

# Festo has BionicANTs communicating by the rules for tasks

27 March 2015, by Nancy Owano



Credit: Festo

Germany-based automation company Festo, focused on technologies for tasks, turns to nature for inspiration, trying to take the cues from how nature performs tasks so efficiently. "Whether it's energy efficiency, lightweight construction or function integration – over time, nature has developed a wealth of optimization strategies for adapting to its environment, and these strategies can be applied to the world of engineering," a Festo sentiment shared by many engineers outside of Festo.

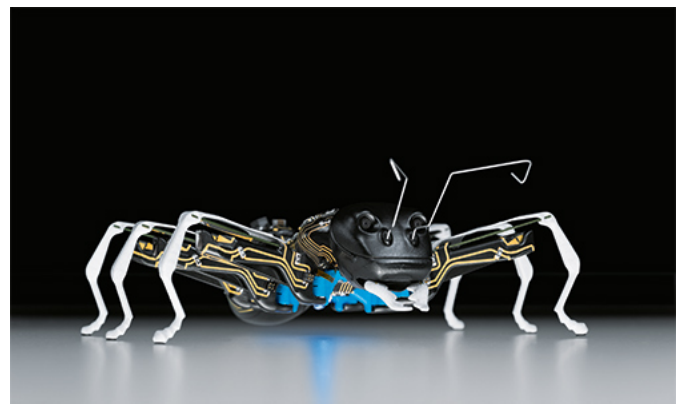
Their latest focus of nature study is the ant. Festo has transferred what they see in ants over to the world of technology, creating their BionicANTs. These are artificial ant units that move together under clear rules. They are showing off their cooperative behavior for doing tasks and working as an overall networked system. The company named their creations BionicANTs, to also stand for Autonomous Networking Technologies. The company sees them suitable as development platforms for new technologies and production methods.

Why ants? "Ants are seen as industrious workers

that can carry a hundred times their own body weight," said the company. "They live in big colonies with a clear ranking order and set rules. In an [ant colony](#), every creature knows which tasks need to be fulfilled. In this way, they can complete work together that a single ant could not manage on its own."

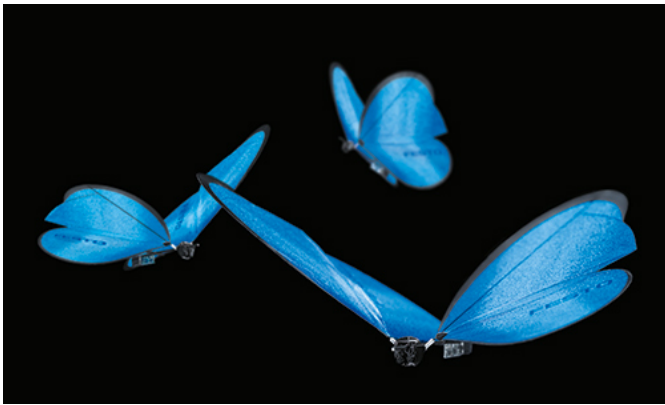
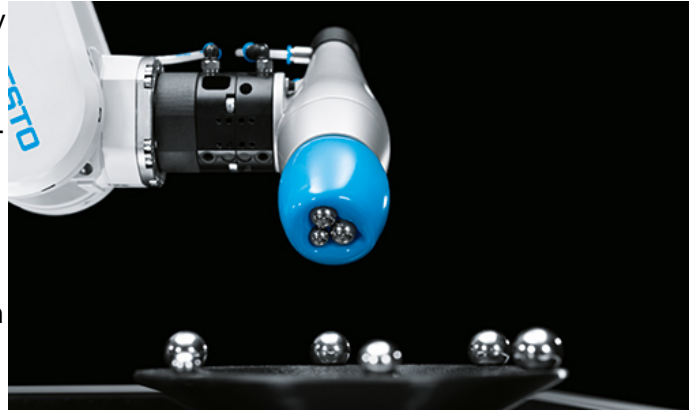
A video shows the bionic ants cooperating to drag an object across the floor. Ehsan Knopf in [9NEWS.com.au](#) described what the Festo team accomplished: "Powered by ceramic motors, guided by an optical laser and communicating via WiFi, a trio of bionic ants have teamed up to move an object across the [floor](#)." He said they were created "using a 3D printer to craft a carapace overlaid with electronic circuits."

Components are described as laser-sintered, embellished with conductor structures. The bodies of the BionicANTs have [polyamide](#) powder, melted layer by layer with a laser. The ant-like creations use a 3D stereo camera in their head to identify the gripping object and for self-localization. An opto-electrical sensor in the abdomen uses the floor structure to tell how the ant is moving in relation to the ground.



For legs, Festo makes use of piezo technology; they said the bending actuators can be controlled quickly and precisely, work on little energy and do not need much space. Specifically, they use "piezo-ceramic" bending transducers in the legs' actuators.

Knopf said Festo will officially debut the bionic [ants](#) at the Hannover Messe technology trade fair, which runs from April 13 to 17. The event showcases advances in industrial automation, energy and environmental technology, production engineering and services and R&D.



In the bigger picture, the BionicANTs platform might find its place with changes in industry production.

Festo said, "A fundamental change is taking place in the world of production. The future is calling for ultimate flexibility and convertibility. In future, the trend will increasingly move in the direction of customized products. The small quantities and high level of variety associated with this require technologies that continually adapt to changing conditions. The components in industrial facilities of the future must therefore be able to coordinate themselves. Tasks that are now managed by a central master computer will be taken over by the components in future."

**More information:**

[www.festo.com/cms/en\\_corp/9617.htm](http://www.festo.com/cms/en_corp/9617.htm)

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