

Information about Ukrainian Space Industry

Composition of the Ukrainian Space Industry

The Ukrainian space industry consists of approximately 30 industrial enterprises, design offices and research institutes of various forms of ownership: 9 of them are joint-stock companies and the others are State enterprises. The National Space Agency of Ukraine (NSAU) was established in February 1992 for realization of State policy in space activity. State enterprises are directly managed by NSAU; the Agency has a block of shares in joint-stock companies.

In accordance with the directions of activity, all enterprises of the Ukrainian space industry are divided into:

1. Machine-Building Enterprises:

- State Enterprise O. Makarov Yuzhny Machine-Building Plant Production Association;
- State Enterprise Pavlograd Mechanical Plant.

2. Instrument-Making Enterprises:

- Khartron Public Company;
- Kharkiv Electrical Equipment Plant, State Company;
- Instrument-Making Research Technological Institute;
- Radio Measurement Research Institute, Public Company;
- Komunar Production Association;
- Kyiv Radio Plant State Joint-Stock Holding Company;
- Kurs Research and Production Complex, Public Company;
- Elmiz Public Company;
- Kyivprylad Production Association;
- Chernihiv Radio Equipment Plant, Public Company.

3. Designer Offices and Research Institutes:

- M. Yangel Yuznoye State Designer Office;
- NASU-BSAU Technical Mechanics Institute;
- Dnipropetrovsk State Designer Institute;
- Ukrainian Engineering Technology Research Institute, Public Company;
- Soyuz Research and Design Institute, State Enterprise;
- NASU-NSAU Kalmykov Earth Radio Physical Sensing Center;
- NASU-NSAU Space Research Institute;
- NASU-NSAU Space Research Institute, Lviv Center.

4. Specialized enterprises:

- Ukrkosmos State Company;
- Dniproskosmos State Company;
- Pryroda State Research and Production Center;
- Obriy State Research and Production Enterprise;
- Radiant State Enterprise;
- State Research and Engineering Center for Space Technique Certification;
- National Space Facility Control and Tests Center;
- National Youth Aerospace Education Center;
- International Space Law Center.

The following pronounced companies have been established with participation of Ukrainian space industry enterprises:

- Sea Launch Company;
- International Space Company Kosmotras;
- Khartron-Arcos Scientific Production Enterprise;
- Westron, Ltd;
- Khartron-Plazmed, Ltd.;
- Lucent Technology CheZaRa, Ltd.

Restructuring and Innovation Development of Ukrainian Space Industry

At present, works on preparation and realization of restructuring the space industry are being performed to ensure further development of enterprises in market conditions.

The Concept Paper of restructuring and innovation development of the space industry was approved by the Decree of The President of Ukraine on February 6, 2001 No 73 "On Measures of Application of Space Technologies for Innovation Development of the State Economy".

The main purpose of restructuring is creation of economically profitable industry that has capacity to manufacture competitive products in conditions of the market economy.

The tasks of structural reconstruction are the following:

- creation of integrated structures according to main directions of activity;
- re-equipping of production through introduction of new technologies;
- improvement of management of the space industry, in particular, through introduction of information technologies;
- revision and changing the forms of property of those enterprises that should be privatized.

According to the concept, it is planned to form a basic part of the industry that would include diversified enterprises that can compete at domestic and the international markets during the first stage, in 2001-2002. At the second stage, in 2003-2005, it is planned to complete formation of a complex of enterprises of the industry that would be able to function effectively in conditions of the market economy.

The following investment sources are planned to provide innovation development of the industry:

- financing of investment projects within the framework of the National Space Program of Ukraine;
- usage of centralized capital investment;
- investment of enterprises of the industry at the expense of proceeds from privatization of state property;
- compensation of a part of discount rate on loans of commercial banks;
- attracting international financial and technical assistance.

Realization of structural reconstruction of the industry should provide for

- conservation and further development of space technologies;
- creation of entities of entrepreneurial activity which can effectively function in market conditions;
- elimination of ineffective and obsolete productions;
- significant increase in amounts of production in the industry.

The main indexes that should be achieved by space industry in 2006 are given in Fig.1.

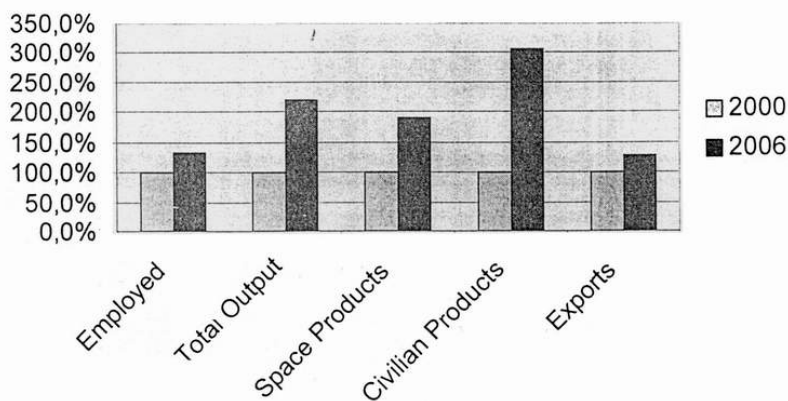


Fig. Perspective Indexes of Growth of Space Industry for 2000-2006.

Directions of Investment In Ukrainian Space Industry

The main directions of investment in the Ukrainian space industry are as follows:

- **participation of enterprises of the industry in international space projects;**
- **participation of enterprises in projects on creation of civil production using space technologies;**
- **participation in the Ukrainian investment fund of high technologies;**
- **purchase of shares of enterprises of space industry;**
- **purchase of products, services and technologies of enterprises of the space industry.**

International Space Projects of Enterprises of the Space Industry

The following priority directions of cooperation are planned in the frames of existing and future international space projects:

- Development of production and usage of existing launch vehicles “Zenit” “Cyclone” and “Dnipro”;
- Creation of new launch vehicles of a light class of “Majak» family;
- Creation of a new generation of small spacecraft (microsatellites);
- Research of the most up-to-date issues of the space science;
- Updating and operation of the national space system for Earth observation;
- Development of space telecommunication systems;
- Usage of a unique ground space infrastructure.

Major Projects where Enterprises of the Ukrainian Space Industry Participate

Sea Launch

This project successfully realizes the idea of application of a sea platform for commercial launches of spacecraft from the equatorial zone of the World Ocean. Participants in this project and founders of the joint venture Sea Launch are Ukrainian enterprises M. Yangel Yuzhnoye SDO and State Enterprise PA Yuzhmash and also companies Boeing (USA), Kvaerner (Norway) and Energia (Russia). Modernization of Ukrainian launch vehicle “Zenit-2” into a three – stage launch vehicle “Zenit-3SL” has been performed for realization of this project. Seven launches have been carried out in the frames of this project. In the future, it is planned to perform up to 8 launches per year.

Dnipro

This project is based on modernization of intercontinental ballistic missiles RS-20 (SS-18 called "Satan") which are removed as weapons in Russia, into a three-stage launch vehicle Dnipro. The international space company Kosmotras has been established for realization of this project. Participants in this company are Ukrainian and Russian enterprises. The first successful commercial launch of LV Dnipro was realized in 1999, the second launch – in September 2000. A number of launch vehicles and their technical capabilities allow providing inexpensive launch services up to 2007.

"Ground Surface Launch"

"Launch from a desert" is a project of performing the launch services on the basis of launch vehicle "Zenit-2". It is planned to modernize the launch vehicle "Zenit-2" into "Zenit-2M" so that to perform GEO – launches of low-orbit satellites from Baikonur cosmodrome. This project is being developed by the joint venture "Sea Launch".

"Cyclone-4"

It is planned to develop a more powerful LV "Cyclone-4" on the basis of a highly reliable launch vehicle Cyclone-3. Participants in this project are "Yuzhnoye" SDO, production association "Yuzhmash" and "Khartron" public company. The newest version of LV Cyclone will have a high-accurate control system, a modified third stage with higher fuel capacity and a multiple engine starting mode. It is planned to begin operation of LV "Cyclone-4" in 2004. It is envisaged to perform up to 6 launches per year.

Projects of enterprises of the industry on creation of civil production using space technologies

The Interdepartmental Program of introduction of space technologies into creation and manufacturing of high technology civil products for the domestic market needs and export for 2001-2005 was approved by the Decree of the Cabinet of Ministers of Ukraine №740 on June 27, 2001. This program has been developed for realization of the Decree of the President of Ukraine "On Measures of Application of Space Technologies for Innovative Development of the State Economy" (dated February 6, 2001) by the National Space Agency of Ukraine (NSAU) together with leading government Ministries and Departments.

The main projects of enterprises of the space industry concerning introduction of space technologies into other branches of the Ukrainian economy are included in this program. There are six target directions, such as:

- Equipment and technologies for the fuel and energy complex;
- Machinery, equipment and technologies for agriculture, food industry and processing branches of the agricultural-industrial complex (AIC);
- Equipment and technologies for machine-building industry and other branches of economy;
- Telecommunication means;

- Transport means;
- Medical instrumentation and equipment.

Realization of the program is supported by the efforts to allocate budget capital investments and attract investments from domestic and foreign sources. Total need in costs for financing the projects is UAH 598.4 million (prices as of on November 1, 2000). Financing sources of the program are shown in Fig.2.

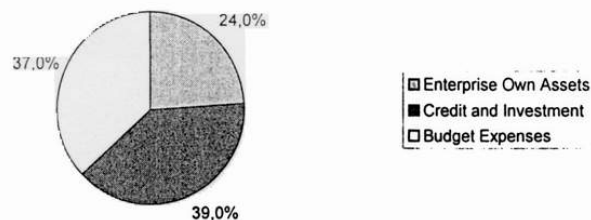


Fig.2. Sources of financing the projects of introduction of space technologies.

The following financial privileges are provided:

- State capital investments for realization of full-scale manufacturing of high-technological civil products beginning from 2002;
- To include provisions for compensation of 50% discount rate for usage of loans (that will be issued by commercial banks to executors of the Program) into the Draft of the State Budget beginning from 2002.

Products, Services and Technologies of Enterprises of the Industry

Enterprises of the space industry of Ukraine create and produce the products for space and general economic purposes. Enterprises of the industry have great experience in development and production of modern launch vehicles (Zenit, Dnipro, Cyclone), spacecraft, engines, control and telemetry systems and radiotechnical equipment;

Enterprises of the space industry develop and produce various products of civil purposes:

- Complex agricultural machinery, harvest combines, tractors and soil processing complexes;
- Technological equipment for the food industry and processing branches of the agricultural complex (ice-cream lines, sweets, cookies etc.);
- Means of municipal transport and municipal machinery (trolleybuses, buses and cleaning machines);
- Wind power plants for industrial wind power stations;

- Plants for combustion and gasification of low-grade coal
- Electric power meters, gas meters and water meters;
- Medical equipment;
- Tele-and radio equipment.

Enterprises of the space industry of Ukraine provide the following space and non-space services:

- Telecommunication services;
- Earth Remote Sensing;
- Space and Geophysics Research;
- Mobile Satellite Communications.

Currently, the space industry possesses expertise in the following fields of technology of high potential:

- precision casting, laser and plasma cutting of sheet materials;
- mechanical processing of materials;
- electric ray welding, welding in carbonic acid environment, welding through explosion, micro plasma and ultrasonic welding;
- modern, environmentally safe technologies of Cr, Zn, Ni coating, energy saving technologies, powder polymeric coating;
- Technologies of products made from composite polymeric materials;
- Methods and means of non-destructive control.

Thus, at the present stage, the Ukrainian space industry confidently advances along the way of innovative-investment development and long-term and complex integration with international space community at the present stage.

Such steps create a foundation for broadening the contacts with domestic and foreign partners; they also help to attract additional investment resources into the Ukrainian space industry.