



## **The project of the 3D laboratory of Petr Palczewski for the preparation for the development of the space industry**

*The project of a laboratory for the creation of 3D micro factories for small businesses and production modules for miniature bases on the moon and asteroids, the development of which was recently launched by the Polish engineer innovator Petr Palczewski "Piotr Palczewski". It sets a task for itself, to begin the first practical steps in creating a mass production of a new way of life and the industrialization of the cosmos. At the first stages, it is planned to develop miniature production micro factories, and miniature alien bases measuring models or toys, but designed according to the principles and technologies of future space production bases. The miniaturization at the first stages will give an opportunity to reduce to the limit the level of costs and complexities facing the beginning of the development of mass additive production and the industrialization of space. But behind the first, miniature projects, a full-scale revolution in industry and industrial colonization of space will follow.*

### **Colonization of space, the global goal facing human civilization.**

One of the global goals facing modern humanity, this is the beginning of industrial development of the solar system. Together with that, humanity will pass to the level of cosmic civilization. And get access to unlimited resources. With which, human civilization can create an economy and a society of a high level of development and general prosperity.



In theory, the colonization of the cosmos will enable human civilization to reach such heights in development and economic power that will far exceed all that has been achieved within the earth.

But in practice, the colonization of space can not begin for a long time, remaining in the category of futuristic abstractions. The main obstacle is the high price and complexity of large-scale space programs, which create intractable barriers to the development of the extraterrestrial industry. And the lack of initiative on the part of state space administrations, which conduct their activities in the course of the race for scientific demonstration achievements. But so far, not one step, not even a pilot step, has been taken to create a space industry.

Modern private teams are planning to start the creation of the first industrial bases on the moon and asteroids, designed to extract valuable raw materials, or the production of rocket fuel.

Corporations are eyeing cosmic space with pragmatic goals. In the coming decades, with a high probability, the development trend of astronautics will be replaced with the "Race for Records", in which space was studied, to the "Race for Resources", in which its real practical development will begin.

Modern private traders, not against starting the colonization of space, but seeing the complexity of this task and the lack of real examples, do not show decisive initiatives.

**Miniature alien bases, minimize the barriers facing the launch of the industrialization of space.**



The project is a miniature base, simple and inexpensive to implement, but based on the same principles and technologies that will later work on full-scale bases of extraterrestrial industry. Its purpose is to reduce the barriers facing the creation of the first reference points of the extraterrestrial industry. Demonstrate the real possibility of creating extraterrestrial industrial bases. And work out the technologies necessary for the next steps in the industrialization of space.

The project of a miniature lunar base begins with the development of 3D printers, light, universal machines capable of producing almost any parts and products. Since it puts a stake on the production direction of activity, the key in the future colonization of space.

**To work on a project of a laboratory for the development of space 3D printers and production modules of miniature alien bases, two innovators joined together.**

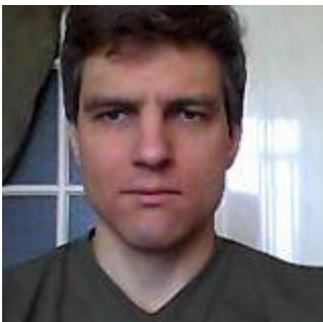


Polish engineer innovator "Petr Palchevski" "Piotr Palczewski", developer of the 3D demo printer, assembled from the details of the designer of the lego and parts from the serial printers.



The philosophy of this printer is to show the possibility of creating printers from widely distributed parts.

And I, Nikolay Agapov, the Russian extra-system innovator, the author of the organizational project, "The Network Community of Space Expansion."



Its mission is to create a new industry on the ground. Based on the model of the space civilization industry, which can actively spread in the solar system. To quickly and without difficult-to-overcome constraints, prepare the earth industry for the beginning of mass industrial colonization of the solar system.

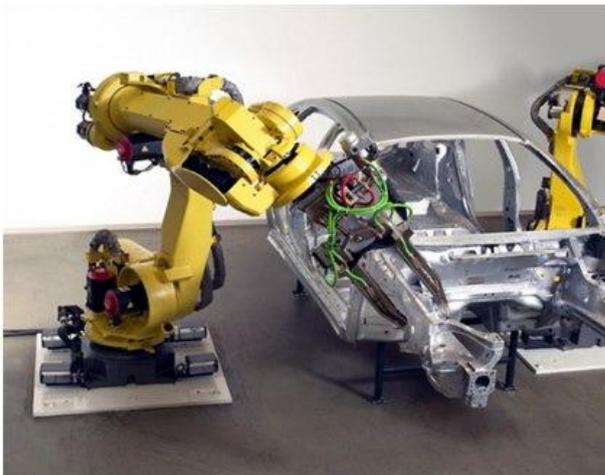
The basic form of organization of a new, sub-space industry, network structure. Since, partner networks, consisting of entrepreneurs, innovators and enthusiasts, are capable of rapid spread

and development.

The main core of the technology of the space age industry is technology of a new industrial way of life. Digital production, which allows to create small-sized, universal, production "Micro factories". And the technology of Replicator machines, production machines that can create their own copies, and rapidly increase their numbers.

### **Preparation for the colonization of space through the development of the space age industry on earth.**

Micro factories, consisting of several 3D printers of different types and assembly manipulators. Capable of being placed in containers, garages, or modules of orbital stations. Will be a light, versatile production machine. Capable of producing virtually any product. And, among other things, create your own copies. Machines of this type, in the future, will replace the modern production infrastructure, consisting of many enterprises and thousands of highly specialized machine tools.



The new production infrastructure will be light, mobile and capable of rapid growth. On the ground, its growth will develop as a mass distribution of small, garage, production. In space in the form of automatic "Reproduction" of production modules, working in conjunction with universal robots. Which, delivered to the sources of resources, will be able to rapidly increase their numbers. Create thousands or millions of groups that can build industrial enterprises and residential settlements.

By launching several replicator modules into space, and arranging the supply of robotic groupings with highly technological details that can not be printed on printers. After a while, it will be possible to get a network of alien bases and industrial enterprises. Which will be on an industrial scale to produce new machine replicators and spacecraft, for the rapid spread of industry in the solar system.

Space enterprises built by groups of replicator machines will extract valuable resources, such as precious metals and rare earth elements. And to deliver them to the ground, on transport vehicles built in space.



Groups of replicators will build in orbit solar power plants of industrial capacity, capable of providing the earth with clean, inexhaustible energy. They will build a new transport infrastructure, such as space elevators, or paths for orbital, electromagnetic trains. Able to connect the earth with space, inexpensive and mass transport.

The industrialization of space with the help of replicator machines will not be over costly, but will be fast, large-scale and super-profitable. Micro-factory replicators, this is the key to the colonization of space.

The mission of the network community is space expansion. Create a new world industry based on micro factories replicators. Do it on the ground, in comfortable conditions, and on a global scale. With the expectation of a transition to space, after replicators become massive and reach the desired technological level.

In addition to the development of micro factories replicators, the network community of space expansion, will develop a variety of projects that promote the reformatting of the earth industry in the space industry. Following the pattern of the mass industry, which will work on the earth in the cosmic period of development. And to develop a networked social movement, people of the space age - Space Ageers, Space Agers, whose mission is reformatting the society to the living standards of space civilization. Working, therefore, on the comprehensive transformation of terrestrial civilization into space. And enabling the society to further develop in the channel of space civilization.

The laboratory for the development of space printers and the first, experimental, production modules for miniature alien bases will operate in two main directions. The creation of the first space production modules, and the creation of small, inexpensive, manufacturing micro factories for small businesses.

The creation of production modules for extraterrestrial bases in miniature versions will serve as a preparation for the beginning of the industrialization of space, with minimal costs and minimal deterrent barriers.

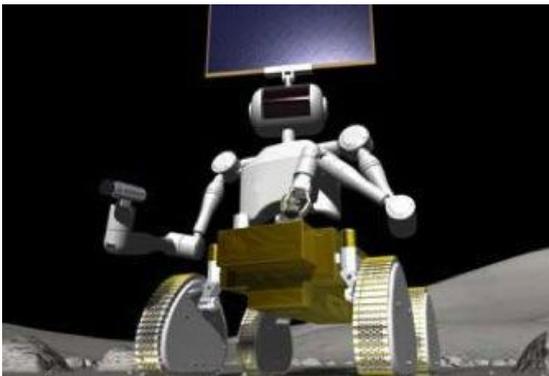
### **The device of miniature alien bases.**

Miniature alien bases should consist of a basic module, equipped with a set of 3D printers and other technical equipment, about a meter in size. And several universal robots, similar in weight and size to electronic toys.



The main task of the basic module, the creation of new robots from space raw materials with the help of 3D printers. And also repair and maintenance of existing robots. Robots must conduct reconnaissance, scientific work, and resource extraction for the core module.

The main type of robots are the so-called "Centaur", cars on a wheeled or caterpillar mobile base, with a humanoid torso and two manipulators, in the form of hands. Such robots are not complex in design, they can confidently move around uneven terrain. And they are able to conduct almost any type of activity in the same way as human hands, which have the highest level of universalism. Performing simple operation in automatic mode, and complex, in a remotely controlled mode, repeating mechanically the movements of the operator on the remote control.



The main material for production on the basic module is "Fibrous ceramic", a mixture of mineral fiber and vitreous powder, sintered at high temperature. Fibrous ceramics, the material is strong enough, not brittle, stable at temperatures of hundreds of degrees, but simple in production. Raw materials for the production of fibrous ceramics, soil from silicate rocks, on the moon and asteroids are everywhere available. Literally lies underfoot.

In the basic modules, it is intended to use two basic types of printers. Printers collecting products from small standardized parts, with detachable connections, such as the Lego Designer. And printers of the traditional type, printing products by adding microscopic portions of the substance.

Lego designer products, with automatic assembly, are made much faster than with traditional 3D printing, which is beneficial for increasing production speed. Lego products turn out to be angular, and heavy, with a low level of mass perfection. But for the small gravity of the moon or asteroids, this is not a significant drawback. For space replicators, the main indicator is not the level of constructive perfection of products, but the speed of production.

Printers of the traditional type, working slowly but capable of making details of any shape with high accuracy, will print auxiliary and unique details.

On the base modules, there should be a stock of highly technological parts, to create several dozen new robots, and possibly several new base modules.

The total weight of the miniature base, should be several tens of kilograms. The total cost of the project is from several million dollars, to several tens of millions. It is a thousand times cheaper than projects of full-size, habitable bases. The time frame for the implementation of the first projects of miniature bases, several years.

### **Functions of miniature alien bases.**

At the initial stages, miniature alien bases will perform demonstration and scientific missions. To serve as a visual demonstration of the potential for the industrialization of space. And serve as test sites for the experimental development of technologies that will later be used in projects of full-scale, production technological bases.

Miniature database replicators can also be used to create full-sized databases. By the principle of a gradual increase in the size of manufactured products. First create robots and new base modules of intermediate size. Which, in turn, will be able to produce components of full-scale industrial bases. This approach, creating a full-size database of miniature predecessors, allows you to reduce costs.

The auxiliary functions of miniature bases can be scientific research.

### **The project of the laboratory of 3D printing and additive production.**

The project of the 3D printing laboratory, to create miniature, production micro factories, is currently under preparation. At the launching stage, it will work as a "Garage" 3D printing laboratory. Using engineering experience, which possesses Peter Palchevsky. And organizational development of the development of partner communities, attracting funding and popularization in the media, in the projects of the network community, space expansion.

The first task of the laboratory will be the creation of a miniature mass micro factory. It has dimensions and price similar to mass 3D printers.

The micro factory, in comparison with household printers will be large and expensive. But it will have a higher level of functionality. It will be able to make a variety of products, more complex and with a higher level of preparedness than traditional 3D printers. Will be able to collect remotely controlled cars, model size, or toy movable robots. And to produce sets of parts for assembling new, similar, micro factories. Due to the ability to produce its parts, such a micro factory will be the first, mass industrial replicator.

In addition to the production of miniature machines and robots, micro factories will be able to work in the garage industry due to hybrid technologies. Complex of 3D printing and traditional production technologies. Such, for example, as highly technological casting of metal products in ceramic 3D printing plates. Or the production of small, auxiliary parts for different purposes, from polymers or ceramics.

The ability to replicate, will simplify the distribution of micro factories, since they can be produced for sale in local, local, production centers. Using widely available raw materials and sets of highly technological details delivered by mail.

After the first serial micro factories, replicators, will be created, the development of basic modules for miniature alien bases will begin.

Another direction of the laboratory's experimental work will be the development of full-size construction 3D printers based on printers of printing products from lego parts.



Automatic construction of full-sized bricks or blocks that have the shape of the lego parts, allows you to build quickly, without the expense of manual labor, getting even walls of high quality. Lego blocks or lego bricks produced on presses also allow you to save cement. Since by pressing, the mass fraction of cement in them is reduced to 4-6%. Building lego parts, you can produce on-site construction sites, from sand, small gravel, or construction waste. Building 3D printers for construction of lego parts, should be relatively simple and cheap machines. Comfortable for small construction companies and private developers.

The global goal of the 3D printing laboratory of Petra Palcevski is to serve as one of the first reference points for the preparation of mankind for the transition to a space age. The implementation of the first projects in miniaturized versions is planned simply because miniature projects are cheaper, easier and faster to implement.

After the laboratory receives sufficient scientific and industrial capacities and financial resources, the development of full-scale micro-factories of replicators for mass production on earth will begin. And experienced, full-scale, production modules of replicators for work in space. The transition to full-scale projects is possible for several years. Or faster, if the necessary investments are made, or partnership agreements with large firms are reached. The beginning of the serial production of micro factories of replicators and production modules for space will be the beginning of the transition of mankind to the level of space civilization.

### **Sources of funding for the laboratory of 3D printing and projects of miniature alien bases.**

To finance the 3D printing laboratory, and the first projects of miniature alien bases, attraction of direct investments through public finance platforms "Croud investment", or crypto-currencies will be used.

To further expand the activities, the relationships with partners will be used, allowing to reduce the amount of financing and at the same time to reach a wide scale of activities.

The projects of the organization of the first experimental laboratory, the creation of miniature micro factories and the development of building, lego 3D printers do not require large investments. They can be realized only through direct investments and partner networks.

Developing full-scale micro factories of replicators, the task is complex and expensive. It will be conducted either together with large corporations, or independently, in case the laboratory of 3D printing, can quickly grow to a corporation.

To prepare for the projects of space miniature bases, partner networks with space firms will be used. Able to develop a small transport vehicle, "Upper Block", to deliver bases to the moon or asteroids.

The main sources of funding for space projects are partnerships with aerospace firms, or scientific organizations. Interested in the creation of miniature bases, development of space technology, and scientific research on the moon or asteroids, which can be carried out with the help of miniature bases, at low cost.

Supporting sources of financing can be advertising. For advertising purposes, partner firms, toy robot manufacturers, robots can be developed for miniature space bases.

At the stage of preparation for the creation of full-size space production modules and extraterrestrial industrial bases, partnership agreements can be concluded with industrial corporations interested in extracting valuable space resources. Or the implementation of large-scale space projects, which are cheaper to do with the help of groupings of replicators.

### **From start-up to the development of a new global industry and the industrialization of space.**

The project of the 3D printing laboratory for the development of the first mass micro factories and production modules for miniature alien bases. This is by stratap, a garage laboratory designed to serve as the first reference point for the development of the space age industry on earth and the beginning of the industrialization of the cosmos.



This approach, to the creation of qualitatively new directions in the industry through cheap, experienced laboratories, with the expansion of activity through partnerships, in several stages of growth and development, is very effective. It allows you to create pivots for a new industrialization from almost zero and to develop activities with minimal costs and constraints. The 3D printing laboratory, Petra Palczewski, who set herself the goal of creating the first mass microprocessor factory, and the first extraterrestrial production base, in miniature versions, is a startup that is working to create the first reference points of the space industry's manufacturing industry. According to preliminary plans, the stated goals should be achieved within a few years. If the goals of creating miniature micro factories of replicators and space production modules will be achieved. The laboratory will turn into a firm, and will proceed to the development of full-scale replicators for earth and space. From which will begin no longer experienced, but a real new industrialization on earth and industrial exploration of the cosmos. The real transition of mankind into the cosmic era will begin.

The first publication in the Russian scientific popular site Globalscience:  
<http://globalscience.ru/article/read/28152>

*At present, Piotr Palczewski is joining the DarkStar Aerospace focal point, and may be working on projects for micro factories for space bases in it.*

Nikolay Agapov.