

3D PRINTING ROBOTS



Robotic Product Development Gears Up with the Help of Dimension 3D Printers

"We use our Dimension to not only create prototypes, but also production parts – and that's something we couldn't do with any other 3D printer."

— Alexey Knyazev, CEO

Dimension made it easy to try out new designs by modifying the original R.BOT.

3Detection Labs develops innovative and high-tech safety protection systems and robotics. Although the company is relatively young, its designers and application engineers have extraordinary product development experience resulting in projects that are executed at the highest technological level, in the shortest amount of time. Their highly qualified research and engineering staff are able to realize the complete cycle of a project starting from an idea to implementation of a finished product – thanks in part to their Dimension® 3D Printer.

Today, 3Detection Labs actively develops robotics: multistage manipulators, hinge rotating mechanisms, gyro stabilized platforms, wheel reduction gears and drive units. Less than a year after the company started, it became clear that there was a need for rapid production of mechanism components for modeling of finished products, construction testing and error identification.

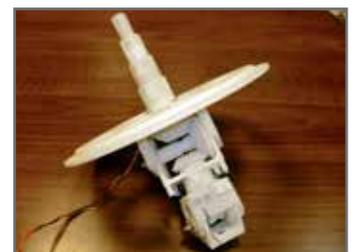
To fill this need, 3Detection Labs purchased a Dimension 3D Printer to create concept models and prototypes from thermoplastics fast. "The parts we produce during robot development are so complex in geometry that we couldn't easily and inexpensively create them without our Dimension 3D Printer," says Andrey Vasilyansky, CFO.

After using the Dimension 3D Printer for a few months the team was pleasantly surprised at the number of components they produced. Among the components were gears with pitch from 0.6 mm (0.024 in), which actually operate and fit perfectly into counterparts of models with zero clearance, slide bearings and load-bearing cases which are affected by significant load.

Besides all of the product development benefits, the team finds it fun to print designs at the touch of a button. It takes just seconds to send a model to the machine for printing where it immediately begins building with an approximate speed of 10 cm³ (0.6 in³) part volume per hour. And, sometimes 3Detection Labs uses their 3D printer to win customers. Once, in order to demonstrate the potential of 3D printing to a customer, 3Detection Labs printed the visiting



The R.BOT 100.



The R.BOT's unique four-stage head swinging mechanism was built as a functional model on a Dimension 3D Printer with ABS plastic.

customer's name during their meeting. Leaving the meeting with a nameplate in hand not only left a good impression, but served as a reminder of 3Detection Labs' capabilities.

One of the most well-known projects at 3Detection Labs is the R.BOT 100 – an interactive mobile robot with remote presence technology. Before die production, the robot and its unique four-stage head-swinging mechanism were built as a functional model with the help of Dimension. Testing fully functional models gave the team an opportunity to find weak points in the mechanical strength of the device and streamline the assembly process. "Testing form and fit with accurate parts is essential in robotic development. Our Dimension 3D Printer creates parts that are not only accurate, but strong - giving us parts that match our designs and hold up during testing," explains Alexey Knyazev, CEO.

Thanks to this working model, changes were made in a short amount of time and immediately taken into consideration for production of dies. Because it's much more expensive to modify dies, total expenditures for executing this project were significantly reduced. Moreover, product development time was shortened. As a result, it took only half a year from the start of work till the production of finished parts.

As an experiment during the assembly of one of the first robots, a neck-reduction gear built with the Dimension 3D Printer, was installed instead of a production version. The robot underwent a normal month's worth of work. To the designers' surprise, the part built with their Dimension 3D Printer was not worn out even though the reduction gear was used extensively. "We use our Dimension to not only create prototypes, but also production parts – and that's something we couldn't do with any other 3D printer," says Knyazev.

With this type of success, it's easy to see why they continue to use 3D printing to improve the design of new R.BOT models. More recent R.BOT series have advanced manipulators that simulate the movement of a human arm. 3Detection Labs attributes this success directly to 3D printing and its ability to produce accurate models that allow their engineers to test form, fit and function fast.

You can see R.BOT robots used in education, health care services and culture. Today, 100 R.BOT's are used throughout Russia: in Moscow schools advancing education of handicapped children, in the A.P. Gaidar Central City Children's Library, in the Center of Children and Youthful Craft "Bibirevo", and receiving practical approval in the Central Clinical Hospital named after A.A. Vishnevsky.

New robotic devices are actively being developed with the help of Dimension 3D Printers. Leadership of 3Detection Labs hopes that increased revenue will make it possible to purchase more Dimension equipment for rapid prototyping in near future.



The complicated motor assembly for the head swinging mechanism was built out of ABS too.



The R.BOT's neck reduction gear prototype was so durable it was installed instead of a production part.



Forearm of the R.BOT.

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