

STMicroelectronics and the Wearable Technology Markets

Firefighters enter a burning house to put out the fire and search for survivors. Outside, their colleagues monitor their progress. Screens in the fire engines show views from helmet cameras, while displaying the temperature inside the building, the level of carbon monoxide, the heart rate of each firefighter and whether they are safe or in trouble. The firefighters are wearing smart helmets and smart jackets that measure these parameters and transmit the data wirelessly to the team outside.

This smart jacket, containing a wide range of sensors, as well as a wireless transceiver and a computer thousands of times more powerful than those that powered the early space missions, would have been considered a miracle of engineering a few decades ago. Today, ST can supply a full kit of market-proven parts at a tiny fraction of the cost of that first space-mission computer.

A grandfather, living alone, falls and lies unconscious on the floor. Within minutes, family or friends he had previously designated to be notified in case of emergency are alerted and arrive. He has been wearing a tiny device that simultaneously monitors many of his vital signs such as heart rate, temperature, movement and orientation. The device also includes a brain/microcontroller that analyzes all of the data it collects to distinguish between different scenarios, and it can wirelessly send an alert to pre-selected friends or family when it identifies a problem.

These are two examples, which are already being deployed, of how semiconductor technology can address key societal challenges. Whether protecting the safety of first-responders in an increasing urbanizing world or meeting the health and safety needs of an aging population that is increasingly likely to be living on their own, technology is being deployed and adapted in a broad range of wearable applications to address real-world challenges.

A fashion model sashays down a catwalk. Every movement of their head, feet, hands and even individual fingers changes the intensity, color, and direction of the lighting or controls some aspect of the ambient music. Motion sensors worn by the model communicate wirelessly with a computer programmed to interpret every movement in ways specified by the set designer and choreographer.

This technology, just around the corner, is not confined to catwalks. Soon, every would-be conductor will be able to conduct their own performance of their favorite symphony; raise the left hand to make the violins louder, point a finger towards the virtual trumpet and the angle of the finger will define the trumpets entrance.

These scenarios offer just a glimpse into how wearable technology could change our lives. Wearables range from the purely functional to the purely fashionable, from implanted devices that keep the body working to devices worn or carried as optional accessories. The applications will play in a range of current and future markets that Strategy Analytics projects to grow by more than 70% through 2017.

None of these scenarios depend on the development of radical new technologies. In fact, wearables are an almost infinite combination of four key semiconductor technologies that are already available in high volumes. STMicroelectronics, a global semiconductor leader serving customers across the spectrum of electronics applications, is unique in being a leader in all four of these key technologies:

(1) Sensors measure what's happening around us, from how fast we're moving and in which direction to ambient air pressure, temperature and relative humidity.

(2) Powerful, affordable, 32-bit microcontrollers provide the application's "brain" while occupying just a few square mm of board space. These electronic marvels are supported by comprehensive software libraries and development tools that accelerate application development.

(3) Power management and control technologies extend battery life or enable battery-less operation via energy harvesting.

(4) Wireless Communication technologies allow objects to communicate over distances ranging from a few cm to tens of metres.

The Fifth Dimension

As the world becomes more and more connected, the security of the communications between objects becomes more and more important. For example, a person wearing a 24/7 heart monitor would want to know that this private medical data can only be accessed by people with explicit permission. ST has been a leader in digital security for over 25 years and is able to offer leading-edge digital security for all customer applications, from the enterprise level that includes banking and energy metering to more personal smart glasses, belts, and jewelry.

STMicroelectronics sees Wearable Technology as a major opportunity to augment the world, from empowering individuals to be more creative and productive to addressing global societal challenges such as the world's ageing population. We work with customers worldwide to deploy our world-class capabilities in all four key semiconductor technologies - sensors, embedded processing, connectivity and

power management - and our unrivalled track record in close partnering with customers to deliver today's solutions and those that will change tomorrow.

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