak with Drew Lakatos, the CEO and President of ActiveProtect to learn about their technology and its potential applications.

**Gaurav Krishnamurthy, Medgadget:** What is the main product ActiveProtect offers and how did you identify the need for it?



**Drew Lakatos:** The main product of APT is a smart garment with 3D motion sensors, micro-airbags, and a sophisticated motion algorithm capable of determining a human fall prior to impact. Our wearable device is able to map normal behaviors and activities of daily living, and determine non-conforming departure sequences or ‘accidents’. Our issued patents have disclosed many things we can do with this – send an alarm, call for help, deploy protection, remote monitor, intervene prior to injury, etc. Our initial focus is hip fracture protection in the elderly, but our patented methodology also works for motorcycle, equestrian, military, sports, and high-risk occupational injury intervention. We can also solve current accuracy limitations with auto-fall detection PERS devices.

The need was identified by our CTO and inventor, who is a senior trauma surgery veteran, lifelong medical innovator, holds 15 patents, and is a former Lieutenant Colonel military surgeon. In a passionate quest to help his new patient population after retiring from the military, he identified the need to protect the frail, age-at-home elderly after witnessing first-hand the volume and life-altering impact of falls in seniors at his trauma center in Pennsylvania. He first sought to identify the key high fall-risk indicators to determine statistical probabilities of specific patients, and then spent years determining the key motor programs embedded in all of us that govern our day-to-day activities, in order to determine the departure signatures.



**Medgadget:** Can the ActiveProtect technology have applications other than elderly care?

**Drew Lakatos:** The methodology has many applications (sports, military, high-risk occupational). It vastly improves fall detection PERS devices (Personal Emergency Response Systems).

Any activity that can be motion-mapped, we can determine departures using our methodology.

**Medgadget:** When was the company started and at what stage is the product at? When will it be available to customers?

**Drew Lakatos:** Research began in 2002. We were incorporated in 2005. Patents were applied for and issued in 2006 and 2008, with a 3<sup>rd</sup> pending patent applied for in 2009. The shift from research to product development occurred in 2011. Our Gen4 research device was delivered in Q1 2013, our airbag hip garment was tested in Q2 2013. We are in the midst of a seed round raise to integrate the component POC technologies, refine the algorithm, and conduct a large scale research trial. Progress has slowed due to resource constraints, but with successful seed investment, we will have a commercializable device within 18 months.

**Medgadget:** Can the garment be re-used after a fall? Is it washable?

**Drew Lakatos:** The device is designed to intervene for two falls before needing to be 're-packed'. It will be washable, and we've gone so far as to measure the water temp in assisted care facilities in order to incorporate into our design criteria (it is significantly hotter than your residential washing machine).

**Medgadget:** Are there any other products on the market that you know of that attempt to protect people from falling? If yes, how is your product better?

**Drew Lakatos:** Passive, plastic hip pads have been around for twenty years. Their fatal flaw is wearability, and usability (see pictures below). They are 90% effective, but overwhelmingly rejected by patients and therefore seldom even recommended by caregivers. We are simply using technology to solve the wearability and usability issues that have killed the adoption of passive hip pads, and are doing it by using now commonplace technologies (inertial sensors, airbags, wearable device). We also offer new capabilities unrealizable with passive pads. Finally, we tested the impact attenuation of our airbag this summer at the Veterans Administration Gait Lab against the best (bulkiest) passive hip pads on the market. We exceed all of them, attenuating impact force by 90%+ with just 1” thickness of air inflation, which puts us well below the force required to fracture the femoral head.

## **5. Wearable Airbags to Protect Seniors, Motorcyclists, Skier and Cyclists**

<https://www.wearable-technologies.com/2016/03/wearable-airbags-to-protect-seniors-motorcyclists-skier-and-cyclists/>

by Stefanie Crucius  
30, 2016

March

**ActiveProtective** developed a belt that automatically inflates airbags over the hip when the sensors detect a fall. According to their website 1-in-3 people over the age of 65 will fall every year. Tests show that their device can reduce the impact force by 90%. The algorithm determines the event of a fall by the absence of stereotypical human motion. The company closed a \$2.4 million funding and announced a cooperation with Key Safety Systems (KSS), a leading global supplier of advanced engineered safety products for automotive and non-automotive markets in January this year. Future applications aim at sports, equestrian, high-risk occupational and military.

**Hip-Hope™**, from Israel, is a smart belt-like device reducing the impact to the hips during fall by inflating two large-size airbags. The system, more specifically the sensors and algorithm, makes it possible to distinguish between real falls and misleading fall-like events. The device includes an automatic remote fall alert transmission, motion and pre-fall data logging, and a self-

operated emergency button. Hip-Hope™ will be available at the end of the year in Europe and the USA. The price will be based on a monthly service model.

Wolk plans to release their first prototype in the first quarter of 2017 at a target price of about \$470. The Dutch company works on an ergonomically shaped belt-like device which can be hidden underneath most clothing and that way can be worn unobtrusive. A feedback speaker makes sure that the device is worn correctly.