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Tucson-based Raytheon missile factory's impact on Arizona economy estimated at \$2.1 billion annually

[Ryan Randazzo](#), The Republic | azcentral.com Published 12:00 a.m. MT Jan. 29, 2017 | Updated 1:59 p.m. MT Jan. 30, 2017



(Photo: Raytheon)

A large yellow robot carries a 50-pound missile "seeker" across the factory floor inside Raytheon Missile Systems' sprawling Tucson campus, running the high-tech component through a variety of tests.

The seeker acts as the eyes and ears of the missile. This particular model, worth about \$150,000, will eventually guide a bomb Raytheon is developing for the U.S. Air Force and Navy. Named Small Diameter Bomb II, the weapon can be fired from 40 miles away and strike a moving target concealed by dust or smoke by using radar, heat-seeking sensors and lasers for guidance.

The SDBII program is one of several Raytheon runs out of Tucson, the largest missile factory owned by the world's largest missile company.

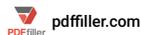
Programs like the SDBII add up to a significant contribution to the Arizona economy, with Raytheon estimated to have a \$2.1 billion annual economic benefit to the state, according to a new analysis from Arizona State University.

RELATED: [Tucson wraps up strong year for economic growth](#) (/story/money/business/economy/2016/12/09/tucson-wraps-up-strong-year-economic-growth/95202158/)

That figure includes all the direct spending by the company on wages and supplies, and the economic activity that takes place as a result. It is one of Arizona's largest companies, with nearly 11,000 workers, and [plans to hire about 2,000 more in the next five years](#) (/story/money/business/jobs/2016/11/18/raytheon-add-2000-jobs-over-5-years-major-tucson-expansion/94071542/).

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"To regional economists, this is what you covet," said Dennis Hoffman, director of the Seidman Research Institute at the W.P. Carey School of Business at ASU. "You want to make sure you have a critical mass of providers that produce goods or services that transfer out of the state so you can capture new dollars coming into the state. Aerospace and defense has been a stalwart for us since World War II."

MORE: [Guided Missiles: Arizona's most high-tech company](#) (/story/money/business/tech/2015/07/04/raytheon-arizonas-most-high-tech-company/29638507/)

The company's economic benefit extends beyond Tucson. Raytheon has more than 500 suppliers throughout Arizona, and more than half of them are in the Phoenix area.

The company reports spending more than \$100 million annually with those Arizona suppliers.

"All businesses add value to the state, but the local service providers don't have any services to provide if we don't have employment coming in from these big guys," Hoffman said.

'Big aerospace and defense sector'

A global report last year by PricewaterhouseCoopers ranked Arizona the No. 1 state for investment in aerospace. The state moved up because of improvements in what it costs companies to operate here, and because the state has the sixth best property tax policies and third best unemployment tax policies, according to the study.

Hoffman's group has conducted several similar economic studies of businesses or large events in Arizona. He said he considers the largest economic benefit attributable to a single sector to be the Defense Department.

"But not for the Department of Defense, where does Raytheon go, Boeing go, the defense element of Honeywell, Orbital, General Dynamics?" he said. "I see it as a big aerospace and defense sector."

Raytheon got its start in Tucson in 1951 when Hughes Aircraft Co. decided to build the facility. Hughes bought the General Dynamics Corp. missile business in 1992 and, while merging it with its own missile line, based it in Tucson. It later consolidated about 2,000 out-of-state jobs in Tucson. Raytheon Co. bought the Hughes defense business in 1997.

The company's history being tied to warfare has drawn criticism over the years, from the controversial success record of the Patriot missiles during the Persian Gulf War in 1991 when they were intended to shoot down Iraqi Scud missiles, to more recent tests where the goal is to shoot down intercontinental ballistic missiles.

The company has had major successes as well. Its massive Tomahawk Cruise Missiles have been fired more than 2,000 times by U.S. and British forces in a variety of operations, including recent actions against ISIL terrorists in Iraq and Syria.

The prospect of President Donald Trump has spurred investor interest in the company.

The stock was trading for about \$136 the day before the Nov. 8 election, and shot up to more than \$146 on Nov. 9, the day after Trump won, and remains in that range.

Getting bigger



Raytheon employee Tony Vulcano uses a robot to carry a small satellite at the company's Tucson facility. (Photo: Raytheon)

The company already is [about the 13th largest in the state \(/story/money/business/jobs/2016/04/22/republic-100-report-highlights-arizonas-top-employers-workplace-trends/83313758/\)](#), and the additional workers could easily put it in the top 10.

The growth will support existing and new programs, said Kim Ernzen, vice president of operations for Raytheon Missile Systems, a subsidiary of Waltham, Mass.-based Raytheon Co.

The SDBII weapons being made in Tucson eventually will be used on the F-35 Joint Strike Fighter, the F/A-18E/F Super Hornet and the F-15E Strike Eagle aircraft, according to Raytheon.

The SDBII is one of several weapons built in Tucson. Others include AMRAAM missiles fired from jets, tube-launched TOW missiles, and the iconic Tomahawk cruise missiles.

The company is constantly seeking highly skilled engineers.

MORE: [Top 10 Arizona business stories of 2016 \(/story/money/business/2016/12/23/top-10-arizona-business-stories-2016/95670890/\)](http://story.money/business/2016/12/23/top-10-arizona-business-stories-2016/95670890/)

"We are making very smart, capable weapons here," Ernzen said. "These are not toasters."

She said the company has invested "hundreds of millions" in automating and upgrading its Tucson facility in the last five years. Automating some of the processes used to make and test those weapons allows for higher volumes and greater precision.

"We have much higher demands from our customers from a performance standpoint," Ernzen said, comparing her manufacturing to common consumer goods. "You only have one chance to get a missile right."

Growing demand for missiles

Analysts recognize increasing demand for missiles.

"Every time I turn around it seems like there is a new, competitive missile opportunity out there," said Pete Skibitski, an aerospace and defense analyst at Drexel Hamilton, a national broker-dealer, during a Thursday conference call with Raytheon executives.

Raytheon Co. CEO Thomas Kennedy said during the call that the company is seeing missile demand from three business lines, including counter terrorism.

"There is a heavy demand for precision weapon munitions in that area to minimize collateral damage, but yet be able to strike at the terrorists, in this case here, ISIS," Kennedy said. "As you know, the new administration has made a statement here that they are going to go after ISIS. So we see a significant demand pull in terms of these precision weapons."



A small robot applies glue to the lens of a missile seeker at Raytheon in Tucson. The lenses can easily be inverted by human engineers, and using the robots helps free up workers from mundane tasks to focus on more complex work that can't be accomplished by machines, officials said. (Photo: Raytheon)

Kennedy said the company also sees demand for new, high-speed "hypersonic" weapons, and missile defense.

"With the near, pure threats with some rogue nations, it is driving some significant demand signals there," Kennedy said. "Missiles will be the leader in the business in terms of revenue and new bookings in the next several years."

Automation in the missile factory will help meet that increasing demand. New robots can move missiles and components from one testing station to another. Previously that work was somewhat tedious and accomplished by technicians, who had to wear protective gear because of the weight of the warheads.

For example, the \$25 million robot Raytheon purchased to test the SDBII seekers is allowing the company to increase production rates. It previously took 2½ hours for engineers to put a missile seeker through a series of tests, moving it about with lifts and carts. The robot can now accomplish the tests in about 15 minutes.

Robots are being used in other parts of the factory as well. Once the missiles are armed, the caution required to move them increases. Large automated carts that carry missiles from station to station handle this type of work much more safely and efficiently than humans, she said.

That means Raytheon can make more weapons at lower cost. Ernzen said production in Tucson in 2016 was two-and-a-half times what it was in 2015.

Virtual reality

Raytheon also is incorporating more virtual reality into its business as it develops new weapons and new factories. The company uses a virtual reality "cave" in Tucson where engineers can take an immersive, three-dimensional voyage into a weapon or into a factory space before it is built.

The company began using virtual reality three years ago, but recently revamped the space dedicated to the technology because it was saving the company so much time and money in development.

"What used to take 12 weeks now takes 12 hours," said Kendall Loomis, manager for the Immersive Design Center.

Engineers previously would review drawings for a weapon and, when changes were needed, they would send their notes back with the drawings and wait months for the new drawings to arrive. Now they often can step inside the cave, put on the 3D glasses, review the weapon and get updated drawings while they step away for lunch, Loomis said.

When Raytheon was designing a new factory space, the company invited engineers to take a virtual tour of the factory as it was planned. Loomis said they offered prizes for the employees who made the most suggestions regarding how to change the layout.

"We started to have this very collaborative conversation," she said. "It became a very dynamic environment."

Eventually, Loomis hopes workers can be trained on how to work on missiles by first learning the tasks in a virtual environment, which is safer and doesn't require shutting down a working factory floor.

Raytheon Missile Systems by the numbers

10,700: Employees in Tucson.

\$2.1 billion: Annual economic benefit to Arizona.

More than 500: Arizona suppliers.

\$100 million or more: Paid annually to Arizona suppliers.

50 percent: Suppliers in the greater Phoenix area.

2,000: New employees expected in the next five years.

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