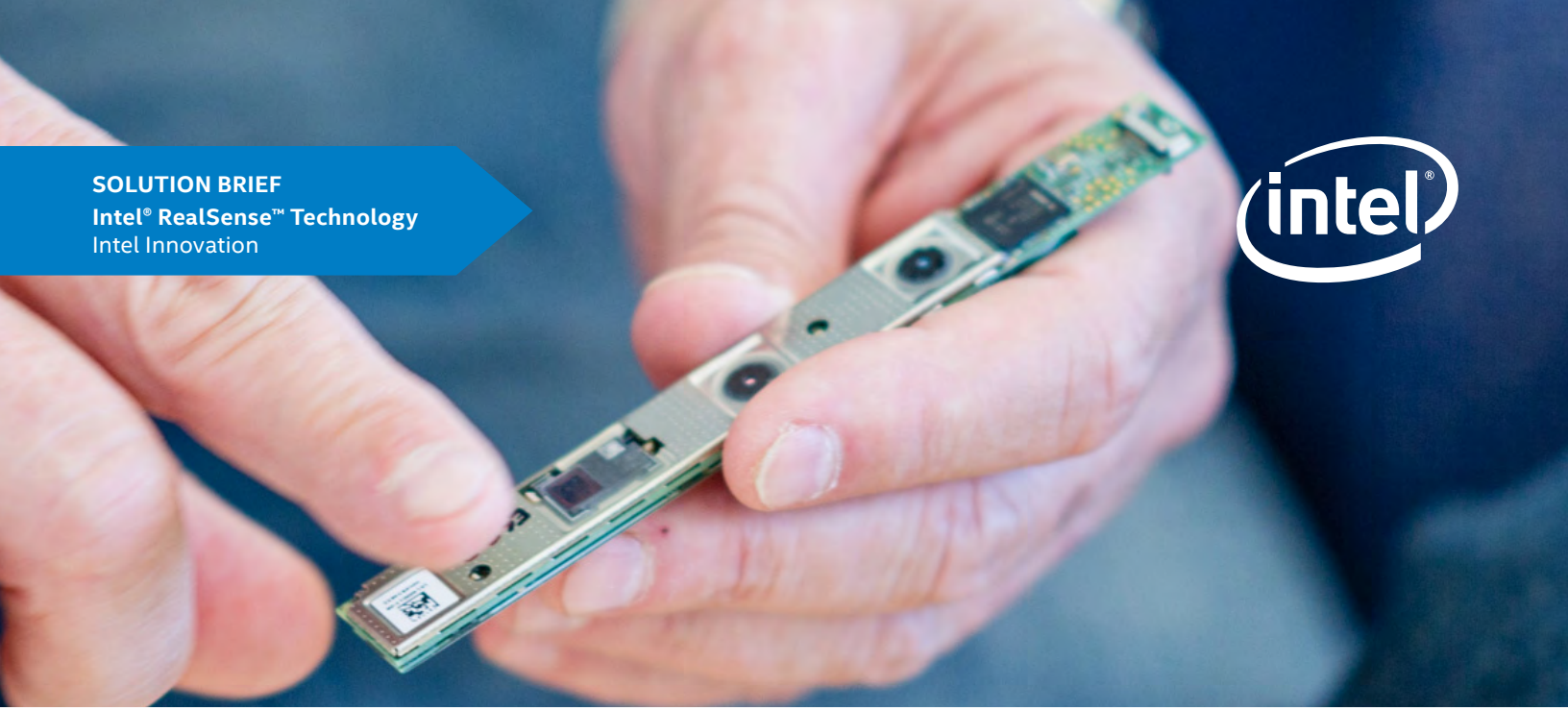


SOLUTION BRIEF
Intel® RealSense™ Technology
Intel Innovation

Intel® RealSense™ Technology Powers Machines That Can See

Features such as 3D camera, immersive collaboration, and natural interaction offer opportunities to transform many activities carried out by Federal agencies and branches of the U.S. military

Imagine the time savings – and increased safety – if a drone could inspect a ship's hull or an aircraft fuselage without touching it. What if Homeland Security trainees could mimic real-life interactions in immersive virtual spaces? Envision the transformation of equipment repair if a technician could scan and print parts in 3D, on site, even on a ship or in a remote area. These things and more are possible with Intel® RealSense™ technology.

At the 2015 Consumer Electronics Show, Intel demonstrated the power of this technology in a very real way. A drone equipped with Intel RealSense technology hovered center-stage. When each of the four people on stage repeatedly rushed at it, the drone dodged out of the way. It could "see" them, and easily evaded them. The ability for devices to "see" and adapt to their environment opens up a vista of new use cases for a wide array of devices.

Intel RealSense technology is already embedded in laptops and tablets. (See the sidebar, **Intel® RealSense™ Technology Powers Microsoft's New No-Password Login System**.) The opportunity exists right now to take advantage of this new technology and transform how Federal employees and members of the U.S. military do their jobs.

Dell's Venue* 8 7000 Series, the world's thinnest tablet that is also equipped with Intel® RealSense™ technology, won the prestigious 2015 CES "Best of Innovation" award.

How It Works

Devices with Intel® RealSense™ technology have three lenses: a conventional camera, an infrared camera, and an infrared laser projector. Together, the three lenses allow the device to infer depth by detecting infrared light that has bounced back from objects in front of it. This visual data, taken in combination with Intel RealSense motion-tracking software, creates a touch-free interface that responds to motions around it.

This technology enables the following:

- 3D scanning and real-time measurement
- 3D environment sensing
- Background segmentation
- Natural interaction with devices using gesture, facial expression, and speech recognition
- Augmented reality for immersive collaboration

A Sampling of Use Cases

It is impossible to list all the ways Intel RealSense technology can transform how Federal agencies and U.S. military branches do their jobs – new use cases emerge every day. Three such use cases are described in detail here, while the next page lists several more.

Parts Replacement Using 3D Printing

An engineer or repair technician uses Intel® RealSense™ hardware to scan the part to be replaced. Software uses the depth information gathered during the scan to accurately identify the part. Then printing instructions are sent to a 3D printer (also known as additive manufacturing). While this may sound futuristic, General Electric is already using additive manufacturing to make aircraft engine parts. If a 3D printer is not available, the app connects with a backend database to determine the best location to pick up a replacement part based on part criticality, cost, and other factors.

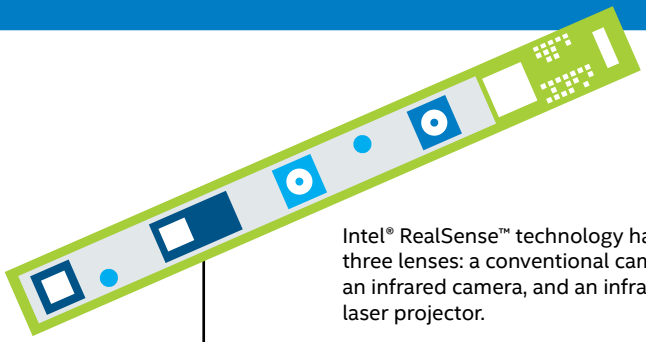
Damage Assessment

An aerial or crawler drone equipped with Intel RealSense technology takes 3D images of a ship's hull or an airplane's fuselage to assess damages for repair. Examples include bow plating damage, cable corrosion, or panel tears. The drone could also perform periodic routine maintenance. The operator reviews the 3D images of the damaged area and simply touches points on the image to measure the size of a breach.

Background Filtering

A Navy commander attends a video conference from the office, but does not want the wall maps and papers to be visible to other attendees. The commander's tablet is equipped with Intel RealSense technology, which enables the other conference attendees to see the commander, but nothing else.

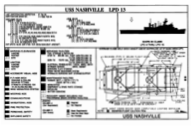
Understanding How it Works



Intel® RealSense™ technology has three lenses: a conventional camera, an infrared camera, and an infrared laser projector.

Drones equipped with Intel RealSense technology use visual data, taken in combination with Intel RealSense motion-tracking software, to create touch-free piloting.

Damaged ships could be assessed with touch-free piloting, allowing the operator to focus on the damage rather than the location of the drone.



Combined with information such as schematics, Intel RealSense technology could greatly improve preventive maintenance processes.

More Use Cases for Intel® RealSense™ Technology

Box Palletization and Ideal Cargo Arrangement

Operator or crawler drone uses Intel® RealSense™ technology to scan boxes in 3D to obtain box dimensions. App determines optimum packing configuration and shipping pallet size.

Trainee Response Monitoring

Trainee performs training routine while Intel RealSense technology tracks trainee's face and emotions. The technology combines selected training module with situational response to modulate difficulty and progression through training course.

Hazardous Material Inspection Using Drone

Drone uses Intel RealSense technology to take 3D depth images at closely spaced intervals, enabling operator to perceive depth when handling hazardous materials.

Surveillance and Reconnaissance

Unmanned surveillance drone uses Intel RealSense technology to provide images and maps while avoiding obstacles.

Hull Painting Using Drone

Using depth data provided by Intel RealSense technology, crawler drone assesses quantity of paint required and applies appropriate amount. 3D data enables effective feedback mechanism for uniform paint job by drone.

Hands-Free Documentation Access

Tablets with Intel RealSense technology enable operators to use gestures or even facial expressions to scroll through documents.

Augmented Reality for Training Purposes

Operator uses tablet with Intel RealSense technology to take pictures of engine bay and an app identifies various parts. Based on maintenance routine to be performed, appropriate spares are identified and the app shows how they fit together.

Pattern Matching of Potential Recruit Tattoos

Mobile app scans a potential recruit's tattoos and compares them against a database of known gang symbols. The technology identifies inappropriate recruits before lethal combat skills have been taught.

Intel® RealSense™ Technology Powers Microsoft's New No-Password Login System

Microsoft has chosen Intel® RealSense™ technology to serve as the foundation of the Windows Hello login system. Part of Windows* 10, Windows Hello is an enterprise-grade authentication system that enables users to securely sign in using facial recognition or their fingerprint.

According to Microsoft's official blog, all OEM systems incorporating the Intel® RealSense™ 3D Camera will support the facial and iris unlock features of Windows Hello, including automatic sign in to Windows. PCs with Windows 10 are expected to ship in late 2015.

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What's Next?

Intel is defining new and innovative usages for Intel RealSense technology. Intel is also continuously improving the technology by incorporating user feedback and insights.

Intel RealSense technology provides real opportunity: Federal agencies and U.S. military branches can use devices equipped with this technology, combined with the Intel® RealSense™ SDK, to develop apps that foster better collaboration, support natural interaction with devices, save time and money, and increase safety.

To read more about Intel® RealSense™ technology, visit **intel.com/RealSense**.

For more information about Intel Federal, visit **intel.com/federal**.

Follow the conversation: **#intelfederal**

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