



MEPhI harnesses 3D printing technology to quickly prototype much-needed engineering solutions

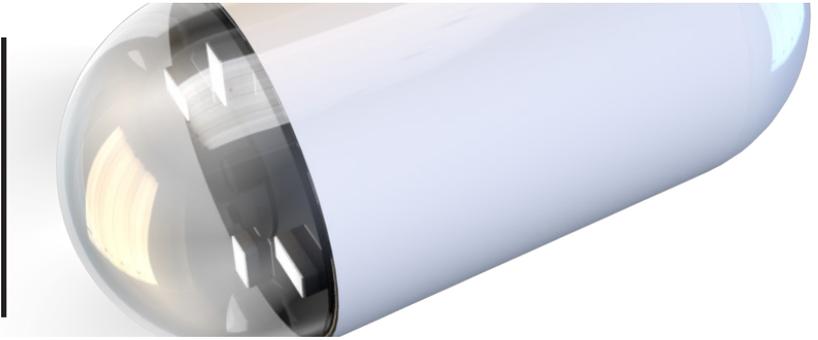
National Research Nuclear University MEPhI, a division of one of Russia's largest universities, prides itself in helping young scientists develop their ideas into commercial products. As such, NRNU MEPhI, which hosts over 100 professionals in IT, medical technology, information security, marketing and economics, relies heavily on iterative design and prototyping as its students develop projects in the university's engineering center.

NRNU MEPhI students, though, had traditionally relied on outside companies for prototyping, the major hurdle being that any traditional part production took a significant amount of time. But when the goal is to innovate products that solve current problems, securing prototypes in anything more than a day is unacceptable.

The answer to their prototyping quandary came in form of 3D Systems' ProJet® 460Plus full-color 3D printer, which the school decided upon for its high level of detail, color options and ease of use. But what it gave to the students at NRNU MEPhI was the ability to cut the time required to create accurate, true-to-life prototypes for investor presentations and to freely innovate without the stress of relying on third-party contractors. As NRNU MEPhI and its students charge forward with the game-changing products they develop and create, the ProJet 460Plus continues energize efficient workflows and powers an innovation model that's all about speed.

Developing the Endoscopic Capsule

Incorporating advanced 3-channel CMY color in an easy-to-use, economical machine, the ProJet 460Plus is the world's most affordable color 3D printer. It's perfect for presentation models and concepts that reflect true-to-life color and design accuracy. In that vein, one of the first projects that put the ProJet 460Plus through its paces and shone a light on its unique capabilities was MEPhI's endoscope capsule project.



The endoscope capsule is engineered to be a cost-effective alternative to traditional gastrointestinal scope procedures. Swallowed by the patient, the capsule makes its way down the digestive tract over an eight-hour period, taking photos along the way and sending them in real time to a recording device. Doctors can then make a diagnosis based on the data sent from the capsule.

While other capsules of this nature are currently in use in Russian clinics, they are manufactured outside of the country, making the procedure an estimated 3-4 times more expensive than it could be with domestically produced capsules. Considering that the inflated price makes such endoscopy procedures at best an economic stress and at worst unrealistic for a large subset of patients, price point was a major factor for MEPhI's capsule.

Their plan was to produce the capsule with domestic materials at a domestic location, thus lightening the cost, but they first had to perfect the design of the capsule and the receiver. As with many of their projects, NRNU MEPhI designers had no idea how many prototypes they'd need to get the design perfect—small changes could drastically alter the size and geometry of the





capsule—once again ruling out external contractors as a matter of speed. Luckily, the school got the ProJet 460Plus in the middle of the development stage. Within two days of receiving the printer, engineers were printing various iterations of the capsule reader and stand, both integral parts of the system.

With the help of the ProJet 460Plus, they made four iterations of the devices included in the endoscope capsule kit. Better yet, on the basis of the final designs, engineers were able to create plastic master models, which after manual grinding and polishing were transferred into full production. From the time they started using the ProJet 460Plus until the endoscope capsule went into production, it took only about a month. NRNU MEPhI scientists estimate that they reduced the production window by a factor of ten and completed the project way ahead of schedule.

Even now, after the ProJet 460Plus gave a boost to the endoscopy capsule project, the machine continues to provide key rapid prototyping capabilities and reduce project times for teaching students, technical workshop leaders and cooperative students across the university. Moreover, it helps young scientists and engineers a new degree of freedom so that they might focus on solutions rather than timetables and logistics.

