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CONTENTS

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3D PRINTER AS A WAY OF MATERIALIZATION OF BOTH CREATIVNESS AND ENGINEERING THOUGHT

In today's environment of human diversity sometimes there is an urgent need for the manufacture of unique parts of varying complexity. And to be tested with the least expenses of time and money, as well as to find more efficient solutions created prototypes with different physical properties. In this area we have proven 3D printers of various designs. Their main advantage - is to minimize manual labor, the ability to create accurate, both physical and electronic copies of various sizes, unique manufacturing process automation, as well as identical parts. Laboratory of Mechatronics and Robotics Onaft due to the urgent need, decided to buy such a device. After analyzing the characteristics of different printers, we settled on the original and Ultimaker Wanhao Duplicator i3. After receiving the first print results, as well as the invaluable skills in this area, we decided to improve print quality without breaking the manufacturer's warranty. For this purpose it was decided to build something like a sarcophagus with ventilation. Its main task is to maintain a constant temperature during printing in the workspace of printers.

The process of parts manufacturing in the printer consists of modeling three-dimensional model in any CAD program. Once implemented the so-called slaysing model is the creation of support structures, clarifying the various printing characteristics and create a simple G-code printer control through stratification model layers. Location model on the table. Directly print the details. Physical or chemical treatment of details.

Because of the simplicity layered printing technology, as well as analyzing the pros and cons of this type, the idea to create your own design of the first printer in our laboratory.
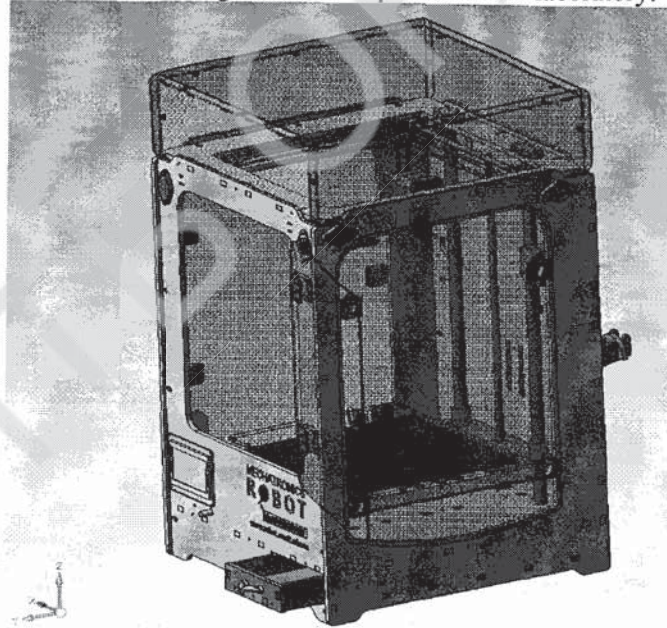

Fig. 1. Designing the program ASCON KOMPAS – 3D V16

When creating parts with overhanging and projecting plane support structures are used, which are disposed after the creation of parts. For rational use of the more soluble material such as PVA, if there are two extruders. Priority polylactide (PLA) due to the excellent properties important for prototyping and recycling of used parts of yourself prototypes: biodegradability, biocompatibility, thermal plasticity. Projected our printer has the ability to print and other types of plastics. Print styling by fusing layering (Fused deposition modeling) can be different plastics with different shades.

The advantages of printing FDM (. English Fused deposition modeling (FDM)) are:
  Reasonable cost of raw materials for printing (various polymers, plastics).
  Easy to manufacture, the mechanical part of the maintenance and repair of the printer.
  The ability to use different colors of the filament.
  Low cost of printing
Among the shortcomings should be noted:
  Spreading plastic beyond the printable area due to the heat.
  The restriction in the selection of materials with respect to temperature.
  Sensitivity to temperature during printing.
Many details are printed on the printer. Some parts were made to order. The electronics includes: Arduino Mega 2560, RAMPS 1.4, as well as the driver DRV8825 stepper motor and stepper motor. As the power supply using the standardized switching power supply (12V, 30A). For ease of navigation in the program, information on the state of the printer and printing is enabled with an LCD screen control panel board RAMPS 1.4 and it has a slot for an SD card that provides the ability to print from removable media.
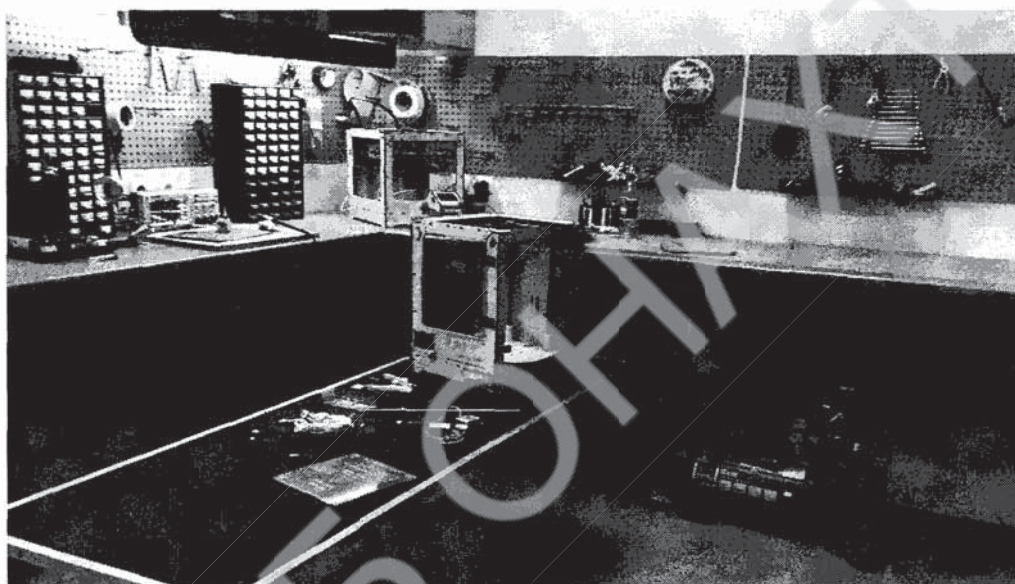

Fig. 2. Completion of the housing assembly and electronics

To date, collected absorbs vibration, the body of plywood, is debugging axes X Y and Z. Completion axle assembly also has collected the bulk of the electronics and you are debugging a program.

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