



SCIENCE & TECHNOLOGY
CENTER IN UKRAINE



Foreign Affairs and
International Trade Canada



AEROSPACE: NOW AND THE FUTURE

Participating Organizations:

"Arsenal" Central Design Office, State Enterprise

Crimean Astrophysical Observatory

G.V. Kurdyumov Institute for Metal Physics

Department of the High Temperature Thermogas-dynamics Institute of Engineering Thermophysics

Institute of Geological Sciences "Scientific Centre for Aerospace Research of the Earth", State Enterprise

V. M. Glushkov Institute of Cybernetics

Institute of Hydro-Mechanics

Institute of Physics

Lashkaryov Institute of Semiconductor Physics

Institute of Technical Mechanics

Instrument-Making Research Technological Institute, State Enterprise

Karpenko Physico-Mechanical Institute

Kharkiv State Aircraft Manufacturing Company

"Khartron", Joint Stock Company

"Kommunar Association" State Research and Production Company

"Kyivprylad" Production Association, State Enterprise

Lviv Center of NASU-NSAU Institute for Space Research

National Aerospace University "Kharkiv Aviation Institute" named by N.Ye.Zhukovskiy

National Aviation University

National Space Facilities Control and Test Center

National Youth Aerospace Education Center

"PRYRODA" State Research and Production Center

"Radio Measurement Research Institute", Joint Stock Company

Space Research Institute

"TechResource-Motors", R&D Enterprise

"Ukrainian Scientific Research Institute of Manufacturing Engineering", Public Joint Stock Company

O. Makarov Yuzhny Machine-Building Plant Production Association (YUZHMAH)

"Ukrkosmos", State Enterprise

"Yuzhnoye" State Design Office, State Enterprise

INSTITUTIONAL ORGANIZERS

- Canadian Embassy in Ukraine
- Science & Technology Centre in Ukraine
- Canada's Department of Foreign Affairs and International Trade
- National Space Agency of Ukraine

ORGANIZING COMMITTEE

- **Michael Reshitnyk**, Trade Commissioner, Canadian Embassy in Ukraine
- **Landis Henry**, Deputy Executive Director, Science & Technology Centre in Ukraine
- **Eduard Kuznietsov**, Deputy Director General, National Space Agency of Ukraine
- **Volodymyr Fedotov**, National Space Agency of Ukraine
- **Igor Litvinov**, Senior Deputy Executive Director, Science & Technology Centre in Ukraine
- **Yulia Zmerzlaya**, Science & Technology Centre in Ukraine
- **Yuriy Mardak**, Canadian Embassy
- **Natalia Melnichenko**, Canadian Embassy
- **Alexander Melashenko**, National Space Agency of Ukraine
- **Roman Torkit**, Science & Technology Centre in Ukraine

AEROSPACE NOW AND THE FUTURE

SHOWCASING R&D EXCELLENCE IN UKRAINE

This booklet was prepared by the Organizing Committee of the 2nd Canada – Ukraine Business Summit.

Kyiv, 28th and 29th September 2009

The booklet encompasses an overview of the expertise, infrastructure and technologies of Ukrainian institutes, universities and corporations that are engaged in aerospace research and development. Furthermore it depicts the innovative cross-disciplinary research activities across organizations that are necessary to meet the emerging challenges of the aerospace sector.

TABLE OF CONTENTS

WELCOME FROM AMBASSADOR TO THE EMBASSY OF CANADA IN KYIV	4
WELCOME FROM NSAU DIRECTOR GENERAL	5
WELCOME FROM STCU EXECUTIVE DIRECTOR	6
A MESSAGE FOR THE PRIVATE SECTOR	8
AVIATION INDUSTRY & KEY PLAYERS	10
SPACE INDUSTRY & KEY PLAYERS	12
MAINTENANCE, REPAIR, OVERHAUL	15
TECHNOLOGICAL / RESEARCH CAPABILITIES OF UKRAINIAN ORGANIZATIONS	18
“Arsenal” Central Design Office, State Enterprise	20
Crimean Astrophysical Observatory	22
G.V. Kurdyumov Institute for Metal Physics	24
Department of the High Temperature Thermogas-dynamics Institute of Engineering Thermophysics	26
Institute of Geological Sciences “Scientific Centre for Aerospace Research of the Earth”, State Enterprise	28
V. M. Glushkov Institute of Cybernetics	30
Institute of Hydro-Mechanics	32
Institute of Physics	34
Lashkaryov Institute of Semiconductor Physics	36
Institute of Technical Mechanics	38
Instrument-Making Research Technological Institute, State Enterprise	40
Karpenko Physico-Mechanical Institute	42
Kharkiv State Aircraft Manufacturing Company	44
“Khartron”, Joint Stock Company	46
“Kommunar Association” State Research and Production Company	48

“Kyivprylad“ Production Association, State Enterprise	50
Lviv Center of NASU-NSAU Institute for Space Research	52
National Aerospace University “Kharkiv Aviation Institute” named by N.Ye.Zhukovskiy	54
National Aviation University	56
National Space Facilities Control and Test Center	58
National Youth Aerospace Education Center	60
“PRYRODA” State Research and Production Center	62
“Radio Measurement Research Institute”, Joint Stock Company	64
Space Research Institute	66
“TechResource-Motors”, R&D Enterprise	68
“Ukrainian Scientific Research Institute of Manufacturing Engineering”, Public Joint Stock Company	70
O. Makarov Yuzhny Machine-Building Plant Production Association (YUZHMAH)	71
“Ukrkosmos”, State Enterprise	72
“Yuzhnoye” State Design Office, State Enterprise	74
UKRAINIAN CO-OPERATION WITH OTHER COUNTRIES OF THE WORLD	76
<ul style="list-style-type: none"> • Joint on-going and perspective projects with other countries in the Aviation industry • Joint on-going and perspective projects with other countries in the Space industry • Cooperation in the Science and Technology area 	
MAJOR OPPORTUNITIES FOR CANADIAN, EU AND US STAKEHOLDERS	80
AVIATION AND AEROSPACE INDUSTRY IMPORT REGULATIONS	80
MAJOR TRADE PROMOTION EVENTS	81
CONTACT INFORMATION	82

WELCOME FROM AMBASSADOR TO THE EMBASSY OF CANADA IN KYIV



G. Daniel Caron
Ambassador to the Embassy of
Canada in Kyiv

My Dear Colleagues:

I am truly delighted to welcome all of you to the Canada-Ukraine Aerospace and Aviation Business Summit, taking place from September 29 - 30th in Kyiv. The idea for this Summit has its origins in the first Canada-Ukraine Business Summit that was held in Dnipropetrovsk and Kyiv on March 12-14th, 2008 where more than 200 high level individuals from more than 50 Canadian and 70 Ukrainian companies, scientific institutions and other organizations were present. The objective of the first Summit was to organize a business to business networking event to showcase Canadian and Ukrainian companies capabilities and to facilitate business development, R&D cooperation and technology commercialization opportunities. Four sectors were the focus of this first Summit: agriculture, energy, construction and aerospace. The aerospace showed huge potential for development, as Canada - Ukraine cooperation in this sector was still in its early stages.

The underlying logic for an aerospace and aviation summit is clear. Canada and Ukraine are both leaders in their respective specialities in aerospace and aviation. Ukraine in the designing and manufacturing of space launch vehicles and aircraft, and Canada in satellites, space communications and commercial and business jets. Supporting the Ukrainian aerospace and aviation industry is a wide range of design and research institutions that made Ukraine the centre of excellence in this area in the former Soviet Union in a wide range of subsectors including launch vehicles, aeronautics, advanced materials, physics, sensors and chemistry. Canadian companies on the other hand have a need to innovate and to adopt new leading edge technologies in order to maintain global competitiveness. We believe there is an underutilized opportunity here for Canadian partners to address this need through tapping into Ukraine's outstanding scientific legacy.

This Summit is part of our ongoing efforts to raise our bilateral overall business and S&T cooperation to a new globally competitive level. But the Summit is only possible because of the collaboration between all of the organizers, corporate sponsors, partners and speakers in organizing this event. I would like to thank in particular the Science and Technology Centre in Ukraine, the Canadian Global Partnership Program, the Department of Foreign Affairs and International Trade Canada, the National Space Agency of Ukraine, the Canadian Space Agency, the Aerospace Industries Association of Canada, the National Research Council and the National Aviation University of Ukraine. I must also express our very sincere appreciation to our Canadian corporate co-sponsors, MacDonald, Dettweiller and Associates - Satellite Systems, Bombardier - Aerospace Division, MDS Aero Support and Export Development Canada for their generous support without which the Summit would not have been possible.

In closing, I offer my sincerest wishes that this Canada-Ukraine Aerospace and Aviation Business Summit lead to enhanced bilateral cooperation in the research and development and science and technology fields.

Yours Sincerely,

*G. Daniel Caron,
Ambassador*

WELCOME FROM NSAU DIRECTOR GENERAL



Oleksandr Zinchenko,
Director General
of the National Space Agency
of Ukraine

Dear Colleagues,

Activities in the exploration and use of outer space acquire special significance in the modern world affecting particular countries, intergovernmental associations and the global community at large. The space engineering development is a vivid indication of the State's technological standing at a certain historical stage and becomes the locomotive for exponential development of all spheres of State and public activities.

It becomes ever more important today when the results of the outer space activities are applied to meet people's life support needs.

Recognition of the space technology and engineering development as a priority at the state level demonstrates wisdom of the public administration in understanding its crucial role for sustainable development in all spheres.

Ukraine is a member of the space states "club" with its long-standing outer space development history, outstanding achievements and a large potential for collaboration and mutually advantageous cooperation with partners in this sphere. The State actively supports this important sector in Ukraine.

Our recent positive contacts with Canadian space organizations and companies, such as the Canadian Space Agency, the companies Macdonald Dettwiller and Associates, Bombardier, the Export Development Canada Corporation give inspiration to believe that there is a large sphere for search and implementation of joint mutually beneficial space projects.

With this in mind we very much appreciate this wonderful initiative of the Canadian Embassy in Ukraine and the Science and Technology Centre in Ukraine (STCU) for organizing the Ukrainian-Canadian Space Business Forum Overview of New Technologies, Trade and Investment Opportunities. I am confident that this activity will result in particular proposals for development of Ukrainian and Canadian cooperation in the space sphere and for implementation of specific joint projects.

This brochure is intended to provide information about particular achievements and potential of the Ukrainian enterprises in the space technology and I am pleased to present this to our potential partners.

Yours Sincerely,

Oleksandr Zinchenko,
Director General of the National Space Agency of Ukraine

WELCOME FROM STCU EXECUTIVE DIRECTOR

STCU VISION:

FOR A SAFER AND BETTER
WORLD,
SUPPORTING THE TRANSITION
OF WEAPON
OF MASS DESTRUCTION
RESEARCH INTO
PEACEFUL CIVILIAN
APPLICATION

The STCU went through a year of uncertainty in 2008, marked by the turmoil surrounding the STCU headquarter office premises in Kyiv. STCU also experienced another decline in overall business activity, with the number and funding amounts of new projects falling for a second straight year. There was also a significant reduction in financing from governmental agencies working through the STCU Partners Program, which caused the overall Partner funding to fall approximately 26% from the previous year.

However, there also were several bright spots for STCU during 2008. STCU received strong statements of political support from its Governing Parties, which helped STCU to persevere in this troubled year and helped to re-establish stable operations by early 2009. Throughout the year 2008, STCU managed to maintain its normal level of service and program implementation, continued to develop its Targeted R&D Initiatives Program, kicked-off its new Institute Sustainability Program, introduced a new supplemental bio-safety/bio-security program, and accepted eleven new Partner organizations.

We would be remiss in not admitting that for most of 2008, the STCU Secretariat confronted a difficult period that adversely impacted its operations. Due to delays in the Ukrainian government renewing the lease for STCU headquarters, STCU faced increasing uncertainty from the start of 2008. This period culminated when utility services were cut to the STCU offices in early April, triggering a regrettable force majeure suspension of all STCU headquarter office operations and all STCU project activity in Ukraine. This suspension lasted until mid-June when a lease renewal was finally signed by the Ukrainian government. A period of relative stability lasted until the last quarter of 2008, during which time the Ukrainian government and the STCU Governing Board debated a Ukrainian proposal to relocate STCU offices to temporary, state-controlled spaces on the campus of Kyiv Polytechnic Institute by the start of 2009. By the time of the 27th Governing Board Meeting in November, when the Governing Board reluctantly accepted the Ukrainian relocation proposal, less than one month remained to prepare STCU for major office relocation.

In spite of it all, the STCU Secretariat managed to work its way through these difficult times, which is a tribute to the professionalism of the STCU staff. During the suspension of STCU headquarter office activities, STCU's Regional Offices continued operating and serving the needs of the former weapon scientists in Azerbaijan, Georgia, Moldova, Uzbekistan, and in the Ukrainian regions outside of Kyiv. Even within Kyiv, STCU staff worked from home or otherwise continued program activities that did not require the STCU office infrastructure. Finally, once STCU emerged from its force majeure suspension period, STCU staff quickly re-started office operations and resolved all delayed project, administrative, and financial transactions within weeks of the re-start.

While new project funding in 2008 was lower, STCU still saw a steady amount of current project activity, engaging over 4860 scientists in collaborative research projects that totaled over \$18 million (USD equivalent) in project expenditures. STCU project activity continued to increase in Moldova, where 53 former weapon scientists became STCU grant recipients and engaged their peers in Canada, Europe, and the United States. Also, several key WMD threat reduction projects continued through the STCU Partners Program, including an extension of a high-to-low enriched uranium conversion project at the Kharkiv Institute of Physics and Technology that is financed by the U.S. Energy Department's Global Threat Reduction Initiative.

STCU successfully completed the 2008 cycles of its Targeted R&D Initiatives Program. A total of 27 projects equaling over \$717,160 USD and ₴282,490 were approved the Governing Board. STCU financing for all these Targeted Initiative projects were matched by co-financing from the Azerbaijan National Academy of Sciences (\$350,000 USD), the Georgian National Science Foundation (\$200,000 USD), and the National Academy of Sciences of Ukraine (\$600,000 USD). STCU and its Targeted Initiative partners also discussed ways to modify the Targeted Initiatives process so that it encouraged a deeper and more active engagement of former weapon scientists with their Canadian, American, and European scientific collaborators.

Under its Sustainability Promotion activities, STCU started its new Institute Sustainability Program, focusing on a pilot group of ten Ukrainian institutes. The program start was delayed by the April-June suspension of STCU operations, but began in earnest in the latter half of 2008. This new program will add a new tool for implementing the STCU mission, by assisting institutes that employ significant numbers of former weapon scientists in developing strategic plans to grow their capacity to be successful and self-reliant. By making the institutes themselves stronger, STCU hopes that these institutes will be better positioned to weather economic downturns and thus be able to keep their scientists (including their former weapon scientists) employed and engaged in peaceful civilian work—a critical objective of the STCU's WMD nonproliferation mission.

The STCU Partners Program continued to add new Partner organizations, although new Partner Project funding fell below STCU expectations. STCU also continued to host delegations of former weapon scientists to a variety of international business trade events, including sending a delegation to the Hannover Messe technology trade show in Germany.

STCU also continued to be active in sponsoring and participating in seminars and workshops, so as to promote the capabilities of the STCU recipient former weapon scientists and to introduce these scientists to new collaborative opportunities for their research work. STCU organized two European-focused workshops, one at the Josef Stefan Institute in Ljubljana, Slovenia and the other at the INSERM biotechnology consortium in Lyon, France. STCU also had a major role in a Canadian-Ukrainian business summit in March, and STCU participated in U.S.-organized workshops on global nuclear smuggling issues. Finally, STCU joined as a co-organizer of an international material science seminar held in the Crimea, Ukraine, and organized one session of that seminar devoted to STCU project presentations.

Thus, STCU managed to engage in many of its planned 2008 activities, and even added a few new activities. For 2009, STCU anticipates settling into its new temporary offices at Kyiv Polytechnic Institute and will work with the Ukrainian government to prepare for the brand new office facility being constructed for STCU, which should be ready for occupancy by 2012. STCU also continues to support the Governing Board strategic planning discussions that will guide the transformation of STCU toward new programs and new initiatives in the field of global security, global cooperative threat reduction, and global WMD nonproliferation.

STCU Secretariat looks forward to a better 2009 and to a new future, grounded in the strong support received from all the STCU Parties.



ANDREW A. HOOD
STCU Executive Director

A MESSAGE FOR THE PRIVATE SECTOR

**LANDIS HENRY,
PHD., MBA
STCU DEPUTY EXECUTIVE
DIRECTOR
(CANADA)**

In today's knowledge based economy scientific innovation is of paramount importance in pursuing economic growth. Not surprisingly, in recent years, the Private Sector has been increasingly outsourcing their operations, including research and development. The advantages of outsourcing are many and include:

- Access to external expertise and innovative ideas
- Reduced investments in fixed assets
- Maximizing existing internal resources
- Cost savings

Cultural similarities and a proven scientific base are the keys that make Ukraine and the other STCU Recipient States attractive venues for undertaking contract research, contract manufacturing etc. Despite the advantages, however, managing outsourced activities at a distance can be challenging. This includes, measuring performance and managing the relationships.

It is noteworthy that the Science & Technology Centre in Ukraine (STCU) has had over 13 years of operational experience in countries of the former Soviet Union. During this time, the Centre has compiled a database of the capabilities of research institutes and their scientists /engineers that were engaged in the former Soviet weapons programme. The STCU has a proud history of facilitating and nurturing cooperation between the Private Sector (in Canada, the European Union and the USA) and scientists / institutes in Ukraine, Georgia, Azerbaijan, Moldova and Uzbekistan.

The bulk of the STCU funding takes the form of technology support programmes. The programmes are intended to promote R&D in specific technology sectors and when appropriate to pass on research results to industry in an efficient way. These programmes have proved to be very effective instruments in promoting cooperation and networking among for-profit companies and the research sector in countries of the former Soviet Union. I encourage you to explore how STCU's programmes and services can give your companies a sustainable competitive advantage.

You will observe from this booklet that Ukraine boasts a dynamic aerospace and aviation cluster that offers many partnering and development opportunities. STCU's "Partner Programme"

<http://www.stcu.int/west/partner>

provides a mechanism wherein the Private Sector can engage the institutes in areas of work that are of mutual benefit. As such, the STCU encourages sponsored research support from commercial entities. Company funding for specific projects can provide substantial benefits to your organizations and to the CIS researchers and organizations.

As a former Industrial Technology Advisor of the National Research Council, Industrial Research Assistance Program, (NRC-IRAP), I am very familiar with

how cooperative efforts between the “Private and Public Sectors” can result in mutual benefit.

The institutions highlighted in the booklet are all very receptive to the idea of partnering. They have all had interactions with the Private Sector and are aware that industrial financial support carries with it certain obligations, including:

- An expectation of a specific research result within a given time frame
- A specific statement of work for the project
- Frequent interactions between the Funding and Recipient parties on the research direction
- Monthly or quarterly informal or formal reports on research progress
- Protection from disclosure of company confidential information
- Delay of publication until the documents are reviewed by company
- Prompt disclosure of inventions resulting from the research project
- Expectation that results of research will be confidential

You are also encouraged to visit our “Technology Marketplace” for available technologies: <http://www.stcu.int/offer/technologymatching/index.phb>

It is possible that some of the technologies listed are consistent with the current commercial interests of your company.

Finally it is important to note that the STCU has:

- Legal status, diplomatic accreditation, tax and custom exceptions for financed projects and activities; all guaranteed under the intergovernmental agreement establishing the STCU
- Proven experience in Project Management; over 1200 research projects totalling close to \$200 million USD
- Over 180 private sector and governmental agencies have joined the STCU’s Partnership programme to finance their own, tailored science and technology projects (totalling more than 59 million USD) through the STCU.



Landis Henry, PhD., MBA
STCU Deputy Executive Director
(Canada)

UKRAINIAN AEROSPACE AND AVIATION MARKET OVERVIEW

AVIATION INDUSTRY AND KEY PLAYERS

Antonov Aircraft Scientific and Technical Complex

The Ukrainian aviation industry traditionally specializes in development and production of passenger and military transport aircraft. Significant experience in this branch has been accumulated by the Antonov Aircraft Scientific and Technical Complex (Antonov ASTC) which includes; the state enterprise ANTK Antonov, Kyiv Aviation Plant “AVIANT”, Kharkiv State Aircraft Production Enterprise (KSAPE) and Kyiv Aircraft Repair Plant 410 Civil Aviation (KARP410CA).

ANTONOV Aeronautical Scientific/Technical Complex is the eminent aircraft designer. It has its own Design Bureau, wide complex of laboratories, experimental plant and the Flight and Test base which make it possible to solve any task on aircraft development including its certification, as well as co-operation in field of manufacture, operational support and “follow-up” of all the Antonov aircraft types. The company has designed over one hundred types (including modifications) of aircraft of various classes and purposes, including:

- AN-2 multipurpose aircraft, the father of the large family of ANTONOV aircraft;
AN-8, AN-12, AN-22 Antei, AN-26, AN-32, AN-72, AN-74T, AN-124 and AN-124-100 Ruslan, AN-225 Mriya, AN-70, AN-3T cargo aircraft; AN-10, AN-14, AN-24, AN-140, AN-148 passenger aircraft; AN-28, AN-38-100, AN-38-200, AN-74TK-100, AN-74TK-200 and AN-74TK-300 convertible cargo/passenger aircraft;
- special-purpose aircraft, including: AN-2M and AN-3 agricultural aircraft, AN-2B seaplane, AN-30 aerial photography aircraft, AN-30M “sky-cleaner”, AN-26P and AN-32P fire-fighters, AN-26M rescue aircraft, AN-74 polar aircraft, AN-72 patrol aircraft, AN-71 AEW aircraft, etc.
- In addition, several types of gliders, hang-gliders and motor hang-gliders have also been developed.

The characteristic advantages of ANTONOV aircraft include structural reliability and economic efficiency, flexibility of transport operations, ability to use unpaved airfields and easy maintenance. Due to these qualities, over 1500 Antonov aircraft have been exported to more than 70 countries. In total, over 22,000 aircraft have been built.

ANTONOV Complex has invested heavily in computer-aided techniques for design and analysis work thereby creating a powerful engineering and research potential. For example “in-house” wind tunnel facilities enable the testing of aircraft models. All aircraft types, including such giants as the Ruslan and Mriya, can be subjected to structural tests to determine their service lives in one of the largest fatigue test laboratories in Europe. The company completes the development cycle of the aircraft with flight test programs to demonstrate the compliance of the aircraft with airworthiness requirements and the customer’s specifications.

Currently, the ANTONOV Complex is engaged in designing and building new aircraft prototypes modifying earlier designs, providing operational and product support and engineering work on extending the service life of ex-

**Contains statistical information of the models and types of aircraft and space vehicles manufactured by the Ukrainian industry.*

isting aircraft. It also provides services such as basic and conversion training for flight and maintenance crews and international air charter transportation, particularly of oversized cargoes.

On-site training of local personnel is available for selected aircraft. Antonov also participates in international cooperation in the field of aircraft and equipment design and manufacture as well as the development of land transit vehicles.

"Antonov" Corporate Group Enterprises have certificates of the Aviation register of Ukraine, the International Aviation Committee, Federal Service of the air transport of Russia, the certificate on compliance with the quality system for standard ISO 9002, the certificate of NATO AQAO-120, etc. Manufacturing of Antonov aircrafts in Ukraine is realized by two plants:

Kyiv Aviation Plant "AVIANT"

The plant possesses the technology capabilities and resources to assemble not only mid-sized, but also heavy (transport) planes. It currently specialises in the production of the An-32, An-70, An-148 aircrafts.

Kharkiv State Aircraft Production Enterprise (KSAPE)

This plant has specialized in the manufacturing of aircraft since 1926. At present, the main production items of the plant are An-74 and An-140 aircrafts in various models.

KARP-410CA is the enterprise with the complete production circle and provides support through out the operational lifecircle of "Antonov" aircrafts. The basic specialization of the plant is repairing and modernization of the An-24, An-26, An-30, An-32, An-72 and An-74 aircrafts.

Other Key Players

Scientific production company "Avionika" LTD, Joint Stock Company «Scientific and Technical Enterprise "Electronprylad", Joint Stock Company "Aviakontrol", "Radioizmeritel" Plant, State enterprise Research Institute "Buran", Joint Stock Company "Kyiv Plant "Radar" and more than 40 other Ukrainian companies are industrial partners of aircraft plants in producing programs.

In addition, the sector includes the companies engaged in designing and manufacturing the light and extra light aircrafts:

- SKYETON" AIRCRAFT INDUSTRIAL COMPANY
- DB Aerocopter Ltd.
- Plant "RSM"
- "AEROPRAKT" Ltd
- KB "Vertical" Ltd.;
- State enterprise "Experimental Design Bureau of Aviation of the General Setting".

The growth of the light and extra light aircraft markets manufactured in Ukraine is 15-20 % per year and ensures development in the corresponding production sectors and stimulates further economic activities.

UKRAINIAN AEROSPACE AND AVIATION MARKET OVERVIEW

Motor Sich JSC

“Motor Sich” JSC and “Progress” Zaporizhya Machine-Building Design Bureau (ZMDB) are the leading enterprises in aircraft manufacturing on the CIS territory. They were recently amalgamated in to “Ivchenko” corporation.

Motor Sich specialises in production, repair and technical support of the “flaming motors” It celebrated its 100th anniversary in 2007. Engines “by Motor Sich” are installed on almost 90 types of aircraft and missiles which are operating in more than 100 countries worldwide. Among the production items of “Motor Sich” are turbo-jet engines used for training and cargo aircraft, as well as for unmanned aerial vehicles and guided missiles, jet-prop and turbo-shaft engines (TSE) for military and civil aviation; auxiliary power units (APU); gas turbines for ground-based power plants and even the wind farms.

Progress ZMDB

This company has significant experience (over 65 years) in designing, refinement, certification and accompanying of serial production both aircraft engines of various types (first piston and later gas-turbine) and ground-based power plants.

State Enterprise Kharkiv Machinery Plant FED,

SE KHARKIV AGGREGATE DESIGN BUREAU, J

SC «Dnepropetrovsk Aggregate Plant»,

JSC “Volchansk aggregate plant”

are the main participants producing the components and aggregates for aircraft engines.

SPACE INDUSTRY & KEY PLAYERS

The Ukrainian space industry is the world leader in the design and manufacture of the launch-vehicles and satellites. These include launch-vehicles CYCLONE, ZENIT, DNEPR and SICH-series satellites.

Yuzhnoye State Design Office

This is a powerful design company which in cooperation with its partners provides turnkey developments for complicated high-tech projects. The main directions of the Yuzhnoye’s activities remain the development operation of the space-rocket technology.

Launch vehicles, spacecraft and rocket engines developed by Yuzhnoye meet the highest international standards.

M. Makarov Yuzhny Machine-Building Plant (Yuzhmash)

Covers the manufacturing phase.

Launches of Ukrainian LV (08/20/2009 est.)

	Zenit-3SLB	Zenit-3SL	Zenit-2	Cyclone-2	Cyclone-3	Dnepr	Total	Total, Worldwide	Ukraine to World ratio, %
1991			1	1	8		10	94	10,6
1992			4		5		9	97	9,3
1993			2	4	4		10	83	12,0
1994			4	1	7		12	93	12,9
1995			1	2	1		4	80	5,0
1996			1	1	1		3	77	3,9
1997			1	1	1		3	89	3,4
1998			2		1		3	82	3,7
1999		2	1	1		1	5	79	6,3
2000		3	2		1	1	7	84	8,3
2001		2	1	1	2		6	59	10,2
2002		1				1	2	65	3,1
2003		3					3	63	4,8
2004		3	1	1	1	1	7	54	13,0
2005		4				1	5	55	9,0
2006		5		1		2	8	66	12,1
2007		1	1			3	5	68	7,4
2008	1	5				2	8	69	11,6
2009	2	1			1	1	5		
Total	3	30	22	14	33	13	115		
%	2,6	26,1	19,1	12,2	28,7	11,3			

The following enterprises participate in manufacturing and designing of the launch-vehicles and satellites:

UKRAINIAN AEROSPACE AND AVIATION MARKET OVERVIEW

Arsenal Central Design Bureau State Enterprise

This well renowned company is a leader in development and manufacture of optical and other equipment for space, aviation, ground-based technology, systems of military and civil applications. It specialises in the development and production of airborne aiming and targeting systems, optical seekers for Air-Air missiles and air defense missile systems, orientation and navigation devices including gyrocompasses and laser gyros, orientation devices and systems for space-rocket systems, space Earth remote sensing systems, space vehicle orientation devices, photolenses.

Kyivprylad Industrial Association

The enterprise specialises in the design and production of the on-board and ground control systems. This company took part in the development and production of devices and equipment for Bion, Foton, Interkosmos, Kosmos, Soyuz-TM, Progress, Energiya-Buran, Proton, Gorizont, Ekran, Okean-O, Sich, Alfa ISS, and other programmes.

Khartron JSC

This is the leading enterprise in control system production for space rocketry and various industrial sectors. Control systems for a number of intercontinental ballistic missiles, Energiya, the most powerful launcher in the world, and Kosmos, Cyclone, Dnepr, Rokot, and Strela light launchers were produced here. Launchers equipped with Khartron's control systems have put into orbit more than 1000 space vehicles. Khartron's control systems were installed in approximately 100 Kosmos satellites, as well as units of the Mir orbital station and International space station.

Khartron was appointed as a general supplier for reconstruction and enhancement of CAM systems at Ukrainian nuclear power plants. Manufacturing of equipment for modernisation of CAM systems at heat power plants as well as oil and gas transportation facilities is another example of Khartron's successful work. Finally, microprocessor systems for power facilities control, terminal air traffic control complexes, and rail mode automatics were developed at Khartron.

Kommunar Production Association

This enterprise produces on-board control systems and on-ground electric checking starters for all versions of 'King Seven' launchers, by which, from 1961, until the present, launches of all manned and many other space vehicles, as well as Proton launcher, which can place various heavy spacecraft into orbit. Moreover, Kommunar produced some devices for other producer's control systems, for Soyuz and Progress launchers, Salyut and Mir orbital stations.

Elmiz JSC

This is a modern enterprise producing electronic professional equipment and having at its disposal various types of “state-of-the-art” technologies related to mounting, assembly, off-line and on-line testing of all types of radio equipment. Skein spinning workshop is equipped with installations allowing production of electric devices from welders to 2 mm core control transformers. The plant includes production design and technology capabilities, as well as engineering supervision department, manned with skilled personnel.

Kurs Research and Industrial Complex JSC

Personnel in the design office have made important contributions to the development of unique radio complexes (Igl'a, then Kurs) for search, mutual pointing, approach and docking of Mir, Soyuz, Progress space vehicles. The company was also involved in the development of navigation systems for strategic mobile missile systems and engine control systems for the third stage of the “Zenit” launcher.

MAINTENANCE, REPAIR & OVERHAUL

Enterprises of Aerospace Industry of Ukraine specialized in repair and modernization of aviation technics (“Aviavoenremont” Concern of the Ministry of Defence of Ukraine) include:

“AVIAKON” Konotop aircraft repair plant, Evpatoria aircraft repair plant, “LSARP”Lviv state aircraft repair plant, “MiGRemont” Zaporozhya state aircraft repair plant, “NARP” Nikolaev aircraft repair plant, “ODE-SAVIAREMSERVIS” Odessa aircraft repair enterprise, Sevastopol aircraft enterprise, “ChARP” Chuguev aircraft repair plant, Lugansk aircraft repair plant, “MOTOR” Lutsk repair plant (engines). These enterprises are able to service all aircrafts and aircraft engines in the Ukrainian Air Force. They all have the certificate from Russian companies – producers of aviation techniques.

“AVIAKON” Konotop aircraft repair plant

This is a leading enterprise in the aviation industry of Ukraine in the field of repair, re-equipment and modernization of “Mi” mark helicopters of all types and modifications. Currently the main direction of the plant activity is overhauling and reconditioning repairs, re-equipment and modernization of attack and reconnaissance helicopters of Mi-24/25/35 family; transport, multipurpose and special helicopters of Mi-8/9/13/17/19 family; heavy transport Mi-26 and Mi-6 helicopters, as well as Mi-2 light transport and utility helicopters.

UKRAINIAN AEROSPACE AND AVIATION MARKET OVERVIEW

Modernization of helicopters is directed first at increasing their survivability in the battle-field (including also a reduction of their vulnerability against portable air-defense missile systems), increased firing power (for combat helicopters and combat support helicopters), as well as providing effective round-the-clock and all-weather operation of rotary-wing aircraft.

Lviv state aircraft repair plant (LSARP)

The leading enterprise responsible for technical support of operation and repair of MiG-29 aircraft belonging to the Air Force of Ukraine. The plant is cooperating with 22 countries of the world. The plant is capable of repair and modernization of MiG-21, MiG-23/27 and MiG-29 fighters of all modifications (number of this type aircraft overhauled and modernized at the LSARP by now exceeds 100 units), as well as a number of other types of combat aircraft.

“MiGRemont” Zaporozhya state aircraft repair plant

Beside the basic task (modernization and repair of Su-27 front-line fighters and Su-25 attack airplanes), the plant carries out the medium repair by technical state of fighter interceptors, reconnaissance and reconnaissance-bombing aircraft of MiG-25 type (with possible revision of air frame elements, airborne systems and separate aggregates of the aircraft repaired). The plant provides also technical operation support and warranty service of the aircraft and aircraft systems repaired.

Nikolaev aircraft repair plant (NARP)

This is one of the largest Ukrainian enterprises focused on the repair of aviation and naval systems. The plant has specialized in the overhaul and repair of various types of aircraft and engines, ship gas-turbine plants and their components. Currently, NARP carries out the repair of aircraft, engines and its aggregates for the Air Force and the NAVY of Ukraine, as well as for other CIS countries and India. The technical services offered by the enterprise are restoration of damaged aircraft and aircraft systems (including battle damages) at the customer's bases. In addition, the plant is also ready to establish joint ventures with foreign partners for repair of aviation and naval systems.

“ODESAVIAREMSERVIS”.

Odessa aircraft repair enterprise is one of the oldest aviation enterprises in Ukraine. At the present time it is specialized mainly on overhauls and modernization of MiG-21 and MiG-23/27 fighters of all modifications, as well as on the overhaul of aviation engines.

Sevastopol aircraft enterprise

Specializes in repair of helicopters (Ka-25, Ka-27, Ka-28 and Ka-32, as well as Mi-2, Mi-8/17 and Mi-14), including repair of airframe, aircraft armament, avionics, instrument and electric equipment, as well as operation checking means.

Chuguev aircraft repair plant (ChARP) - carries out the repair and modification of L-39 trainer combat aircraft and MiG-23 frontline fighters of various modifications (including trainer combat variants) by installation of modern target designation and aiming systems, aircraft equipping with GPS system, new flight parameters registration system, etc. In addition, the repair of aggregates and systems of other types of aircraft is also carried out (including MiG-21, MiG-27, MiG-29 and Su-27/30).

During its existence this plant has repaired aircraft and aviation systems from many countries. Moreover, having at its disposal a modern training base and skilled trainer team, the enterprise trains foreign specialists in the repair and operation of both aircraft and aircraft engines. The enterprise also develops «Strepet-L/S/VM» unmanned aerial vehicles of its own design.

Currently, “ChARP” is able to carry out the following:

- supply the customer with repair and operating documents in four languages (Russian, English, French and Spanish)
- provide the technical support of aircraft and engine within warranty period of their operation
- fulfill the delivery of spare parts for aircraft and engines;
- manufacture the ground service means for all types of aircraft.
- render the consulting services in organization of aircraft repair at the operator’s production base.

Ukrainian aviation industry include enterprises for designing and producing missile systems: State Joint Stock Holding Company ARTEM, State Kyiv Design Bureau “Luch”, State Enterprise Research and Production Company “Progress”, State Enterprise “Krasilivsky Aggregate Plant”, State Enterprise Zhuliany Machine-Building Plant «Vizar», Konstantinovka State Scientific Industrial Enterprise “KVAR SIT”, Research & Development Company ADRON are necessary for re-equipment and modernization military aircraft.

UKRAINIAN AEROSPACE AND AVIATION MARKET OVERVIEW

TECHNOLOGICAL / RESEARCH CAPABILITIES OF UKRAINIAN ORGANIZATIONS

The main technological organizations in Ukraine, which provide the services for aviation- and space industries, have different specializations and are presented below. More detailed information on the capabilities, expertise and technologies of some of the organizations can also be found in this booklet.

JSC Ukrainian Research Institute of Aviation Technology (UkrRIAT)

This is the main organization of Ukraine in the field of material science and technology of aircraft production. The Institute unites specialists in different branches of production, and machine-building industry. It also provides consultations in the field of application of devices, sophisticated technological equipment and other product of foreign enterprises be Ukrainian manufacturers of aviation products.

YUZHGIPRONIIAVIAPROM Southern State Design and research Institute Of Aviation Industry

A developer of complex projects on creation of new capacities, reconstruction and technical re-equipping of aviation hardware production (aircraft plants, airborne).

Public Joint Stock Company «Ukrainian research institute of manufacturing engineer («UKRNIITM»)

This is the lead organization of Ukraine in the direction of complex providing of the manufacturing engineering, namely in the production of rocket-space technique and wares of the national – economic purposes of the Ukraine. Institute has a considerable potential in the elaboration of the unique technologies of engineering, especially in area of the equipment of units and details production from composite materials, galvanic coverings, non-destructive test, welding, machining, cleanness and hermiticity support.

State Dniprovsky Design Institute is the lead organization of Ukraine. It's activities are directed toward designing machine building and professional equipment building enterprises.

State Research and Engineering Center for Space Technique Certification is the lead organization of Ukraine in the direction of space equipment certification.

Technological research institute of instrumentation provides technological maintenance of designing of space equipment, developing and manu-

facturing of the engineering, devices and materials for instrument making.

Radmir Radio Measurement Scientific And Research Institute JSC is the main enterprise for the Ukrainian on-ground automated spacecraft control complex. The institute is the lead organization of Ukraine for development and production of control, data transfer systems for spacecraft.

Soyuz Scientific, Research and Design Institute is a specialised organization for development and construction of special and departmental telecommunication and information control systems.

Fundamental scientific research for the aviation and space-rocket industry is executed by the institutes of the National Academy of Sciences of Ukraine. Leading institutes are : the Institute of Technical Mechanics under NASU and the National Space Agency of Ukraine, G. S. Pisarenko Institute for Problems of Strength, Institute of Physics, V. Ye. Lashkaryov Institute of Semiconductor Physics, G. V. Kurdyumov Institute for Metal Physics, Ye. O. Paton Electric Welding Institute, I. M. Frantsevich Institute for Problems of Materials Sciences, V. N. Bakul Institute for Superhard Materials.

Experts for the aviation and space-rocket industry are educated at: The National Aviation University of Ukraine, National Technical University "Kyiv Polytechnic Institute", Dnipropetrovsk National University, National Aerospace University, "Kharkiv Aviation Institute".

"ARSENAL" CENTRAL DESIGN OFFICE STATE ENTERPRISE ("ARSENAL" CDO SE)

KYIV
UKRAINE

Mykola Lykholit
Director – Chief designer
of "Arsenal" CDO SE

8, Moscovska Street,
Kyiv-10, 01010,
"Arsenal" CDO SE

Tel.: +38(044) 253-0062,
Fax: (044) 288-9429,
e-mail: info@arsenalcdb.com.ua

"Arsenal" CDO SE was founded in 1954 within the structure of "Arsenal" Plant and in 1991 became an independent state owned enterprise. Since 2004 the enterprise was subordinated to the National Space Agency of Ukraine.

"Arsenal" is the leading NSAU enterprise in the field of optical and optical-electronic instruments with primary scientific and technical expertise in design, research and production. The enterprise structure includes research, manufacture, mechanical and assembly shops, technological and metrological services, testing and certification production, marketing, sale and design supervision and products commissioning at the Customers' place. The organization provides the full range of services from designing to manufacturing and products operation support.

DISTINCTIVE COMPETENCIES AND RANGE OF PRODUCTS

As a leader in the field of optical and optical-electronic instrument production, the range of the company's products include;

- optical and electronic aerospace systems of the Earth remote sensing (ERS)
- onboard optical and electronic systems of the space vehicle orientation
- onboard optical and optical-electronic devices for scientific research
- optical and electronic devices for the ground tracking stations and tracking of the astronomical and space objects
- devices and systems of independent "azimuth" orientation and determination of the base planes mutual turns for the rocket and rocket and space equipment
- inertial measuring devices for the "strapdown" reference systems
- portable surface-to-air missile systems with the optical homing heads
- weapons' optical homing heads
- aviation optical and electronic target acquisition and aiming systems, target detection and tracking, collimator and screen indication
- optical and optical-electronic devices for orientation, surveillance, detection, direction finding, and location of the targets for the land military equipment and weapons
- infra-red, television, thermal vision and the laser equipment for the civil and special purposes

INTERNATIONAL CERTIFICATION

“Arsenal” is certified as follows:

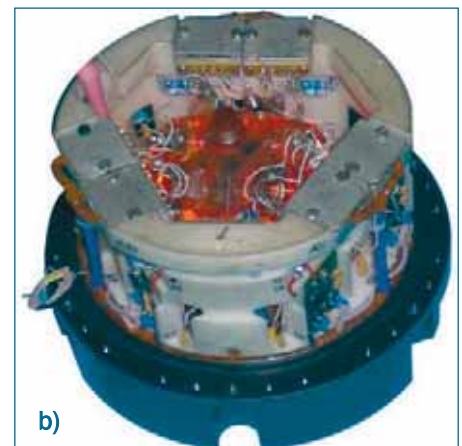
- ISO 9001:2000
- ISO 9001:2001 (Certificate of conformity with IQNET)
- GOSSTANDARD ICO 9001:2001 (Military Register of the Ministry of Defense of the Russian Federation)

PARTNERING OPPORTUNITIES

The enterprise has a highly skilled workforce; including 2 doctors and 23 candidates of physical and mathematical and engineering science as well as technological and industrial personnel. “Arsenal” intends to expand the enterprise’s field of activity in the design and manufacture of new types of products, including utilizing international innovative cooperation. With this in mind, the company offers to the research and development, technological and innovation and investment centers of Canada, the European Union and the USA the following:

- performance, by “Arsenal” designers in accordance with the customer’s technical requirements
- joint performance of the aforementioned works with the Private and Public sectors of Canada, EU and the USA, within the framework of contracts or through creation of joint ventures
- creation of joint innovative research-and-production and technological complexes for designing and manufacturing in “Arsenal” and / or in Canada of new products, which meet international standards, for sale both in Ukraine, Canada, and other international markets

In this regard, “Arsenal” seeks both purely financial forms of investment from investors of Canada and investment in the form of new technologies and technological transfer (with possible joint modernization and adaptation) by investors for creation of the specialized production and joint sales of the products.



-
- a) Gimbales inertial navigation control system for launch vehicle Cyclone-4
 - b) Triaxial monoblock laser gyroscope for missile technology
 - c) Small-size astroinstrumentation system for spacecraft
 - d) Gyrocompasses and gyrotheodolites for the azimuth orientation of missile systems

CRIMEAN ASTROPHYSICAL OBSERVATORY

CRIMEA
UKRAINE

Dr. Alla Rostopchyna-Shakhovskaya
Director

Nauchny, Bakhchisaray reg.
98409 Ukraine
+380-6554-71161
director@crao.crimea.ua
info@crao.crimea.ua

The Crimean Observatory was the first major observatory of former Soviet Union to enter the age of astrophysics and is today one of the largest scientific centers in Ukraine and the former Soviet Union.

The observatory possesses modern equipment for astrophysical observations over a wide spectral range from gamma-rays to meter radio waves of stars and galaxies as well as Sun and solar system. The main part of the Observatory is located in Nauchny (1.2km SE from Bakhchisaraj) at an altitude of 600 meters (lat=+44:43:36, long= 2h 16m 03s). The main telescopes are: the 2.6-m Shajn telescope, two 1.25-m telescopes, ground-based gamma-telescope GT-48 with the mirrors area of 54 square meter, the 1.2-m Solar Tower telescope as well as a few other smaller instruments. The Department of Radioastronomy with its 22-m radio telescope for mm and cm radio waves is located at the foot of mount Koshka in Khatsiveli (near Simeiz) (lat=+44:23:52.6, long=2h 15m 55.1s). One of Observatory Departments - Simeiz station (lat=+44:24;12.3, long=2h 15m 59.3s) is located on mount Koshka at an altitude of 346 m and a distance of 3 km from the shore. A laser device which has been mounted at 1-m telescope for the location of satellites is under operation here.

The observatory has 5 departments: Solar Physics, Physics of Stars and Galaxies, Radio-Astronomy, Gamma-Ray-Astronomy and Experimental Astrophysics. There are optical and mechanical workshops and electronic labs, where astronomical instruments have been manufactured for both ground-based and space experiments. There are 420 employees including about 120 scientists. The main subjects of investigation are: solar activity, helioseismology, structure and chemical composition of stellar atmospheres, stellar and solar magnetic fields, variable stars, extragalactic astronomy, cosmic-rays in Universe, planets and asteroids, geodynamics and laser location of satellites. Currently, ground-based and space telescopes of the new generation as well as astrophysical equipment are being designed and manufactured at the observatory.

Between 1983-1989 the observatory carried out the largest Soviet ultra-violet experiment from the astrophysical station "Astron" which was equipped with the multi-purpose 80-cm ultra-violet telescope.

The scanning spectrometer with a concave diffraction grating installed on the telescope was designed and manufactured in cooperation with the Laboratoire d'Astrophysique de Marseille. At the observatory numerous observations were made, most notably: registration of energy distribution in spectra of stars; registration of the spectral line profiles indicating a powerful flow of matter from stars; estimation of sizes of the hot, invisible from the Earth, components in the dwarf double systems where the optical and X-ray flares take place; measurements of radiation in many UV-lines in spectra of extra-galactic systems and diffuse nebulae in our Galaxy; high time-resolved registration of UV flares on the red dwarf star; estimation of the evaporation rate of the Halley comet by observations of the UV molecular bands; appearance of the thermonuclear synthesis products in the Supernova 1987 in Small Magellan Cloud was detected essentially earlier, than in other observatories. Comparison of the data received in different sessions of communications has shown that the large-size optics made in the optical workshop of the observatory had practically no degradation for all the six years of the telescope operation in space.

The abundant experience which has been accumulated by working out, manufacturing and operation of the ASTRON has allowed to initiate a larger experiment design of the astrophysical station "Spectrum-UV" for an orbital space telescope of 1.7 m diameter of main mirror. By now the original project "Spectrum-UV" has grown to an international project – the World Space ultra-violet observatory (WSO/UV) with participation of Russia, Germany, Spain, China, Ukraine, Hungary, the Great Britain, Israel, Argentina and Bulgaria. In this project the following tasks are assigned to the observatory: design and participation in manufacturing of the optics of the telescope T-170, its final figuring and coating; certification and assembling of optics of the telescope; design of the field cameras; scientific and technological justification of the experiment; expert estimates of independent proposals on these questions from the other participants; participation in assembling and testing of the scientific equipment and testing of the whole complex of the telescope; participation in drawing up and carrying out of the technological tests of the telescope on orbit; participation in drawing up of the scientific program of the experiment.

Ecological monitoring of near-Earth space

Ecological monitoring of near-earth space is a perspective area of research. In recent years contamination of near-earth space with various objects of artificial origin has become an acute problem. In 2004 the observatory began systematic investigations of small-sized (below 1m) debris at the geostationary earth orbit (GEO) area in the framework of ISON cooperation with Keldysh Institute of Applied Mathematics (IPM) of RAS.

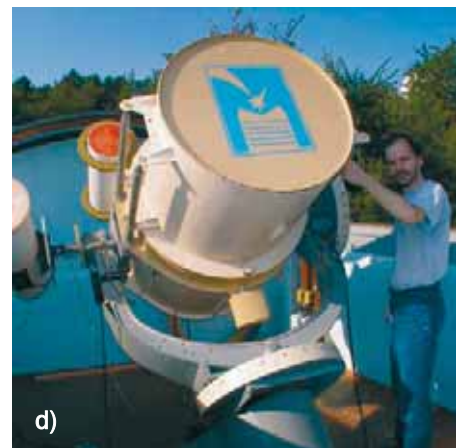
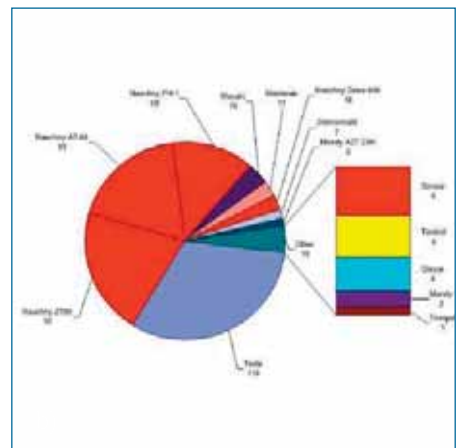
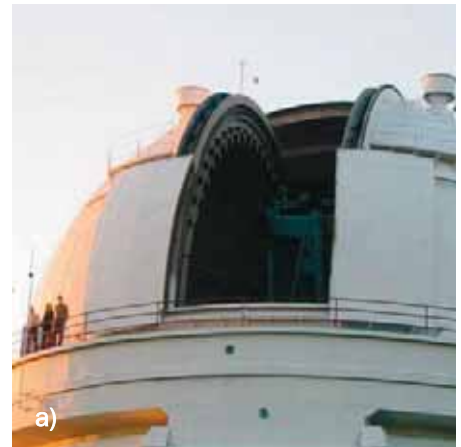
The goals of this research are:

- determination of the current level of circum-terrestrial space contamination
- enhancement of the models of debris motion
- determination of the likely origin of new-discovered objects
- verification of existing models of space debris distribution
- estimation of the hazard from the debris for spacecrafts on high orbits now and in the future

PARTNERING OPPORTUNITIES

The observatory is interested in the following type of collaboration:

- Positional and photometric observations of near-earth objects of the partner's interest, based on an a bilateral agreement.
- Development and deployment of observational facilities funded by the partner, cooperative usage of that facilities.



G.V. KURDYUMOV INSTITUTE FOR METAL PHYSICS

NASU

KYIV
UKRAINE

Anatoly P. Shpak
Director, Dr. Sc., Prof.,
Academician
and First Vice-President
of National Academy
of Sciences of Ukraine

36, Vernadsky str.,
Kyiv, 03680,
Ukraine

Phone: +38 044 424-10-05
fax: +38 044 424-25-61
e-mail: metall@imp.kiev.ua

Oleksandr M. Semirga
Chief Technology
Commercialization Officer

Phone: +38 096 949-60-74
fax: +38 044 424-25-61
e-mail: sashenko@imp.kiev.ua
web site: <http://www.imp.kiev.ua>

The Institute for Metal Physics is one of the major research centers in Ukraine and is responsible for fulfillment of the program "Nanoscale systems, nanomaterials, nanotechnologies".

DISTINCTIVE COMPETENCIES

Specific projects that highlight the Institute's capabilities are:

- the phase transformations in amorphous and nano-crystalline metallic alloys
- cost-effective production of titanium alloys for automotive industry,
- apatite-like nanosystems and nanomaterials
- high nitrogen steels
- solidification in microgravity conditions
- growth of single crystal shape memory Cu-Al alloys
- development of Zr-based shape memory alloys
- localized rapid heat treatment of Al and Ti alloys for improved wear and fatigue resistance
- development of high hardened engineering Al-based alloys with nanocomposite structure
- hardened Invar Fe-Ni-C-based alloys for varying of hardness and thermal expansion
- transformation of solar energy into power one by nanostructured electrodes
- methods of dynamical diffraction, shape-memory alloys, super-elasticity and magneto-elasticity in Ni-Mn-Ga-based alloys
- methods for computational modeling of atomic and electronic nanostructures and spectral diagnostics of nanomaterials

EXAMPLES OF SOME NEW DEVELOPMENTS AT THE INSTITUTE

High-strength titanium alloys production technology

New methods of rapid heat treatment (RHT) of two-phases + and - titanium alloys provide high-strength with improved fatigue and ductility properties were developed.

Cost-effective production of powder metallurgy titanium components

The distinctive feature of the technology is employment of hydrogenated titanium powder instead of traditional titanium powder. Hydrogen has a major effect on synthesis improvement, providing production of alloys having 98.5-99.5% density, desired microstructure and chemical homogeneity, low impurity content and high mechanical properties.

Amorphous and nanocrystalline magnetic cores for flux-gate and induction magnetometers with heightened sensitivity

The goal was to develop production technology of rod-shaped nanocrystalline and ring-shaped amorphous magnetic cores with sensitivity and noise parameters on a level exceeding performance of the best world analogs.

Hardened Invar Fe-Ni-C-based Alloys

The Invar Fe-Ni-X-C-based (X is alloying element) alloys have been developed, which on thermal expansion coefficient and stability of thermal ex-

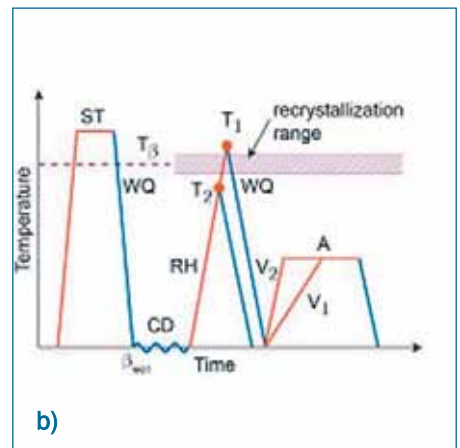
pansion in the temperature range of 100 – 400 K do not yield the standard Fe-Ni Invar. Additional products show high strength and plasticity, resistance to cyclic loading and elinvar behaviour as well as new thermal expansion coefficients. The effect of alloying elements Co and Mn on these properties has been determined.

New construction rapidly quenched Al alloys – nanophase composites

The proposed nano-phase multicomponent Al-based alloys have a number of considerable advantages compared to conventional alloys: such as increased high-temperature strength and heat-time stability, which cannot be achieved in conventional microcrystalline aluminum alloys. In addition, high corrosion resistance characterizes the alloys. New compositions of the Al-Ni(Fe,Co,Fe)-Y(La,Gd,Tb)-based alloys and the technology of manufacturing thin (30 - 200 μm) ribbons directly from molten material using rapid quenching methods as well as bulk amorphous nanophase semifinished products at relatively small cooling rates are proposed. The application of Al-based alloys increases the opportunity to create new generations of aircraft equipment, in particular constructions of complex shapes, which must perform under conditions of reduced and elevated temperature.

Heat-resistant and high temperature wear resisting alloy for hardening of gas-turbine engine blades

The cobalt-based eutectic alloys (XTN-1) and XTN-2, which are characterized by high wear-resistance and heat-resistance at high temperatures, high corrosion stability and good casting characteristics were developed. The alloys can potentially be used for nickel-based aviation alloys. Applications: air-space industry and gas-turbine engine.



a) Samples of products obtained by the technology

b) High-strength titanium alloys production technology. Scheme of technological process

c) High-strength titanium alloys production technology. Samples of products obtained by the technology

d) Amorphous and nanocrystalline magnetic cores for flux-gate and induction magnetometers with high sensitivity. Samples of products obtained by the technology

DEPARTMENT OF THE HIGH TEMPERATURE THERMOGAS- DYNAMICS INSTITUTE OF ENGINEERING THERMOPHYSICS

KYIV
UKRAINE

Artem Khalatov
Professor, Head of DHTTGD

*2A Zhelyabova str.,
03057, Kyiv-57,
UKRAINE*

Tel. (of.): 38 (044) 456-9302
E-mail: Artem.Khalatov@vortex.org.ua

The Department of High Temperature Thermogasdynamics (DHTTGD) of the National Academy of Sciences has vast experience in the aerospace engineering field. DHTTGD has worked for many years with the leading gas turbine and space companies.

PRIMARY SCIENTIFIC DIRECTIONS

- novel cooling technologies for high performance gas turbines
- flow separation control in gas turbines, centrifugal compressors and flight control
- heat transfer studies in components of aerospace systems

DISTINCTIVE COMPETENCIES

Novel oscillating film cooling technique

Development of heat resistance alloys has lagged behind designers requirements. Since modern gas turbines operate at gas turbine levels above the blade melting point, both internal and external cooling systems are employed in the blades to meet product life span. Film cooling is the primary technique employed in various applications to protect objects externally in the flow path while operating at high gas temperatures.

However, in some cases, the coolant amount becomes so great that associated pressure losses due to providing the cooling flow are excessive. To reduce losses, designers increase the number of cooling arrays which leads to significant wall temperature non-uniformity, thermal stresses, surface cracks, and damage. Modern production technologies, such as shaped cooling holes with compound angles, give opportunities for increasing the coolant flow without large increases in pressure loss penalties. However, they are complex and expensive.

Recently, the unique vortex structures generated in a deep spherical dimple at relatively high Reynolds number flow were documented. This led to the innovative concept of using dimples to create a naturally oscillating film cooling pattern, as patented in the Ukraine. The aim of the proposed collaboration is to evaluate the primary merits and benefits of this innovative film cooling concept where the film naturally oscillates.

Innovative internal cyclone cooling for gas turbine blades

Despite the progress in the design of cooling systems, adequate internal blade cooling remains a serious engineering problem. The cyclone cooling concept is based on the creation of swirl flow in a blade cooling passage. The results of experimental studies have demonstrated the high ability of a cyclone cooling concept to enhance heat transfer in the cooling passage. In some cases this extends the limit of the internal blade cooling system, and the production of a blade with internal cyclone cooling is much simpler and more cost effective. The aim of the proposed collaboration is to evaluate the merits and benefits of the cyclone cooling scheme in terms of the real blade design.

Passive flow separation control

The suction side of the gas turbine and compressor blade often suffers from

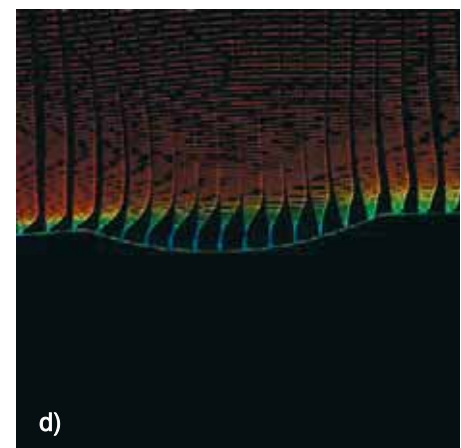
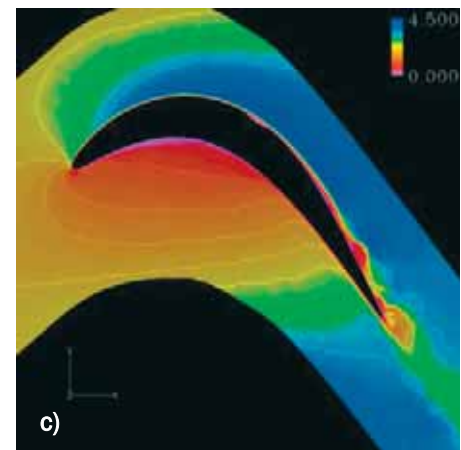
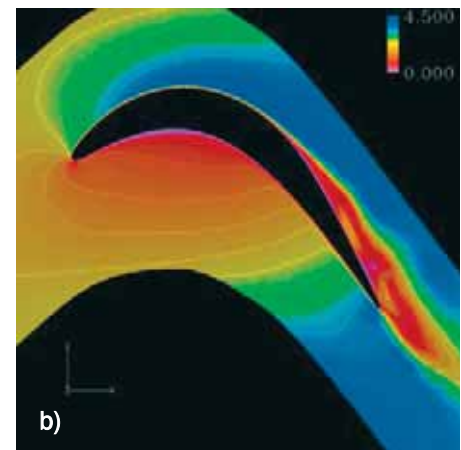
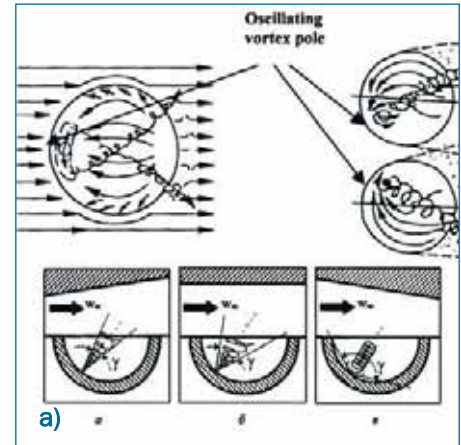
boundary layer separation while operating at off-design or close to off-design conditions. The separation zone reduces the blade (aerodynamic profile) efficiency and leads to a reduction of turbine or compressor power. To improve the turbine or compressor efficiency both active and passive flow separation control techniques are being considered. The aim of the proposed collaboration is to assess the effect of span-wise dimple configurations on the efficiency of the flow separation control using the actual gas turbine or compressor blades and various space system elements.

PARTNERING OPPORTUNITIES

The DHTTGD has close scientific and industrial links with Cardiff University (UK), University of Oxford (UK), University of Cambridge (UK), Rolls-Royce (UK), Solar Turbines Inc. (USA), General Electric (USA), US Air Force Academy, Stuttgart University (Germany) and others.

Over the last ten years the DHTTGD was involved in several international projects and research programs in the aerospace engineering field. This includes the programs carried out jointly with the Cardiff University (UK), University of Utah (USA), US Air Force Academy (USA) and Russian aerospace companies.

The DHTTGD is looking for international collaboration to establish experimental and CFD studies of the innovative cooling systems, flow separation and flight control and heat transfer studies in components of aerospace engineering.



a) The oscillating film cooling concept:

Top - the angular fluctuations of jets bursting out of dimples

Bottom - compressed vortex inside a deep spherical dimple

b) Passive flow separation control using the surface dimple technology. Flow separation over gas turbine blade.

c) Passive flow separation control using the surface dimple technology. "Suppression" of the flow separation by means of dimple row.

d) Passive flow separation control using the surface dimple technology. Flow field inside the two-dimensional groove.

INSTITUTE OF GEOLOGICAL SCIENCES “SCIENTIFIC CENTRE FOR AEROSPACE RESEARCH OF THE EARTH” STATE ENTERPRISE

KYIV
UKRAINE

Vadym Lyalko
Director

55-B Olesia Gonchара,
01601, Kyiv, MSP,
Ukraine
Tel: +(38 044) 486 9405,
482 0166
Fax: +(38 044) 486 9405,
482 0166
e-mail: casre@casre.kiev.ua

The State Enterprise Scientific Centre for Aerospace Research of the Earth (CASRE) was established in 1992 according to the Decree of Presidium of National Academy of Sciences of Ukraine (NASU) on the basis of research divisions of the Institute of Geological Sciences and Kiev Institute for Aerospace Techniques. Strategic trend of activity for The Centre was assigned to develop fundamental and applied research of the Earth by remote sensing methods. The Centre has approximately 100 staff.

There are 5 research departments in CASRE: Energy and Mass Exchange in Geosystems, Aerospace Research in Geology, Aerospace Research in Geoecology, System Analysis, and Geoinformation Technologies for Remote Sensing.

The work of Center is directed at the fulfillment of scientific targets of NASU and such important programs as IV National Space Program of Ukraine in 2008-2012, National program “Oil and Gas of Ukraine”, “National geological map – 200”, and also international programs such as “Global Earth Observation System of Systems” (GEOSS), “Global Monitoring for Environment and Security” (GMES/Copernicus), Russian-Ukrainian programs “Monitoring of wave processes’ structure that are generated in lithosphere and other geospheres of Earth”.

PRIMARY SCIENTIFIC DIRECTIONS

- Development of scientific principles for the aerospace monitoring together with the physical and mathematical models of radiation and scattering processes in the different ranges of electromagnetic spectrum that are induced by the natural objects (vegetation, soil, water, air)
- Theoretical, methodical, and applied studies targeting the prospecting and exploration of mineral resources using remote sensing tools and techniques
- Development of new methods and technologies for the computer processing and interpretation of satellite images to solve resource and environmental tasks
- System analysis for the problems in remote sensing of the Earth.

On the basis of acquired spectral models it was developed several modern space technologies to solve topical tasks of global natural changes forecasting and maintenance of national energy security by diversification of energy supply to Ukraine.

DISTINCTIVE COMPETENCIES

The engineers and researcher staff of the Centre are the authors of many international, Ukrainian and Russian patents for techniques and image processing tools in prospecting for oil and gas fields, monitoring of environmental changes and solving of economic issues. The Institute’s most promising technologies are:

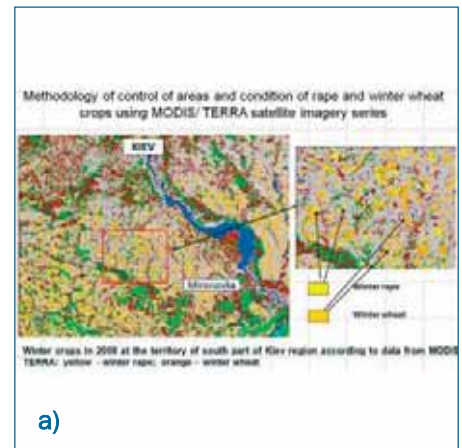
- Satellite technology for searching of onshore and offshore oil and gas fields
- Evaluation of environmental conditions for different areas
- Technology to estimate geodynamic and technogenic impact on geo-

ecological conditions of urban agglomerations and landscapes

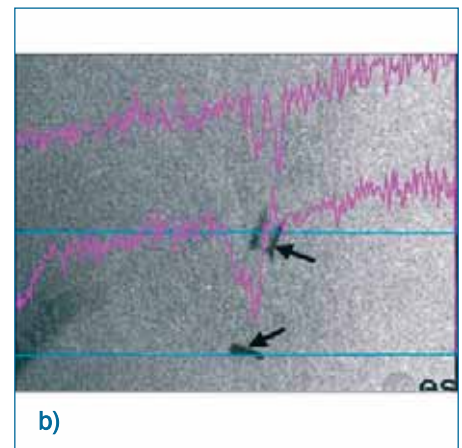
- Technology to detect and measure heat losses from the caliducts, industrial and social objects and buildings by thermal remote sensing survey
- Technology of the external control for the optical and electronic RSE equipment installed onboard of space satellites
- Technology to determine composition, phyto-sanitary state and fire risk for the forests and meadows
- Technology to evaluate the vegetation state of winter wheat and its yield using an integrated processing of ground and space information
- Technology of information support of the strategic and operative planning while decision making for the orbital remote sensing systems development.

PARTNERING OPPORTUNITIES

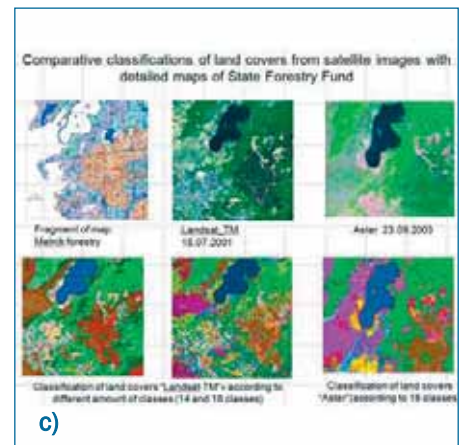
The Centre diversifies its international contacts and maintains international cooperation with European Space Agency (ESA), Space Agencies of Germany (DARA-DLR), France (CNES), International Institute for Applied System Analysis (IIASA), Polish, Hungarian and Russian Academies of Sciences and many other leading research institutions and remote sensing organizations abroad. CASRE is a member of European Association of Remote Sensing Laboratories (EARSeL).



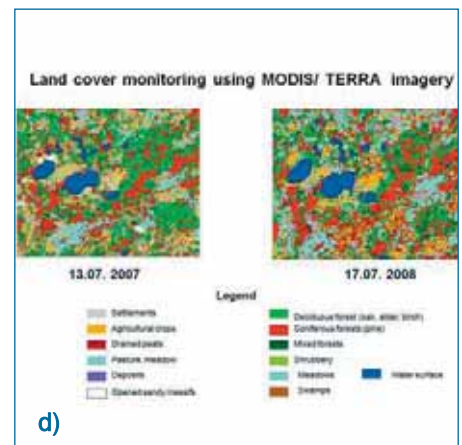
a)



b)



c)



d)

a) Methodology of control of areas and condition of rape and winter wheat crops using MODIS/ TERRA satellite imagery series

b) Identification of an oil slick upon sharp decreasing of reflected radiofrequency signal

c) Comparative classifications of land covers from satellite images with detailed maps of State Forestry Fund

d) Land cover monitoring using MODIS/ TERRA imagery

V. M. GLUSHKOV INSTITUTE OF CYBERNETICS

NASU

KYIV
UKRAINE

Alexandr Khimich

40 Academician Glushkov ave.,
Kyiv, 03680,
Ukraine
Phone.: (380-44) 526-41-78,
Fax: (380-44) 526-41-78
E-mail: aik@public.icyb.kiev.ua

PRIMARY SCIENTIFIC DIRECTIONS

- Investigation and development of architecture of program engineering complexes adjusted to computational problems in the aircraft-building industry based both on cluster architecture computers (SCIT-3) and technologies of high-production distributed computations, included MSC.Nastran Software. MSC.Marc Software, etc.
- SCIT-3 – supercomputer for information technologies

DISTINCTIVE COMPETENCIES

Include 127-processor of cluster on multicore processors (75 nodes on duo core processors Intel Xeon of 5160 and 52 nodes on quad core processors Xeon 5345)

Peak cluster productivity is 6500 Gflops, the real confirmed productivity (on 125 nodes) is 5317 Gflops.

Network InfiniBand is intended for a high-speed exchange between nodes during calculations. At data exchange between two nodes on network InfiniBand with use of reports MPI throughput of 850 Mb per second can be reached.

Network Gigabit Ethernet is intended for connection of all computing nodes of cluster with operating node and a file-server.

INPARCOM - family of intelligent parallel workstations (joint development of State scientific production enterprise “Elektronmash” of the Ministry of Industrial Policy of Ukraine and by V.M.Glushkov Institute of Cybernetics of the National Academy of Sciences of Ukraine)

Advantages Of The Intelligent Computer:

- enhancement of the specific scientific and engineering user tasks and works: investigation of the problem; creation of the required algorithms; writing and debugging of the programs
- reduction of time required for posing and solving the problem often by a factor of over 100
- possibility of formulation of the user's problem on the computer in terms of the specific application area
- obtaining machine solutions together with reliability estimates and, if desired, determination of the main characteristics of the machine model of the problem even on basis of approximately given initial data
- considerable reduction of time required for machine driven investigation and solution of scientific and engineering problems

The development of these “intelligent computers” on the basis of “state of the art elements”, “intelligent software” and general-purpose technologies ensures relatively low prices for this kind of computers and best “run time/cost” ratios. Engineering characteristics of the family of intelligent knowledge based workstations are given in the Table.

Family of intelligent parallel computers “INPARCOM”

	Peak productivity, GFlops*	Peak productivity LIN-PACK, Gflops	Operating memory, GB	Disk memory, GB	Disk storage
INPARCOM -32 (Xeon Quad-Core)	200 – 380	150 – 290	64	1000	-
INPARCOM -64 (Xeon Quad-Core)	400 – 770	300 – 580	128	2000	from 1 Tb
INPARCOM -128 (Xeon Quad-Core)	800 – 1500	600 – 1130	256	4000	from 3 Tb
INPARCOM 256 (Xeon Quad-Core)	1600 – 3000	1200 – 2200	512	8000	from 4 Tb

Note: * - depending on the processor's clock frequency;

Multi-Agent Control of Autonomous Unmanned Vehicles under Conflict and Uncertainty

New methods, algorithms, and software for control of the multiple unmanned aerial vehicles under conflict and uncertainty are proposed.

Scientific bases of construction of the integrated interactive geo-information aero-navigation complexes of real time

The developed complex can be applied in the centers of operative control of air, ground and marine systems or objects, and also in different systems of operative control, for example, at construction of the automated system of agro-ecological monitoring and certification of ground territories which are freed in the process of conversion.

The integrated geoinformation system of complex protection of especially important objects (the airports, atomic power stations, oil refining factories, etc.)

Application of magnetocardiography for health control of astronauts

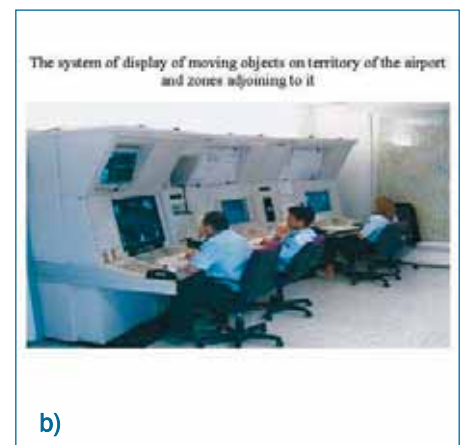
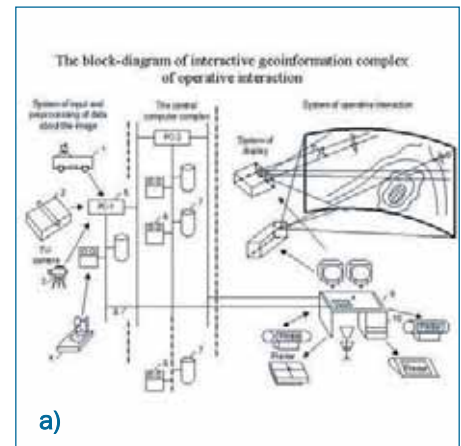
Current methods at diagnosing heart disease are not effective at the onset of the disease. Using magnetocardiography it is possible to detect the hidden form of gipocsy of myocardium. Practical application of technology of registration of the biomagnetic field at the deep cardiologic inspection of candidates to the Antarctic expedition allowed the development of additional criteria of estimation of backlogs of cardiac activity and forecast what violations are possible. The fundamental value of the use of magnitometric technology in medico-biological researches in Antarctic Region consists of the depth studies of electrophysiology mechanisms of alterations of adaptations of cardiac activity of subjects at the protracted stay in extraordinary conditions. With the same success magnetocardiography can be used for examination of cosmonauts before and after missions. Similar researches were executed in Russia for candidates to cosmonauts and pilots-testers with the use of magnetocardiography, the software for which was developed in V.M.Glushkov Institute of cybernetics .

a) The block-diagram of interactive geoinformation complex of operative interaction

b) The system of display of moving objects on territory of the airport and zones adjoining to it

c) INFRACOM – family of intelligent parallel workstations

d) ZCIT-3 – supercomputer for information technologies



INSTITUTE OF HYDRO- MECHANICS

KYIV
UKRAINE

Victor Grinchenko
Director

8/4 Zhelyabova street,
03057 Kyiv,
Ukraine

Tel. 8044 456 4313

e-mail: grinchenko@hydromech.com.ua

The Institute of Hydromechanics, of the National Academy of Sciences of Ukraine, was founded in 1926 as the Ukrainian R&D Institute of Hydrology and Hydraulic Engineering.

PRIMARY SCIENTIFIC DIRECTIONS

The institute is involved in fundamental and applied investigations within two scientific fields:

- fluid dynamics related to objects moving in laminar and turbulent flows
- hydromechanics of water flows and hydraulic engineering

The institute is traditionally involved in studies of flow structure around all bridges in Kyiv and of various hydraulic engineering constructions in Ukraine. In parallel, fundamental problems of fluid flows are studied including ideal, viscous and non-Newtonian fluids, heat transfer (basically, with applications to power stations), control of separated and boundary-layer flows, etc. Over the years, scientists at the institute have made major contributions into the development of fundamental fluid dynamics, acoustics, hydro-bionics and boundary layer, stratified and two-phase flows, hydraulics and hydraulic engineering.

DISTINCTIVE COMPETENCIES

The Institute has unique experimental infrastructure including a big water channel, aerodynamic facilities, and hydraulic research station in Kyilov. The Institute is a coordination centre for fluid mechanics research and training in Ukraine.

Research in aerodynamics

The aerodynamic part of the institute's research activities is presented by projects and research of Dr. Nina Yurchenko. The goal is the development of advanced flow-control techniques aimed at reduction of fuel consumption and environmental pollution.

These research activities deal with the collaboration and sponsorship of the European Office of Aerospace Research and Development, USA. Figure 1 shows the beginning of these activities as a success story page of the Air Force Office of Scientific Research, Air Force Research Laboratory / International Office (AFOSR / IO). Currently Dr. N. Yurchenko is a Principal Investigator / Manager of seven projects on fundamental research which were funded for more than 15 years by the EOARD through the Science and Technology Center in Ukraine (STCU) and Civilian Research and Development Foundation (CRDF).

Our solution is to offer innovative flow-control technologies to improve aerodynamic performance of a vehicle or any moving/rotating object. Our concept can be expanded to many related applications, e.g. to wind and gas turbines as well as to marine applications and to heat transfer enhancement. Thus our potential customers can be found in other segments of industry, such as wind turbines, propulsion systems (improved turbine blade operation), automotive industry, etc.

The research team combines specialists from the Institute of Hydromechanics, National Space Agency of Ukraine, National Aviation University of Ukraine and Moscow Radio-Technical Institute of Russian Academy of Sci-

ences. It has broad experience in basic fluid dynamics, numerical & experimental aerodynamics and electrodynamics, the latter being applied to develop advanced methods of flow control using microwave (MW) radiation.

Summary of the flow-control concept. Technological advantage

The concept of flow control (improvement of aerodynamic performance) is developed that is based on a modification of the near-wall flow structure. Two active flow control methods are realized in the framework of this concept using selective boundary-layer heating with (1) flush-mounted streamwise elements and (2) spanwise arrays of localized plasma discharges. Matched experimental investigations of lift and drag coefficients of an air-foil model and numerical modeling of a fine flow structure show their correlation and open possibilities to manipulate integral flow characteristics. Combinations of parameters are found which can improve the aerodynamic performance (lift-to-drag ratio) of tested models. The developed remote mode of active flow control using MW-initiated plasma arrays is innovative and beneficial due to its greater operational flexibility.

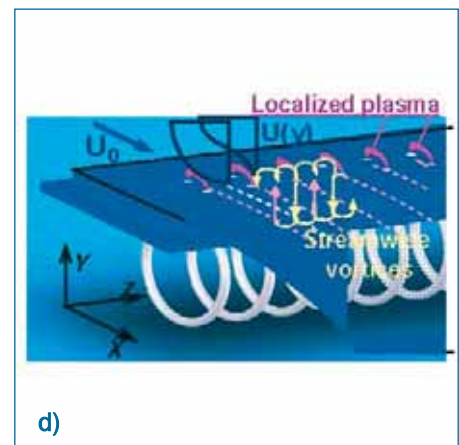
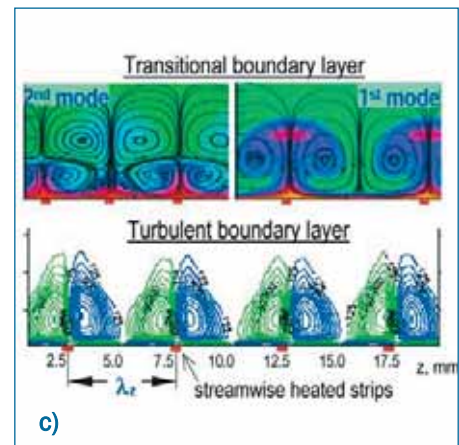
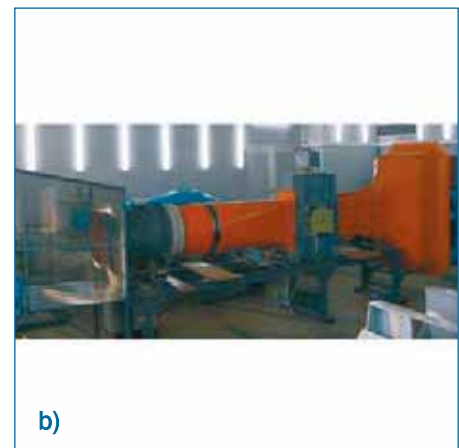
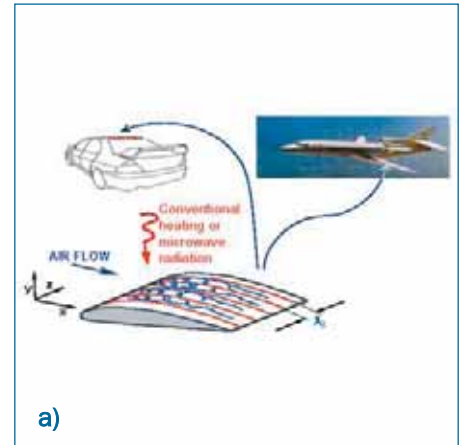
A unique experimental complex for interdisciplinary research is created to measure aerodynamic parameters under conditions of microwave radiation and plasma generation.

PARTNERING OPPORTUNITIES

Important areas for collaboration include:

- Estimated net potential fuel burn benefit for subsonic transports due to application of drag reducing technologies is about 5 – 12 %; 15% reduction in fuel cost doubles the profit for an airline.
- European Commission has required 50% reduction in fuel consumption (a 50% cut in carbon and 80% cut in nitrogen oxide emissions per passenger kilometer) by 2020. In 2005, 55 billion gallons of the aircraft Jet A-1 fuel was consumed by the US airline industry creating 540 million tons of CO₂.
- Competition in the global aircraft market forces manufacturers to take right decisions today for investments in cost effective technologies for products of tomorrow.

We seek for funding from an interested party to transfer our encouraging fundamental results into an application area, i.e. to perform the research oriented on a specified commercial customer.



a) Generation of drag reducing vortices (blue) using flush-mounted heated elements (red)

b) Wind tunnel complex equipped with the microwave/plasma-generation and protection systems for automated aerodynamic measurements

c) Iso-vorticity lines displaying development of streamwise vortices generated thermally with different λ_z scales: $Re=5 \cdot 10^5$, $\Delta T_z=35^\circ$

d) Flow control approach based on MW-generated localized plasma discharges

INSTITUTE OF PHYSICS NASU

KYIV
UKRAINE

Olena Fesenko
*Head of the Technology Transfer,
Innovations and Intellectual Property
Department*

46, Nauky avenue,
03680, Kiev,
Ukraine

Tel.: +38 (044) 525-98-41,
525-79-52

Fax: +38 (044) 525-15-89
E-mail: fesenko@iop.kiev.ua,
fesenko.olena@gmail.com

The Institute of Physics, of the National Academy of Sciences of Ukraine, was founded in 1926. Over its 80-plus years of existence, five specialized institutes were “spun-out from the Institute of Physics. This includes, Bogolubov Institute for Theoretical Physics, Institute of Semiconductor Physics.

The Institute of Physics is consistently ranked at the top of national academic institutions ranking. Besides, international reputation of IOP is growing constantly as prominent scientists from the Institute expand their activity to leading foreign research centers and universities.

Currently, the Institute of Physics employs more than 300 researchers (together with two Full Members and eight Corresponding Members of the NASU) and around 200 people of supporting personnel. It has more than 20 scientific units (including the state-of-the-art Femtosecond Laser Complex).

PRIMARY SCIENTIFIC DIRECTIONS

- Condensed Matter, including Soft Matter Physics;
- Nanophysics and Nanoelectronics;
- Laser Physics, Nonlinear and Singular Optics, Holography;
- Physics of Surfaces, Emission and Plasma Electronics.

Although the Institute of Physics has focused on fundamental research, it has a strong applied research in a number of areas, such as cryogenics, LC displays, laser systems, pyroelectric detectors, biophysics and plasma technologies strengthen the Institute's activities.

DISTINCTIVE COMPETENCIES

Accomplishment of the fundamental researches in the area of pyroelectric material science made it possible to develop the performance of physical principles of the whole class of pyroelectric infrared sensors which have been successfully used in the industrial and cosmic investigations:

- quasi-immersion highly sensitive pyroelectric receiving devices 322B for IR spectro-radiometric apparatus of the artificial Earth satellites (“Meteor-2”, “Meteor-3” and “Ocean”); these devices have been in service during the period between 1977 and 1993;
- two-channel detectors 322P, realized in the form of the cavity-shaped “black body”, for measurement of the total thermal radiation of whole Earth surface for artificial Earth satellites “Meteor-2”;
- radiation detectors for IR radiometer of the interplanetary stations “Venus” and “Mars”;
- radiation detectors for IR radiometer of the interplanetary station “Phobos” overlapping spectral range from 2 to 67 μm ; these detectors operated and provided the information during the whole period of the station operation;
- 32- and 64-element pyroelectric radiation detectors arrays for IR spectroradiometer of the orbital station “Mir”; these devices were designed within the framework of the ecological complex “Priroda”, of international scientific Council “Intercosmos”.

Leading organizations of the industrial complex of former USSR: the Scientific and Industrial Association “Astrophysics” (Moscow), the Central Design

Office “Almaz” (Moscow), the Central Design Office “Geophysics” (Moscow), Cosmic Research Institute of the USSR Academy of Sciences, Moscow), the State Optical Institute (St. Petersburg), etc. were the consumers of these products.

COMPACT PYROSENSOR (MPV)

MPV device is intended for detection of thermal radiation in the spectral range 0.5...45 mm and can be used in a variety of optical instruments: spectrometers (especially in the Fourier spectrometers), radiometers, IR thermometers, space spectroradiometers, gas analysers, pyrometric safe-guard systems.

Sensor element of the MPV device is fabricated in the form of a plane plate made of a pyroelectric material. Electrodes are deposited in vacuum on both sides of the plate.

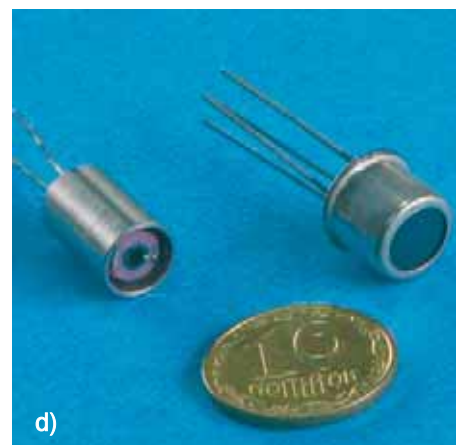
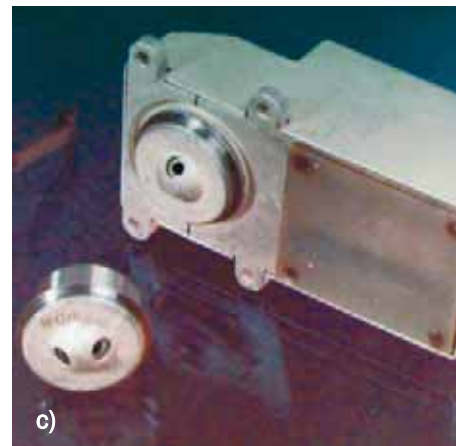
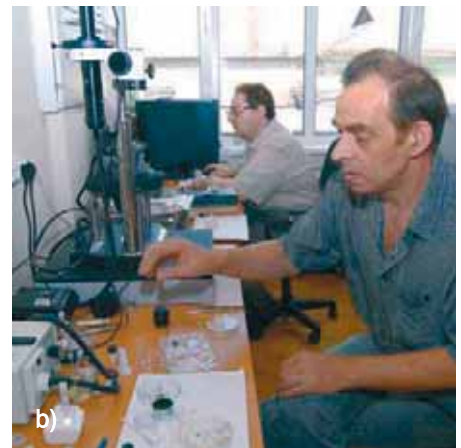
Irradiation of the plate increases its temperature and reduces spontaneous polarization. Variations of the plate temperature, caused by absorption of the radiation, manifest itself in the form of variations of the capacitance charge, which can be measured.

Technical Features

Threshold of sensitivity, $W \text{ Hz}^{-1/2}$, at the modulation frequency:	
$f = 60 \text{ Hz}$	$\leq 1,5 \times 10^{-10}$
$f = 200 \text{ Hz}$	$\leq 3,0 \times 10^{-10}$
$f = 470 \text{ Hz}$	$\leq 5,0 \times 10^{-10}$
Voltage sensitivity, V/W , at the modulation frequency:	
$f = 60 \text{ Hz}$	≥ 10000
$f = 200 \text{ Hz}$	≥ 10000
$f = 470 \text{ Hz}$	≥ 10000
Diameter of sensing head, mm	
Angle of field of view (without protection enclosure), deg	≥ 120
Diameter of enclosure, mm	≤ 7
Length of enclosure (without wires), mm	12
Supply voltage, V	$U_1 = +15 \pm 1,5$ $U_2 = -15 \pm 1,5$
Power consumption, W	$\leq 0,36$
Operating temperature, C	+10 ... +30
Material of sensor	LiTaO_3

Note: material of the window and size of sensor can be customized on request (Ge, ZnSe, quartz, BaF2, CaF2, KPS-5).

Price of compact pyrosensor (MPV) is about 1000 \$.



a) Atomic-force and tunnel microscopes

b) Liquid crystal laboratory

c) Nonselective two-channel detector 322P for measurement of the total thermal radiation of Earth surface (artificial Earth satellites “Meteor-2”)

d) High-sensitive compact pyrosensor (MPV)

LASHKARYOV INSTITUTE OF SEMICONDUCTOR PHYSICS (ISP)

KYIV
UKRAINE

Volodimir F. Machulin
Director, Dr. Sc.,
Academician of
National Academy
of Science of Ukraine

41, Nauki ave.,
Kyiv, 03028,
Ukraine

phone: +38 044 525-40-20,
fax: +38 044 525-83-42,
e-mail: machulin@isp.kiev.ua

Vadim F. Mitin
Chief Technology
Commercialization Officer

phone/fax: +38 044 525-59-39,
e-mail: mitin@isp.kiev.ua,
web-site: www.isp.kiev.ua

V. Lashkaryov Institute of Semiconductor Physics (ISP) of National Academy of Science of Ukraine (NASU) was established in 1960 on the basis of several departments and laboratories of the Institute of Physics of the NASU. Today it is recognized as a leading research center specializing in semiconductor materials and devices. ISP consists of 8 divisions, each containing of 3 to 5 departments

PRIMARY SCIENTIFIC DIRECTIONS

The Institute of Semiconductor Physics is engaged in fundamental and applied research in following areas:

- Semiconductor materials science
- Interaction between electromagnetic radiation and matter
- Semiconductor optics, spectroscopy and photonics
- Physics of low-dimensional structures, micro- and nanoelectronics
- Optoelectronics and solar power engineering
- Technologies and materials for sensors
- Infrared engineering and microwave electronics

DISTINCTIVE COMPETENCIES

- The center "Diagnostics of Semiconductor Materials, Structures and Applied Systems"
- The center "Cryogenic Sensors and Thermometry"
- The testing laboratory for holographic safety elements
- The central testing laboratory for semiconductor materials science
- The center for testing the photoconverters and photovoltaic batteries
- The laboratory of non-conventional and renewable energy sources

The Technology Park "Semiconductor Technologies and Materials, Optoelectronics and Sensor Technique" was established in 1999.

ISP's research and development results include new methods of optical and electrical characterization and certification of semiconductor materials and devices, and a variety of sensors for measurements of temperature, magnetic field and pressure, chemical and biological sensors, microwave devices, high-resolution photo resistors, high-efficiency silicon-based solar cells and optoelectronics devices, including liquid-crystal, electroluminescence displays and indicators.

Space vehicles photovoltaic panels

Developed and manufactured by ISP NASU and SDTB ISP NASU in the framework the project "Mikrosuputnyk" of National Space Program of Ukraine. Spacecraft KS5MF2 of "Mikrosuputnyk" was launched into orbit 26.12.2004.

Intended purpose - use in the power supply system of spacecraft KS5MF2 of class "Mikrosuputnyk"

Test equipment for space vehicle photovoltaic panels «KPA Mars-BF»

Developed and manufactured by ISP NASU and SDTB ISP NASU in the framework the project "Mikrosuputnyk" of National Space Program of Ukraine.

Intended purpose - testing of functionality PP at various stages of their manufacturing and operation activity, including at plant- manufacturer of spacecraft and launch technical complex. Used in Center for testing of solar cells and photovoltaic panels of ISP NAS for testing of space and terrestrial photovoltaic modules installed power to 640 W.

Center For Testing Of Solar Cells And Photovoltaic Modules

was established in 2006 by ISP NASU for check-out and testing of silicon solar cells, space and terrestrial photovoltaic panels.

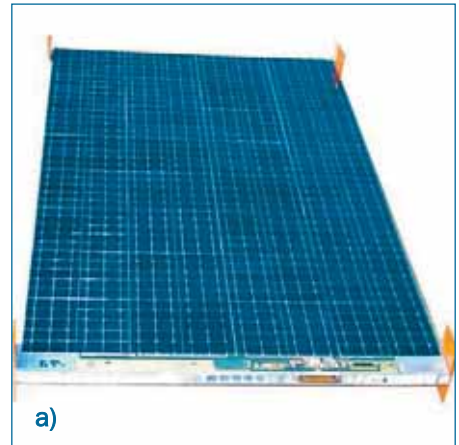
Setup for accelerated thermocyclic testing

Developed and manufacture by ISP NASU and SDTB ISP NASU in the framework the project "Mikrosuputnyk" of National Space Program of Ukraine.

Intended purpose - setup intended for accelerated resort environmental test development design and testing space and terrestrial solar sells and photovoltaic panel.

PARTNERING OPPORTUNITIES

A broad range of technologies and devices for technology transfer and commercialization are offered by ISP. This include various physical, chemical and biological sensors, and diagnostic systems, microwave devices, solar cells, optoelectronics devices, electroluminescence displays, low-cost self-assembling technology for nano-electro-mechanical systems (NEMS), ultra-fast light-emmission sources, etc.



a) Space vehicles KS5MF2 "Mikrosuputnyk" photovoltaic panels

b) Test equipment for space vehicle photovoltaic panels

«KPA Mars-BF»

c) Center For Testing Of Solar Cells And Photovoltaic Modules

THE INSTITUTE OF TECHNICAL MECHANICS (ITM)

DNIPROPETROVSK
UKRAINE

Oleg Pylypenko

Director of Institute

Corresponding Member of NASU

49600 MSP,
Dnipropetrovsk-5,
15 Leshko-Popelya str.

E-mail: itm@pvv.dp.ua
Telefon (0562) 745 12 38
Fax (0562) 47 34 13.

The Institute of Technical Mechanics of the National Academy of Sciences of Ukraine and the National Space Agency of Ukraine is involved in addressing a wide range of scientific problems regarding the development of launch vehicles and spacecrafts. The Institute has been acting as the leading Institute of Ukrainian aerospace industry since 1995.

PRIMARY SCIENTIFIC DIRECTIONS

- software, physical and mathematical modelling for investigations of hydrodynamic processes in the feed systems of rocket propulsion
- thermo-gas-dynamic and heat-and-mass exchange processes in power plants
- vehicles in-flight conditions simulation at high, medium and low altitudes, for strength and vibration tests
- technological processes for manufacturing radio-engineering devices elements
- solar power concentrators by the electroforming method

DISTINCTIVE COMPETENCIES

The Institute has developed experimental and test equipment possessing unique capabilities;

The plasma electrodynamic facility is one of the best plasma-gas-dynamic tunnels in Europe. Systems and technical characteristics of the facility make it possible to model and simulate many effects like high-energy electrons, Earth's radiation belts and auroral plasma in the ionosphere; solar ultraviolet radiation; thermal cycling in vacuum; supersonic flows of atomic oxygen; gas and plasma jets of spacecraft electrical-jet engines; supersonic fluxes of a "cold" ionospheric plasma, magneto-hydrodynamic control in heat exchange and deceleration of magnetized bodies.

Vacuum aerodynamic plant with cryogenic discharge system is used to investigate parameters of interaction of:

- rarefied gases supersonic flows with design materials of spacecraft external coating
- spacecraft components and structures thermal state
- lighting situation in spacecraft neighborhood
- effective cross-sections of atoms and molecules dispersion
- working efficiency of on-board measuring equipment and its calibration
- dynamics of pressure reduction in untight containers.

It is possible to conduct full-scale aero-dynamical experiments using passive standard artificial satellites.

At the Institute wide-scale investigations are carried out in the field of cavitation self-excited oscillations in hydraulic systems, which in their content and novelty of the results obtained have no analogues in the world. Scientific and engineering fundamentals of a new original scientific trend are founded in the areas of liquid-propellant rocket propulsion and liquid-propellant launch vehicles.

Fundamental research is carried out for the inert and chemically reacting liquids and gases injection into supersonic high-enthalpy gas flow. **The obtained results on supersonic flow excitement on jet engine nozzles allow to develop effective methods of supersonic flow processes control. It allows for the first time in rocket-manufacturing practice to develop new highly-efficient “servoelements” for the rocket flight control system.**

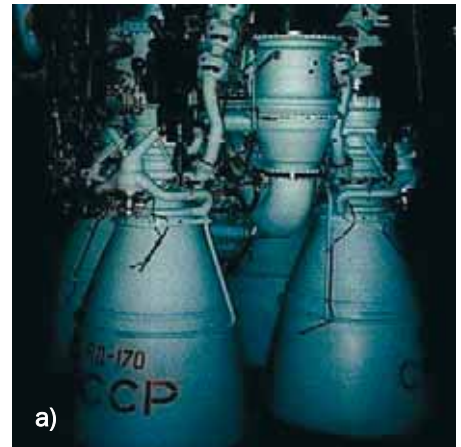
Heat-resistant coating on calorific intensive surfaces of liquid propellant rocket engine combustion chambers are developed at the institute. Complicated problems on deformation, strength and load-carrying capacity of non-homogeneous structures of rocket and space and aircraft technologies, power and transport engineering industries operating under intensive effects of different physical nature, including local loads and contact interactions, are solved.

PARTNERING OPPORTUNITIES

The Institute’s scientists collaborate with many international societies and organizations including

- the Tsiolkovsky Russian Academy of Cosmonautics
- the American Society of Mechanical Engineers
- the Pugwash Movement National Committee
- the International Society for Ramjet Engines
- the German Society of Applied Mathematics and Mechanics
- the International Committee on Machines and Mechanisms Reliability
- the International Assistance Association for Cooperation with scientists of the Independent States of the former Soviet Union
- the International Engineering Academy

the Ukrainian Automatic Control Association of the International Automatic Control Federation, etc.



a) The rocket flight control system

b) The plasma electrodynamic facility

c) Mikrosputnik spacecraft

d) Vacuum aerodynamic plant with cryogenic discharge system

INSTRUMENT- MAKING RESEARCH TECHNOLOGICAL INSTITUTE STATE ENTERPRISE (IMRTI)

**KHARKIV
UKRAINE**

*Mykola Zamirets
Director*

*40/42 Prymakova str.,
Kharkiv, 61010,
Ukraine.
Phone: +38057 733-35-68
Fax: +38057 733-11-80
E-mail: nitip@kharkov.ukrtel.net*

The Kharkiv State Enterprise “Instrument-Making Research Technological Institute” (IMRTI) specializes in development of high technologies for instrument engineering and tools with the smallest weight and dimension characteristics, possessing high quality, reliability and long-term durability.

PRIMARY SCIENTIFIC DIRECTIONS

The Institute develops microelectronic and electronic devices, tool materials with special characteristics, as well as state and sector standards for instrument engineering. It has extensive practical experience of producing and supplying to the clients according to their specifications solar cells, photoelectric converters, control and measurement equipment for space applications, thick and thin film chip assemblies for microelectronic devices, sensory devices, tachometers, speed meters, instrument boards for electric devices and tool materials.

DISTINCTIVE COMPETENCIES

The Institute has practical experience in development and production of solar cells for space applications. It was involved in development and production of a solar cell and test instrumentation for power supply of Egyptian and Ukrainian micro-satellites EgyptSat-1 and MC-2-8, where ultralight cell plastic frames, uni-junction photoelectric converters on the base of gallium arsenide and germanium substrate with 21% of efficiency (Picture A) were used. Technology for ultrasonic and microcontact welding of silver inter-element joints and contact boards of arsenide-gallium photoelectronic converters was for the first time developed in Ukraine.

The Institute has mastered the industrial technology for manufacturing silicon photoelectric converters. This is done by applying combined technological processes of diffusion from solid sources and liquid-soluble compounds simultaneously with the processes of external generation providing maximal output power at the level of 190 W/m², technology for producing assemblies of unijunction gallium arsenide photoelectric converters providing maximal power at the level of 260 W/m² and flexible solar modules (Picture B). Volt-ampere characteristics of photoelectric converters are presented in Picture C.

A combined orientation sensor providing an angular velocity measurement range of $\pm 20\%$ with separate angular velocity capacity at the level of 0,005% (Picture D) was developed and produced while implementing the project Sich 2 for the space vehicle MC-2-8 for measurement and identification of the sun direction vector angles and vector projections of angular velocities for space vehicles.

The Institute developed a technology for creation of new generation microelectronic devices on the basis of multilayer aluminium polyamide flexible boards, microcables and circuit elements, which allow replacement of wiring and is employed in the modern detector modules used for radiation tool engineering on the basis of the latest microchips of ALICE-128, HAL-25, AMBRA-64, PASCAL-64 types and others with 64 up to 128 information processing channels with speed of up to 100 ns/channel. Ultrasonic welding of aluminium conductors are compatible with TAB-technology and are tailored for using automatic welding equipment of FK Delvotec-6400 type.

KARPENKO PHYSICO- MECHANICAL INSTITUTE

LVIV
UKRAINE

Volodymyr Panasyuk
Director,
Academician of the
National Academy of Sciences
of Ukraine

5, Naukova str.,
Lviv, 79601,
Ukraine.
Fax: 8 (0322) 649-427
Web site: <http://www.ipm.lviv.ua>

Romana Darevych
Chief of scientific-
organizational department,
Ph.D.

Phone: 8 (0322) 296-575
8 (0322) 637-049
E-mail: darevych@ipm.lviv.ua

The Karpenko Physico-Mechanical Institute, of the National Academy of Sciences of Ukraine, was founded in 1951 and is today a world class research Centre with more than 500 specialists. The Institute performs fundamental and applied research.

PRIMARY SCIENTIFIC DIRECTIONS

- fracture mechanics and strength of materials,
- physicochemical processes of corrosion and corrosion protection of metal products,
- creation of the methods and means of non-destructive testing and diagnostics of materials

DISTINCTIVE COMPETENCIES

Scientists at the institute have made many important contribution in engineering, including:

- development and certification of high-strength and corrosion-resistant metallic materials for ship-building and power generating industries;
- investigation of structural materials for space equipment that operates in contact with hydrogen-containing environments;
- development and manufacturing of equipment for space exploration and control systems for space apparatus; processing of associated data on these objects;
- formation and organizing of the production of heat- and corrosion-resistant pipes for civil engineering of Ukraine;
- development and introduction of effective ecology-friendly technologies and equipment for cleaning the surfaces of large-scale objects (bridges, capacities, train carriages) against corrosion products and other contaminations as well as application of the protective coatings on their surface.

Some specific examples that demonstrate the institute's capabilities and expertise are:

Technology of surface hardening of titanium alloys

The technology is intended for the improvement of the tribo-technical properties of friction couples made of titanium alloys that operate in the conditions of contact loading up to 10 MPa (Boriding). The technology uses the gas component of active medium for a major effect on boride formation process and allows to form the boride coatings with transition diffusion layers at temperatures in the γ -area (750...850°C) on titanium alloys surface. The technology is intended for the improvement of the wear and corrosion resistance of titanium couples used at contact loadings up to 10 MPa, including the aggressive media influence (Nitriding). The technology uses the elements of vacuum technology and rarefied dynamic nitrogen environment (nitrogen partial pressure – 0.1...10 MPa, temperature 750...850 °C). Application of these technologies provides high durability and corrosion resistance due to formation of the gas-saturated region of the depth of 100...200 μm and a high (7...14 GPa) hardness. The technology vacuum Nitriding is used for surface hardening of the AN-148 planes undercarriage elements.

Technology of vacuum thermal treatment of welded parts from single-phase titanium alloys

Technology is intended to improve the efficiency of welded parts from sheet-titanium alloys. Technology is grounded on regulation of temperature-time

and gas-dynamic parameters of vacuum medium (residual pressure within $1,3 \cdot 10^{-4} \times 1,3 \cdot 10^{-2}$ Pa, specific leak-in is within limits $26 \mu\text{Pa} \times \text{s}^{-1}$) and also tolerance parameters of gas saturated layers (it was specialized the limits for gas saturation process of undersurface layers). Technology allows to improve the fatigue properties of welded joints and to reduce their ability to delayed brittle fracture as compared to annealing on air and conditioning etching. Technology is used for thermal treatment of welded elements of air system of airplanes AN.

Technology of mechanical-pulse treatment of metal product

The technology uses the energy of high-speed friction. In the friction contact zone of the treated element and a special hardening instrument, the surface layers of the element are intensively heated with rates from 10^5 to 10^6 K/sec accompanied by simultaneous plastic deformation and rapid cooling. Such conditions allow saturating the near surface layers with different alloying elements and get nanocrystalline structure on the surface of machine elements. Thickness of the hardened layer is from 100 to 800 μm , micro hardness from 8 to 12 GPa, hardened surface roughness $R_a = 0.4 \dots 1.6 \mu\text{m}$.

Peo technology of surface treatment of al, mg, ti, zr, ta alloys

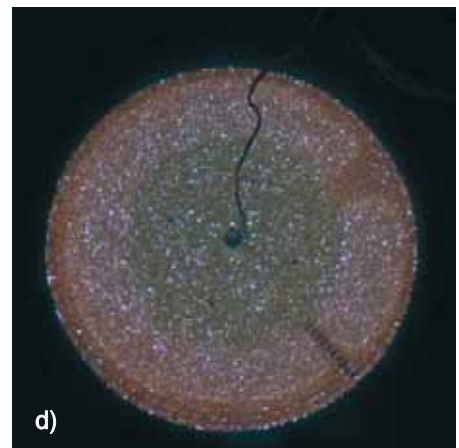
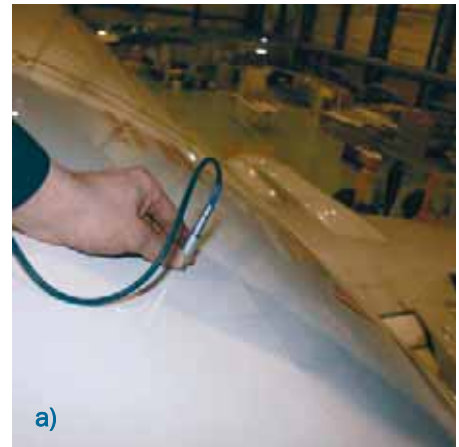
Oxide-ceramic coatings on surfaces of aluminum, magnesium and zirconium alloys are formed by electrochemical method in electrolyte plasma. The coatings consist of the α - and γ - Al_2O_3 oxide phases for aluminum alloys, MgO for magnesium-based alloys, ZrO_2 and TiO_2 for zirconium and titanium alloys, respectively. Microhardness of the coatings is 15-30 GPa on aluminum alloys, 10-12 GPa on magnesium alloys, 7-11 GPa on zirconium alloys and 8-10 GPa on titanium alloys. These coatings are dielectric, resistant against heat, corrosion and wearing, with high adhesive properties. The optimal thickness is within the range 30-250 μm , the maximum thickness is 450 μm . Surface roughness can be controlled. The coating process is environmentally safe.

Eddy-current flaw detectors

New defect detecting technologies are based on the application of new MDF type multi-differential eddy current probes. Developed probes have different size and operational frequency. The main feature of MDF probes is high sensitivity and spatial resolution, excellent lift-off suppression. Low frequency MDF type eddy current probes have high penetration in combination with small size. For example, low frequency MDF type probes are applied for detection of hidden flaws in internal layers of multilayer aircraft construction, under fastener head or sealing coatings. Having these features MDF eddy current probe are used in connection with different eddy current devices and computerized inspection systems for solving the most difficult inspection problems in Ukraine, Russia, Germany and Sweden.

INTERNATIONAL CERTIFICATION

The Institute's developments meet the requirements of international standards, including ISO.



KHARKIV STATE AIRCRAFT MANUFACTURING COMPANY

**KHARKIV
UKRAINE**

Anatolii K. Myalitsia
General Director

Tel. +38057003439,
Fax +380577070834
info@ksamc.com

Jurii B. Kolomijtsev
Head of Marketing Division

Tel +380577078816
Fax +380577070835
marketing@ksamc.com.

Kharkiv State Aircraft Manufacturing Company (KSAMC) is one of the leading aviation companies in Ukraine. Thanks to an effective cooperation with Antonov ASTC and competitiveness of the manufactured products KSAMC ranks among the leading aircraft manufacturers at the international market. The company gained popularity in the sector of regional and transport aircraft. KSAMC today is an active and consistent adherent to the principle of the integration into the world aviation complex. The Company has produced aircraft of various modifications since 1926, and proved itself as the reliable partner in the aviation business.

Currently the enterprise produces the aircraft developed by Antonov ASTC: the regional An-140-100 turboprop aircraft and An-74 multifunctional transport convertible aircraft in various modifications. Huge possibilities were realized with the design of An-74 for its further improvement and development of perspective modifications. The aircraft of this family are specifically tailored to carry cargo, passengers and equipment; indispensable at humanitarian and special missions. Transport missions include handling and paratropping cargo and troopers, medevac and intensive therapy. With one aircraft family an operator will get more than a dozen options, while converting from one option to another is easy and straightforward. The An-140-100 is designed to carry up to 52 passengers, luggage, mail and cargo on regional routes with high passenger traffic. It can be operated on both concrete and unpaved airfields.

Beside the full-scale production of An-140-100 and An-74 at its facilities, KSAMC delivers An-140 aircraft kits to HESA Company of Iran and to Russia "Aviacor" aviation plant for final assembly. In addition KSAMC cooperates with Antonov ASTC, Ivchenko Progress Design Bureau, KiGaZ Aviant and the Voronezh joint-stock aircraft constructing company in development of the aircraft An-148 (a new generation aircraft).

The company's aircrafts are well recognized in the CIS countries and the Middle East, in North Africa and in Latin America. Besides, the growing market demand for light transport and regional passenger aircraft, as well as for the VIP jets in super midsize segment, gives the company optimism for future growth.

DISTINCTIVE COMPETENCIES

KSAMC is among a few aircraft manufacturers in the world with a complete production cycle chain at one location. Several business units organized into KSAMC production complex provide the closed cycle of marketing, series production; maintenance and after-sales support of two families the new generation aircraft. KSAMC comprises:

- Pre-production and auxiliary production shops with the full set of technological equipment to produce rigging and tools, as well as maintenance of the equipment in production shops
- hot shops systems, producing stamping and forgings and molding the whole range of parts for the airplanes
- fitting and welding site processing parts made out of plates, tubes, and sections of carbon and stainless and titanium; welding, fitting blank production and stamping shops system that cut out the ma-

terial, produce complex 3D parts, sections and tubes for the aircraft systems

- machine-shops and machine-assembly departments system producing a wide range of parts from nuts and screws to integral wing panels
- non-metal production shops system for parts of polymer composites, rubbers, plastic and glass, heat and sound proofing rugs
- aggregate and final assembly shops system where boards, sections, aggregates are assembled and final assemblage of the aircraft is processed
- coating shop that chemically treats the parts, applies metal plating and paint coat, and carries out the aircraft external painting
- flight-test center performing ground and flight aircraft tests as well as all predelivery procedures
- after-sale technical support department that carries out all types of after-sales and post-warranty services

Besides, KSAMC integrated structure comprises MRO services units and equipment producers.

INTERNATIONAL CERTIFICATION

International quality standards are a core entity of the entire development process (manufacturing and marketing chain) of the Company. The quality monitoring system is certificated under standard ISO 9002. Manufacturing and maintenance facilities of the Company comply with interstate CIS Aviation Committee AR MAK requirements.

The development of after-sale support services to ensure full customer satisfaction is one of the priorities of the company. The concept of service support envisages a tailored scheme of non-stop technical audit that the manufacturer offers to the operator within the whole aircraft service life. It includes: Providing customer with complete documentation set; Training of flight and ground personnel; Warranty; After-sale technical support; System of spare parts delivery; Restoring and repair; Maintenance center creation at the customer's base; Manufacturer's supervision.

Kharkiv State Aircraft Manufacturing Company also has subdivisions as TORA, Aircraft Repairing and Servicing Plant, which provides aircraft technical support, repair, maintenance and overhaul; Sokolniki plant, manufacturing a wide range of consumer goods, beginning with ladders and furniture up to playgrounds equipment; Chuguev Aircraft Repairing Plant, producing various equipment and techniques facilities.



a) Aircraft AN-74

b) Aircraft AN-74 TK-300 VIP

c) Aircraft AN-140-100

d) Finishing department

“KHARTRON” JOINT STOCK COMPANY

KHARKIV UKRAINE

*Academician Proskury Street,
P.O. box 9971,
Kharkiv, 61070,
Ukraine.*

Nikolay I. Vahno
Chairman of the Board

*Contact phone: +38(057) 315-2053, fax
(057) 719-06-95,
E-mail: centr@cit.kharkov.ua,
www.hartron.com.ua*

Oleg Luchenko
Director General

*Contact phone (fax): +38(057) 759-12-18,
E-mail: plant@vlink.kharkov.ua.*

*«Khartron-Plant» RPE, 1,
Academician Proskury Street,
P.O. box 9971,
Kharkiv, 61070,
Ukraine*

Khartron JSC was founded in 1959 and up until 1991, it was the largest developer and manufacturer of the control systems (CS) for strategic missiles, launch vehicles (light and medium class), and control systems of heavy class space vehicles (including the “Mir” station modules) in the USSR.

After Ukraine became independent in 1991, the enterprise was restructured. Currently “Khartron”, comprises the managing company “Khartron” JSC and ten (10) additional enterprises in the form of limited liability companies.

“Khartron” is also an active participant of the National Space Agency of Ukraine program. The company’s core management, scientific and production personnel consists of highly skilled specialists with world class expertise in the design, development and manufacturing of space rocket equipment control systems. Its subsidiaries, “Khartron-Arkos” and “Khartron-Jukom” operate Ukrainian satellites: “Sich”, “Ocean”, Egyptian “EgypSat” micro-satellite.

PRIMARY SCIENTIFIC DIRECTIONS

The company’s primary activity remains the space-rocket sector but it has diversified into a number of other important market segments such as;

- energy (including nuclear energy) and
- railway transportation.

In addition, the company participates in the “Sea launch” programme, develops new systems for the Ukrainian micro-satellites and for independent space tow on the basis of fourth stage of “Dnepr”LV, which is able to carry commercial space crafts into the circumlunar, stationary, and Martian trajectories.

Within the framework of the Ukrainian-Brazilian space project, “Khartron” together with SDO Yuzhnoe participates in “Cyclone-4” LV development.

Currently, “Khartron” is responsible for designing the control systems for the Ukrainian-Russian LV “Dnepr” (on the basis of ICBM SS-18) for the International Space Company “Kosmotras”. “Khartron” conducts scientific and technical research in the sphere of launch vehicles control systems designed under the contracts with China and Italy.

In the non-space sector, the company’s achievements include the design and manufacturing of:

- automated electrical control and diagnostic systems for railway vehicles,
- fire prevention and alarm systems.
- automated control systems, which are critical for the safety of nuclear power stations,
- the relay protection and automatics energy objects systems in the range of 6-750 kV

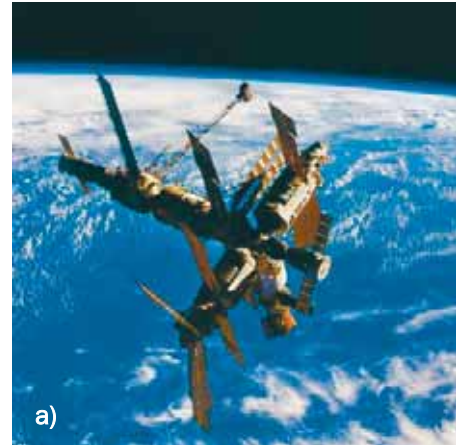
QUALITY CONTROL SYSTEM

“Khartron” JSC implemented international quality control system of production at all stages of its manufacturing, including ISO 9001-2001.

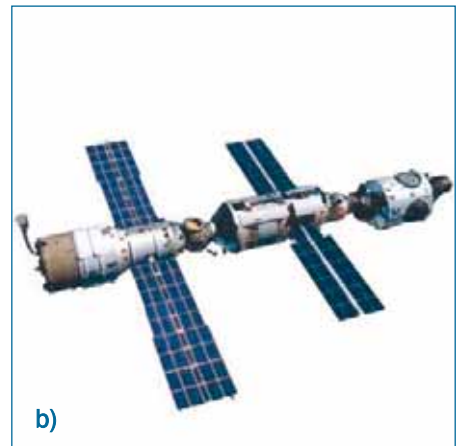
PARTNERING OPPORTUNITIES

The enterprise has a diverse client base with market leadership in several sectors. It has partnership agreements with Rosaviacosmos”, NASA, and the European Space Agency. Space technologies are implemented in the course of civil domestic and export markets.

The company currently sells its products and services directly to customers. It does not use a distribution network. The primary customers for the rocket-space sector are: the MOD of Russia, Ukraine, and enterprises of some foreign countries (Italy, China, Brazil).



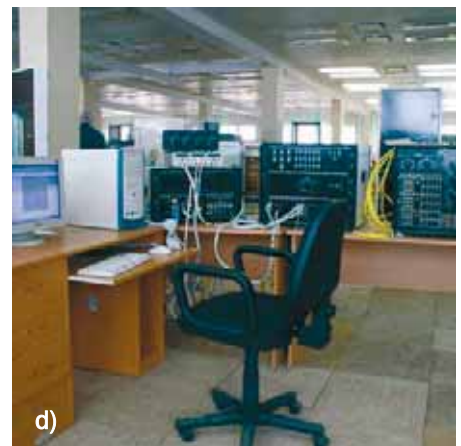
a)



b)



c)



d)

a) Control station blocks of MIR, including approach and docking with the orbital unit were ensured by the system of Khartron

b) The first set of ISS Alpha is equipped with SD development of Khartron

c) Products of the Khartron-Plant

d) Cyclone -3 LV stand (Khartron-Arcos)

"KOMMUNAR ASSOCIATION" STATE RESEARCH AND PRODUCTION COMPANY

KHARKIV UKRAINE

The Kharkiv state research and production company "Kommunar Association", is one of the largest companies in Ukraine in the radio and electronic industry. For many years, the company's highly innovative staff have specialized in the development and production of control systems for the "Soyuz", "Proton" and "Zenit" launch vehicles. As such, the company has played an important role in research programs and exploration of "near" and "deep" space over many years.

In addition to technologies for the space program, specialists at the company designed and produced in series the modern digital control devices for de-icing and central air-conditioning systems for the AN-140, AN-70, AN-38, AN-74, AN-148, TU-334, and TU-214 aircrafts. The primary customers for these products are "Antonov" ANTK (Ukraine), "Kharkiv state aviation enterprise" (Ukraine), Novosibirsk aviation association named after Tchkalov (Russian Federation) and others.

One of the important scientific and technical direction of the enterprise is development and large-scale production of the modern digital control systems and electronic devices for the aircraft and aviation engines that match the best world prototypes. This development is being conducted in cooperation with "Antonov" ANTK (Ukraine), "Motor Sich" JSC (Ukraine), "Ivchenko-Progress" ZMKB (Russian Federation), NVO "Nauka" JSC (Russian Federation) and other leading enterprises of the aviation industry in Ukraine and Russian Federation.

Today, "Kommunar Association" continues its research and development works in the new directions of aviation science. Indeed the company is continuously expanding the range of control devices for the different types of aircrafts.

In addition, the enterprise manufactures a wide range of the industrial and household commodities. Those are fluoroscopic systems for the luggage screening named "Polyskan", equipment for railway transport, hardware and software complexes for the steam turbines control, welding equipment on the basis of universal frequency arc rectifier (UFAR), industrial and household electric power supply gauges, domestic water consumption gauges, and other appliances.

PARTNERING OPPORTUNITIES

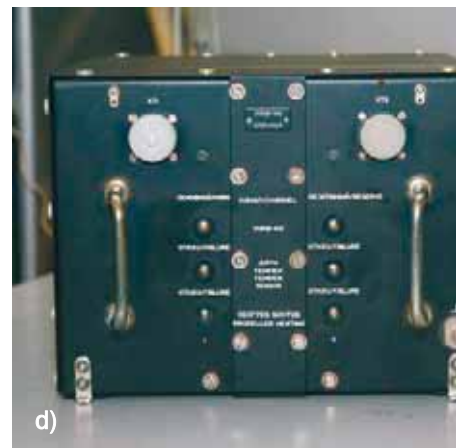
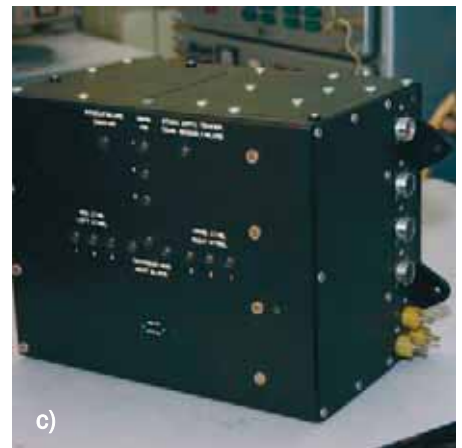
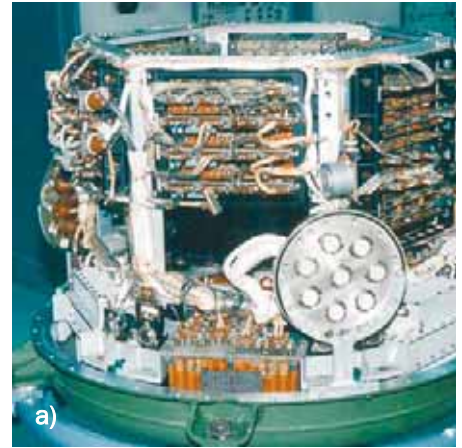
Our enterprise is interested in the business cooperation with foreign partners for the joint manufacture and marketing of the aerospace products and technologies in the external and domestic markets. We believe that the above information will be of help in establishment of the business contacts and mutually beneficial cooperation.

Lyubomyr Sabadosh
Director General

Grigory Rudyka Street, 8
61070, Kharkiv,
Ukraine

Tel.: 8-057-700-32-92,
Fax: 8-057-707-01-72

e-mail: kommunar@tvset.com.ua
Web site: www.tvset.com.ua



a) and b) – Launch vehicles control system devices
c) and d) – Aircraft control devices

“KYIVPRYLAD” PRODUCTION ASSOCIATION STATE ENTERPRISE

KYIV
UKRAINE

Olexandr Osadchiy
General Director

2 Harmatna str.,
Kyiv, 03680,
Ukraine.

Phone: +38(044) 446-38-48

Fax: +38(044) 446-02-16

E-mail: marketing@kievpribor.kiev.ua

www.kievpribor.com.ua

“Kyivprylad” PA has a powerful industrial base equipped with “state-of-the-art” equipment, highly skilled technical staff and technologies.

DISTINCTIVE COMPETENCIES

The company’s activities cover the full cycle of aerospace equipment manufacturing.

The equipment is designed for mechanical treatment, printing and forming, forging, cold-heading, thermal, galvanic, impregnation, painting processing; winding equipment. In addition the equipment for casting of plastic and metal under pressure, manufacture of various products for universal application. The manufacturing process is supported with modern standard measuring devices.

Testing equipment employed by “Kyivprylad” PA includes: vibration testing machine, shock tables, centrifuges, heat and cold chambers on different volume and temperatures range, moisture resistance test chambers, dust protection test chambers, pressures chambers for tests under high and low pressure, screened chambers, and other modern equipment.

“Kyivprylad” PA implements the quality control system, which processes are regulated by 73 enterprise standards.

OVERVIEW OF THE COMPANY PRODUCTS AND SERVICES

Space Applications

“Kyivprylad” PA designed and currently manufactures control systems for “Soyuz-M” and “Progress” piloted and cargo spacecrafts as well as the “Sirius” onboard microelectronic radiometric system that is used for measurement and transmission of information from the “Zenit” and “Proton” launch vehicles.

Within the framework of Cyclone-4 project, the company also developed the hardware and software for the automated control and management system for “Dynatest” vibration insulation system. The complex permits to automate processes during the testing procedures. Currently the complex is successfully functioning at “Yuzhnoye” SDO of Dnipropetrovsk.

In 2006, the company developed, manufactured, and commissioned hardware and software complex for preparation and launching “ZENIT-M” launch vehicle at the Baikonur launching site. This complex is developed to the highest standards. Currently, within the framework of Ukrainian-Brazilian project at the Alcantara space launching site for the “Cyclone-4” LV, the company’s specialists completed development of the working and design documentation and prepared for now production of the following systems:

- The electric power supply quality monitoring and control system (EPQMCS), which in turn consists of 3 systems:
 - EPQMCS system for electric power supply of the launching complex technological equipment
 - EPQMCS system for electric power supply of the launch vehicle technical complex
 - EPQMCS system for electric power supply of the space vehicle and head unit technological equipment. As a whole, those are 18 cabinets filled with the most modern equipment

- The automated control system of preparation and launching (ACS PL) consists of the following subsystems:
 - The automated workplace of the works manager
 - Subsystem of the automated remote control of refueling by the rocket fuel components (SADC RFCR)
 - Subsystem of the automated remote control of high pressure air thermostating system for the head unit system of the compressed gases supply (SADC CG)
 - Subsystem of the automated remote control of the rocket fuel components and industrial waste vapour collection and neutralization system (SADC FWVCNS)

Within the framework of the joint Ukrainian - American project on development of "Taurus-II" launcher, the company has completed development of documentation. They now prepare for production of hardware and software complex intended for automation of the management process for the LV automatic elements while conducting pneumatic testing on the technical complex of the launch vehicle tanks ventilation.

Energy direction:

"Kyivprylad" PA has developed and currently manufactures the microprocessor relay protection devices of MP3C-05 and MP3C-05M 6-10-35 kV series, that are functionally comparable to the world's best analogues. Such devices are extensively utilized for replacement of the outdated electromechanical protection devices that reached the end of their service life. Microprocessor protection devices of MP3C-05 and MP3C-05M series are successfully operated across the whole Ukraine and in Russia, Belarus, and other CIS countries. The company has developed more than 30 modifications of the microprocessor relay protection devices. "Metran" series of the microprocessor pressure gauges is manufactured in cooperation with Russian Industrial Group "Metran".

INTERNATIONAL CERTIFICATION

The system of a quality control at the enterprise implemented with regard to designing and manufacture of technical equipment is certificated according to requirements of DSTU ISO 9001-2001 (ISO 9001-2000) standard in UkrSepro certification system. The certificate No. UA2.002.03409-09 was issued on January 29, 2009 and valid till January 29, 2014. Certificates of conformity are issued by the relevant authorities to the products, which are manufactured by the enterprise (microprocessor devices of protection, automatics, joints control and management, electric power meters, pressure gauges, intercoms).

The production quality control system implies the entrance control of component parts and materials, daily and periodic control over observance of technological discipline with registration of the findings and adoption of the corrective measures when necessary.

- a) Energy production (MP3C-05)
- b) MP3C series devices adjustment
- c) Plastic products manufacturing shop
- d) Energy products (Cascade)



LVIV CENTER OF NASU-NSAU INSTITUTE FOR SPACE RESEARCH

LVIV
UKRAINE

Valery Korepanov

*Scientific Director of Lviv Centre of Institute
for Space Research & Chief of Laboratory for
EM Researches,*

5-A Naukova St.,
79000, LVIV,
UKRAINE

Tel.: 380-32-2639163,
Fax: 380-32-2639163
and 380-32-2540225
Email: vakor@isr.lviv.ua ,
<http://www.isr.lviv.ua>

The Lviv Center of Institute for Space Research (LC ISR) of the National Academy of Sciences (NASU) and National Space Agency of Ukraine (NSAU) was organized in 1996 as a scientific experimental division of the Institute for Space Research. The institute's main objectives are: the development, testing and implementation of the advanced instrumentation for space research.

PRIMARY SCIENTIFIC DIRECTIONS

- fundamental investigations of acoustic-electromagnetic interactions in atmosphere and ionosphere
- investigation of the lithosphere-ionosphere and Sun-Earth connections
- propagation theory and experimental study of electromagnetic fields in conducting media (space plasma, ground, sea water)
- development and manufacturing of high class sensors and systems for measuring the parameters of electric and magnetic fields and for data collection and processing for space and ground geophysics
- preparation and realization of space experiments.

DISTINCTIVE COMPETENCIES

LC ISR has a unique technological resource for the development, manufacturing and calibration of flux-gate and induction magnetometers. This allows creating the space and ground-based instrumentation with the highest for today level of metrological parameters.

Some examples of LC ISR production are presented on the figures. The specific advantage of LC ISR technology is the tailoring of the developed instrumentation to the customer's requirements and all what is theoretically possible within existing physical restrictions may be realized at the highest level.

Some examples of the technological achievements of the institute

More than 10 spatial experiments were carried out with the participation of LC ISR specialists. The first scientific space physics experiment "Variant" on board the remote sensing satellite "Sich-1M" with international scientific payload (launched 24.12.2004) enabled for the first time direct measurements of the spatial current density in space plasma.

The effect of solar bursts on atmospheric infrasound was revealed and the concept of the interaction model of solar activity and atmospheric infrasound was developed for the first time;

A generalized approach to the recognition of the electromagnetic precursory signals of earthquakes preparation process when structural changes and anomalies occur in the Earth crust was proposed.

A new physical effect – gamma – magnetic normalization of alloys with high magnetic permeability – was discovered and experimentally confirmed.

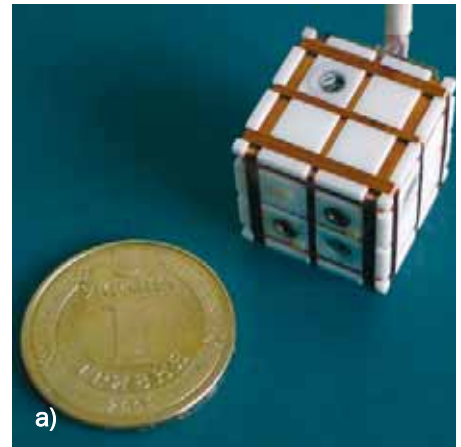
LC ISR is one of the leading organizations in the world in the branch of development and manufacturing of field electromagnetic geophysical instrumentation, as well as of methodology and practice of electromagnetic measurements. A set of high-class geophysical devices both for space, on-ground and marine applications were developed and commercialized.

These devices have international recognition and are used both in Ukraine and abroad (USA, Canada, European Community, Japan, Italy, Hungary etc., about 25 countries altogether). The success of the achieved sustainability is in great deal based on LC ISR–STCU collaboration in regular and partnership projects.

PARTNERING OPPORTUNITIES

LC ISR has close relations with Alberta University and several private companies in Canada. The institute is looking for collaboration with interested institutions and companies (in Canada, the EU and the USA) in the development of both low noise and super-low power light-weight flux-gate and induction coil magnetometers for different applications – space and field geophysics.

LC ISR is also looking for the partnership in the development of new advanced electromagnetic instrumentation for geophysical prospecting, especially for new applications, such as cable and autonomous systems for oil/gas prospecting at sea bed, in the harsh environment as mountaineer or polar areas etc.



a) The lightest and smallest flux-gate sensor with high resolution (better than 10 pT)

b) Low noise electric sensors for DC and AC variations LEMI-501, LEMI-502

c) Wide-band three-component induction magnetometer LEMI-106i

d) The best in its class attitude control magnetometer for precise satellite orientation LEMI-016

NATIONAL AEROSPACE UNIVERSITY "KHARKIV AVIATION INSTITUTE" NAMED BY N.YE.ZHUKOVSKIY

**KHARKIV
UKRAINE**

Igor Rybalchenko
Deputy Vice-Rector
R&D manager

National Aerospace University "KhAI"
17 Chkalova str.
Kharkiv 61070,
Ukraine

Phone/Fax: +38 057 719-04-73
E-mail: iar@khai.edu
[www: www.khai.edu](http://www.khai.edu)

The National Aerospace University "KhAI" is today a globally recognized educational and research center.

DISTINCTIVE COMPETENCIES

Aerodynamics: KhAI has developed advanced methods for the determination of aerodynamic forces on subsonic, transonic and supersonic speeds and special software for processing experimental results real-time processing. Supersonic wind tunnel T-6 is equipped with automated systems for control and registration of important flow parameters that permit an increase in the precision and reliability of the system, and to decrease power resources expenses. KhAI aerodynamic complex has the status of National Heritage of Ukraine.

Unmanned aerial vehicles:

- research and experimental design of a whole complex of remotely operated aircraft for civil applications
- study of airplane critical flight modes on its unmanned free flying dynamically similar models

CAD/CAM/CAE design: The Design Center is equipped with powerful graphic stations and up-to-date software (UNIGRAPHIX, EUCLID, ANSYS, NAS-TRAN, COSMOS, SOLID WORKS, LS DYNA etc.) for the whole range of work from aircraft master-geometry development up to structure and element design and calculation.

Structural strength: Static and repeated static certification tests of light aircrafts and their structures, FEM simulation and analysis of structures, lifetime prediction on the basis of original methods, determination of static, fatigue and cyclic deformation characteristics of materials, development of technologies for aviation machinery repair.

The Strength Lab is certified: Aviation Regulations of Ukraine, part 23, sections C and D. Airworthiness Specifications JAR-VLA, sections C and D

Aircraft and spacecraft propulsion systems:

- analysis of flows in gas turbine engine and defining its operation characteristics, multistage axial compressors expert assessment on the basis of a set of two-dimensional analysis methods
- gas turbine engines real-time diagnostics and service life monitoring: the developed system allows temperature monitoring and the stress of parts and estimates service life
- development of new generation of high-effective plasma thrusters for micro satellites
- development of a new generation of high-performance electric jet engines for space aircraft orientation and satellite orbit correction
- self-heated plasma cathodes for plasma thrusters, etc. (current range from 0.5 to 150A)

Material science: gas-thermal, ion-plasma, gas-detonation, and metal-nanodiamond coatings for thermal, chemical, corrosion and wear protection.

The advantages of KhAI automatic complex for gas-detonation include: (a) computer systems for process control and coating properties prediction (b) obtaining coatings with pre-set properties (c) wide range of materials used.

Nanoscience: KhAI is deeply involved in advanced research in different areas, including:

- Low-cost and highly productive technologies and equipment for metal, ceramic, polymer (ZrO_2 , Y_2O_3 , TiO_2 , Al_2O_3 , WC, TiC, Fe_2O_3 , Cu, Ni, Co, etc.) nanoparticle production
- Technologies and equipment for multilayer nano-scaled coatings (heat-resistant, anticorrosive, antierosive, etc.) for gas-turbine engine blades
- Wear-resistant paintwork material with nanoparticles for aeronautic and engineering applications
- Wear-resistant nano-modified electroplating coating
- Enhancement of carbon fiber reinforced plastic (CFRP) mechanical properties with Nano-diamonds
- Nano-modified carbon fiber plastic for composite structures lightning protection.
- Nano-modified lubricants with enhanced tribological properties

Composite structures: Advanced algorithm for high-strength composite structures; innovative composite-to-metal and composite-to-composite heavy-loaded joints; composite parts manufacturing process modeling and optimization; manufacturing tool design; composite parts repair processes modeling.

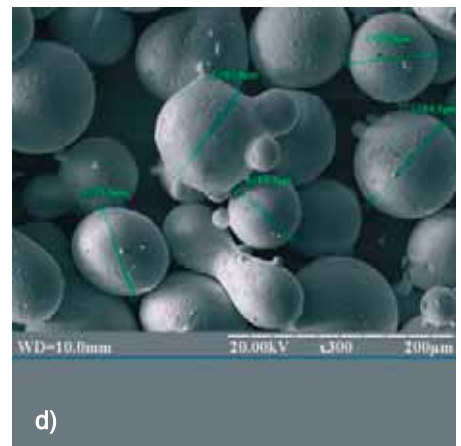
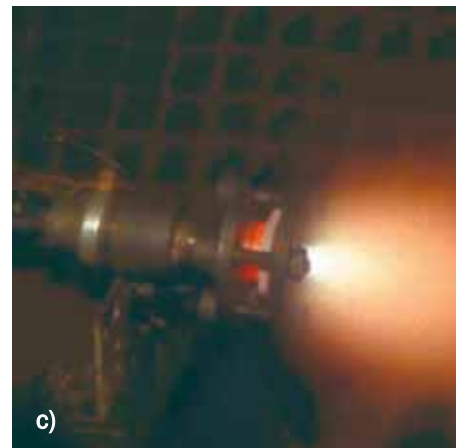
Aerospace thermal engineering: Development of advanced two-phase thermal-control system for the next generation of communication satellites that provides a 30% thermal control system mass reduction and 10 times lower power consumption for thermal control accuracy ± 0.5 °C.

Spacecraft control system: Development of an active fault-tolerance FPGA-based self-remedial control system for satellites.

Power supply: Development of accumulators accelerated life tests technology, based on intensification of the degradation processes.

PARTNERING OPPORTUNITIES

Today KhAI is involved in international educational and research activities together with academic and industrial partners from Germany, France, Great Britain, Italy, Sweden, Finland, Greece, Israel, USA, Japan, Mexico, South Korea, China etc. Innovative research in different areas are conducted with AIRBUS, ONERA, ThalesAlenia, BOEING, EOARD, IAI, AVIC etc. As a result of international cooperation more than 50 agreements with foreign organization were signed. KhAI is open for international cooperation with all possible type of partners.



a) Supersonic wind tunnel T-6

b) Static test of L 410UVP E fuselage

c) Arc Jet Engine

d) Produced nano-powder

NATIONAL AVIATION UNIVERSITY

KYIV
UKRAINE

Prof. Volodymyr Kharchenko
Vicerector for science
National Aviation University

1 Komarov Ave.
Kyiv, Ukraine, 03058
tel: +38 (044) 408-5333
e-mail: nauka@nau.edu.ua
web: <http://www.nau.edu.ua>

The National Aviation University (NAU) is a large state-owned institution of higher education that takes an active part in many international programs with foreign universities, training centers, associations and companies.

DISTINCTIVE COMPETENCIES

The University has a training airfield, a one-of-a-kind hangar, signal training area and aviation ground equipment facilities as well as training and aerodynamic complexes with the wind tunnel. The University scientific and technical library comprises 2.6 million books.

The following examples demonstrate the strength and depth of the research at the university:

- Development of equipment for navigation field monitoring which provides the means for evaluating GPS, GLONASS, GALILEO, SBAS, GBAS as well as providing real-time accuracy, continuousness maintenance and operation availability.

Global Satellite Navigation Systems Interference Stability and Interference Protection.

Satellite navigation signal intensity equals to 10-16 Watt on the Earth surface and any low-level signal that exceeds this level can cause coordinates miscalculation. Antenna arrays ensure interference suppression by means of directional diagram particular form. Interference adaptive antenna array ensures natural and deliberate interference suppression by means of satellite navigation receivers.

The simulator “EXPERT”

The simulator “Expert” is designed for effective students training and the ATM personnel recurrent training at the ATC, flight region and area control centers.

The simulator provides:

- Modeling of airspace within specific boundaries;
- Simulation of air traffic situation within predetermined complexity in real and fast time scale;
- Simulation of radar data;
- Simulation of meteorological conditions;
- Operation in procedural, module and complex (in local network) modes of operation;
- Aircraft traffic control in automatic, semi-automatic and manual mode;
- Aircraft position finding (ATC responsibility zone, flight phase, runway or stand position);
- Statistic data for ATC station;
- Simulation of radio and intercom service with individual headset plugging.

The number of pilot stations, trainees and the simulator configuration depends upon customer’s requirements. Module design is used for the system software and hardware realization in the simulator. IBM-based compatible PC software is used for all components of the simulator.

UAV M-7 “SKYWATCH”

Application: cartography, aerial photography (M-7K), real-time video surveillance (M-7P).

The main objective of the project is to make better a twin-engine UAV on-

board surveillance equipment performance by means of its layout design improvement and front semi-sphere surveillance boundary limits enlargement. The onboard equipment vibration load is decreased and the efficiency of the UAV above mentioned functions are perfected.

UAV “SKYWATCH M-7” is a normal scheme twin-engine high-wing UAV. Composite materials have been used as the main manufacturing technique. This provides relative simplicity of UAV manufacturing, because the aluminic alloys are not used in production but all necessary characteristics of strength, reliability and weight have been reached. The wing mounted on two pylons above the fuselage is a special feature of an aerodynamic design. To get the access to the payload compartment the upper part of the fuselage is done in the form of a detachable fairing. The forward observation cameras are installed in the nose part of the fuselage in the special opening.

Multifunctional UAV M-6 “LARK”

Application: biological protection of plants (M-6CX), cartography and aerial photography operation (M-6K), real-time video surveillance (M-6P).

The project is based on the results of the UAV application for pest control, agricultural plantings affections and weeds control efficiency; map-making, video surveillance and other aerial works. The UAVs have proved to be very effective and shown techno-economic efficiency of the operators, performing above-mentioned functions. The economic effectiveness of the UAV application is based on fuel and lubricants savings as well as on the decrease of direct operating expenditures, human and material resources.

Two UAVs with ground navigation system, parachute eject device and specialized onboard equipment can operate under visual met conditions both day and night. Manual and automatic UAV control modes can be used. The automatic mode of operation maintains preset parameters of heading, bank and pitch angles, flight speed and onboard equipment operation control. The utilization of UAV technology gives 3-4 times increase of productivity in comparison with mechanical ground devices. The fuel saving comprises 85-98% in comparison with the An-2 airplane or the Mil-2 helicopter. The UAV can perform the aerial work on 20000 hectares per season.

PARTNERING OPPORTUNITIES

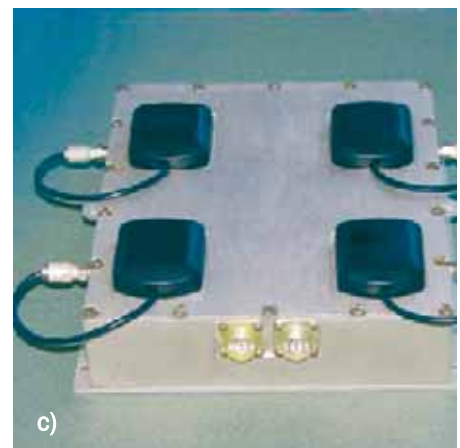
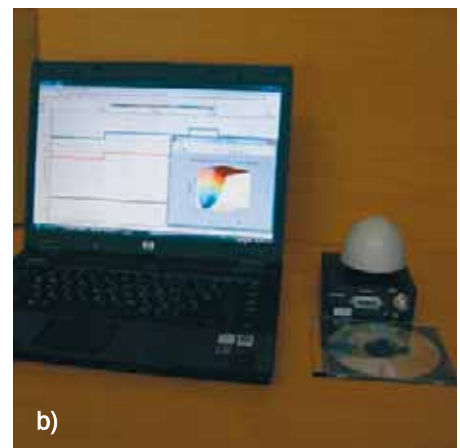
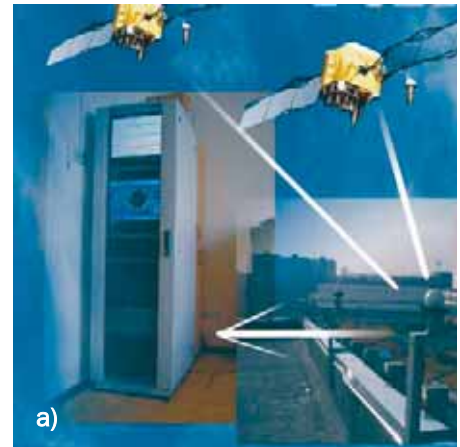
The National Aviation University (NAU) co-operates with more than 100 foreign scientific and training institutions of Russia, the European Union, CIS and Asian countries. Indeed the University has been successfully collaborating with the International Civil Aviation Organization (ICAO). It also has two ICAO European Regional Training Centres which provide training and retraining for personnel of aviation companies from Ukraine and abroad. Both centers use the generally-acknowledged TRAINAIR methods based on ICAO Standards and Recommended practices.

a) Navigation signal monitoring station

b) Navigation researches by means of geodesic equipment application

c) Adaptive antenna array

d) UAV M-7 “SKYWATCH” and Multifunctional UAV M-6 “LARK”



NATIONAL SPACE FACILITIES CONTROL AND TEST CENTER (NSFCTC)

YEVPATORIYA
UKRAINE

Stanislav Malevinsky
Director

Yevpatoriya-19, ARC,
Ukraine, 97419.

Tel. +38 (06569) 494-18,
Fax +38 (06569) 494-24

E-mail: ncvzk@spacecenter.gov.ua
www.spacecenter.gov.ua

The National Space Facilities Control and Test Center (under the National Space Agency of Ukraine) is a multifunctional entity which conducts research and development in a number of important areas: These include: the application of “near-the-earth” space devices which enables the:

- planning and formation of command-program information for on-board equipment functioning on the space crafts
- conducting communication with the space crafts
- reception of information about current navigation parameters, projection of movement parameters, calculation of the standard ballistic information
- control and analysis of functioning condition of on-board equipment on the space crafts
- identification of the space crafts orientation parameters
- formation of operation schedule for space crafts control
- formation of the payload operation schedule
- information support of technological operations of space crafts control
- operational information support of data users
- program-command information output on-board of space crafts
- acceptance of control-acknowledgement and telemetric information
- measurement of current navigation parameters

The information reception centre provides reception of scientific and special information within the range of frequencies 1.7 GHz and 8.025-8,4 GHz. Information processing units provide preliminary and themed processing of the accepted information in compliance with user’s requests as well as data backup.

The control and analysis of space situations

This permits the processing, analysis and output of coordination and analytical information about space situation to the users and includes:

- centre for space control is intended for output of acquisitions to optic and radio surveillance facilities
- stations for radio surveillance which are responsible for the maintenance of the catalogue of the space objects
- Optic-electronic and optic systems; for the analysis of condition in the near-the-earth space

Problems addressed:

- tracking of the priority space objects
- provision of flight safety for national space crafts
- control for space objects that drift down (fall) and for “space debris”

The stations for radio surveillance are the main source of information about parameter of the space object orbits used for maintenance of the catalogue of the space objects.

The optic-electronic and optic systems. Laser optic devices allow identifying and tracking of the space objects as well as for adjustment of moving parameters. They are aimed at highly accurate ranging and measurements of angular coordinates of space objects for improving accuracy and projection

of the orbits. Optic facilities of astronomic observatories are involved for addressing problems of identification and ballistic support of space crafts flights.

The system of outer space scientific research, enables the:

- control of interplanetary stations and outer-space crafts
- conducting of radio astronomy and radiophysical researches.

Provides implementation of works for:

- program “Interferometer” – surveillance of near-the-earth and outer space objects in the autonomous regime and by the network of radio interferometers with very long baselines;
- radiolocation of the solar system objects;
- mapping of radio emissions of Galaxy and off-Galaxy sources;
- identification and cataloging of “space debris”.

The system of geophysical monitoring and provides:

- control for seismic situation in the territory of Ukraine and globally
- control for non-proliferation of nuclear arms by registration of nuclear explosions globally.

The registration results are transmitted to the International Data Centre (Vienna, Austria).

The system of navigation and time support, is currently under development. It is intended to provide the users with broad band differential adjustment information for insuring accurate positioning of the user based on application of space and navigation systems.



a) Main information hall of NSFCTC

b) and c) Quantum-optical station “Sazhen-C”

d) Radiotelescope RT-70

NATIONAL YOUTH AEROSPACE EDUCATION CENTER (NYAEC)

DNIPROPETROVSK UKRAINE

Viktor V. Hutornyi
Director General

*P.O. box 503,
26, Gagarina Avenue,
Dnipropetrovsk, 49005,
Ukraine,
Tel./fax: +38(056) 377 36 88
e-mail: ncaomu@email.dp.ua
www.unaec.dp.ua*

The National Youth Aerospace Education Centre was founded in 1996 at the initiative of the National Space Agency of Ukraine with support of the leading space industry enterprises of Ukraine. Its primary goals are:

- the practical implementation of the State's youth policy
- realization of the modern system of personnel provision to the space-rocket and aviation industries
- search for and attraction of the talented youth to the aerospace science
- establishment of appropriate conditions for intellectual enrichment of young generation of Ukraine
- educational activity and popularization of knowledge in science, space, and national achievements in the space-rocket and aviation areas

PRIMARY SCIENTIFIC DIRECTIONS

The Center possesses all the necessary infrastructure and material resources for research. It undertakes research in many areas including, the design of materials on the basis of metal powders and development of technologies for their production, in cooperation with Dnipropetrovsk National University. In order to satisfy the needs of mechanical engineering sector, the center specialists developed technologies of manufacturing constructional, antifriction, electro-technical products on the basis of iron and copper powders with high mechanical properties.

DISTINCTIVE COMPETENCIES

- Technology for manufacturing materials on the basis of stainless steel powder (for example, type Cr (13... 18 ... 18) – Ni (9 ... 15)) for functioning in the corrosive medium, under high and cryogenic temperatures, and in the wear conditions. High density and wear resistance of the products is developed by way of solution-phase sintering with special alloys. Those materials are used for manufacturing of frictional couples (friction factor of not more than 0.02... 0.03), parts of the locking and adjustment fittings used in the space-rocket equipment, gas - and oil pipelines, chemical, and foodstuff industries.
- New antifriction materials on the basis of copper-graphite compositions with a heterogeneous structure that are able to operate at a wide range of the sliding speeds (from 1 km/s to 50,000 km/s) and under heavy conditions (vibratory impact, corrosive environment, low temperatures, etc.). These materials have successfully proved their performance in the space-rocket equipment and in electric transport machine building. Current collectors' resistance has grown 15 times in comparison with graphitic ones, which are used at present while decreasing wear of the overhead wire system.
- Development of technologies for manufacturing water sprayed powders of the quick cutting steel and tools made of them. The material utilization ratio is increased to 0.80 instead of traditional 0.28...0.40, wear resistance of the cutting tools is heightened 1.5... 2 times.
- Developed production technologies of a new class of materials – carbide-steel, which combine hardness and wear resistance of the hard alloys with durability and viscosity of quick-cutting steel.

- New technologies of manufacturing powders of aluminium and its alloys by dispersing melts with high pressure water, as well as technologies of the powders processing into the products. The core of ecologically clean technologies complex is an effect of superfast crystallization, which implements during dispersion. Powder detail material match the mechanical properties of the forged materials produced of this same alloy.
- Porous filters and aerators on the basis of powder corrosion-proof steel, nickel, copper, which may be reused after regeneration.

INFORMATION SUMMARY ABOUT RADIATION-PROTECTION MATERIALS AND PRODUCTS

Containers for radioactive waste storage

Containers are intended for collection, transportation, storage, and burial of toxic and radioactive waste of low and medium radiation level. Containers are designed for the storage period of not less than 300 years.

Results of the products functioning in conditions of solar radiation, oxygen, high humidity etc. revealed no traces over a 30 year period. The containers in sea water during five years showed decrease of the tensile strength and compression strength by less than 10 %, elasticity module - less than by 6 %.

Radiation protection screen

The radiation protection screen on the fiberglass basis is intended for manufacturing of protection equipment in the form of hard screens, boards, external and internal coverings elements, fast erected building structures. Material radiation resistance study accomplished in the facilities of National Science Center of KhPTI with employment of the electron linear accelerator proved that operational properties of the material sustain for at least 300 years (absorbed dose is 10 MR). Upon request of the customer, plates of this material can be made of different size.

Personal protection equipment (PPE)

The center presents samples of radiation protection film and modified polyvinylchloride applied on the synthetic fabric. Weight of 1 m² film of 0.5 mm thickness is 1.5 kg. Certain types of the protection gear may be manufactured with use of one film layer and additional protection of the gonadal areas or certain personal protection means may be manufactured of several film layers.



a) Container for radioactive waste storage KXC-02K

b) Container for radioactive waste storage KXC-007

c) Radiation protection gear

"PRYRODA" STATE RESEARCH AND PRODUCTION CENTER

KYIV
UKRAINE

Vasyl Hotynyan
Director of the center,
PhD Geological
and mineralogical sciences.

40, Academician Glushkov Ave.,
building 4/1,
Kyiv, Ukraine, 03680.

Tel. +38(044) 522-5968,
522-5891,
tel./fax (044) 522-5894,
e-mail: gotynyan@pryroda.gov.ua,
<http://www.pryroda.gov.ua>

"Pryroda" or "State Research and Production Center of Aerospace Information, Earth Remote Sensing and Environmental Monitoring" was founded in 1992 and acts as a data archiving and dissemination center. The organization has its head quarters in Kyiv, plus branches in Donetsk and the Northeast region of Ukraine, and reports to the National space agency of Ukraine. It is functionally subordinate to the Ministry for environmental protection of Ukraine.

In accordance with directive of the National Space Agency of Ukraine and other departments, "Pryroda" SRPC, acts on the basis of the aerospace survey, promptly develops cartographic materials, performs other tasks with regard to the country defense capacity maintenance, monitoring of ecological and technogenic disasters, exploration of natural resources, and control over their utilization. The current archive of "Pryroda" SRPC remote sensing data is the largest in Ukraine. It encompasses aerospace imagery data and consists of two parts: archive of the photocarrier data and archive of digital data.

PRIMARY SCIENTIFIC DIRECTIONS:

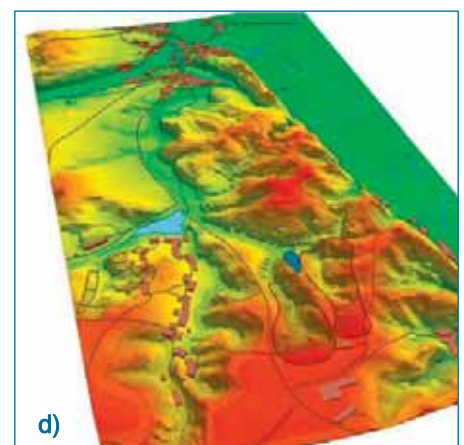
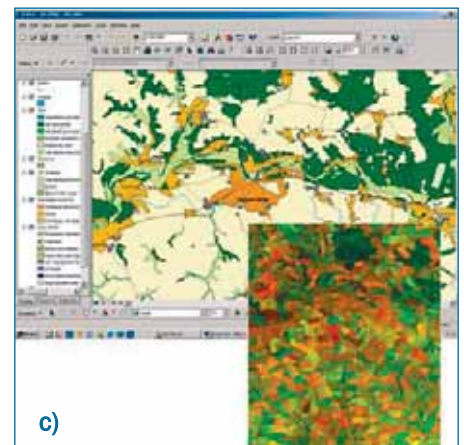
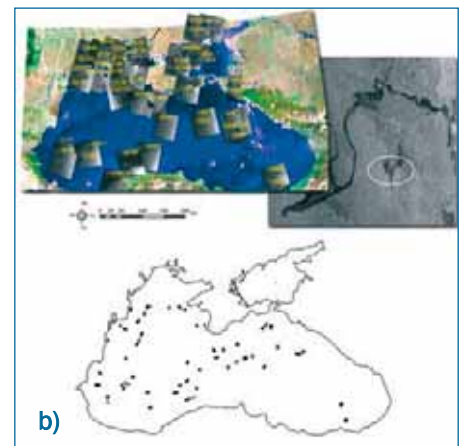
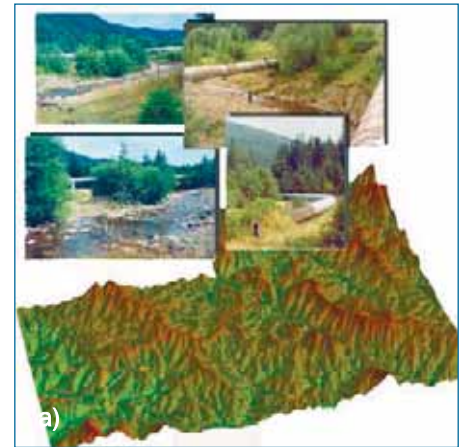
- processing, storage, and dissemination of the Earth remote sensing information
- research, development and production works with regard to the improvement and implementation of remote methods for wildlife management and environmental monitoring
- assessment of innovation capabilities of the space images from different types of environmental monitoring
- designing of requirements for conditions and parameters of new aerospace sensing of the territory of Ukraine
- creation of digital thematic maps on the basis of GIS/ERS technologies
- creation of the regulatory and methodical documents concerning the Earth remote sensing and environment
- monitoring of the environment by the remote sensing instruments
- forecasting and exploration of natural resources by remote methods, studying of the earth crust structure, tectonics, and geodynamics
- ecological research (pollution of surface water, efficiency of the irrigation systems, vegetation monitoring, etc.)

DISTINCTIVE COMPETENCIES

"Pryroda" SRPC facilitates archiving, processing, and transmission of the remote sensing data to various Ministries, departments (including, among others: Ministry of Defense of Ukraine, Ministry of Emergencies of Ukraine, National Space Agency of Ukraine, Ministry for Environmental Protection of Ukraine and regional state administrations).

“Pryroda” SRPC offers:

- Data of the Earth remote sensing, including archival data that includes, among others, images made by SC NOAA, "Sich-1", "Ocean-0", "Meteor-3M", "Resource F" ("KFA-1000", "KFA-3000", "KATE-200", "MK-4"), TERRA/MODIS, ERS-1, Landsat, SPOT, IRS, Quick Bird, Ikonos, and ALOS satellites
- Inter-sectoral processing of the images; geometrical correction, reduction to the defined projection; geographical reference and cartographical transformation of data; colour correction and image filtration; conversion of the aerospace survey materials from the analogue format into digital one. creation of the geospatial databases with use of Internet technologies.
- Thematic processing of the images for accomplishment of the following tasks: monitoring and mapping of agricultural resources; monitoring and mapping of a natural vegetative mold; monitoring and mapping of water resources; use of ERS data and GIS technologies in the geological surveys; use of ERS data and GIS technologies in the ecological surveys; creation and updating of the maps with use of aerospace images; forecasting and prompt assessment of the emergency situations implications.



-
- a) Geodynamical monitoring of the main pipelines
 - b) Estimation of the oil contamination of the offshore zone
 - c) GIS “Zemelny Fund”
 - d) 3D model of the firing ground #5 terrain (JSC “KyivSpecTrans”)

“RADIO MEASUREMENT RESEARCH INSTITUTE” JOINT STOCK COMPANY (RMRI)

**KHARKIV
UKRAINE**

Oleksandr Vereschak
Chairman of the Board of Directors

271 Ak. Pavlov Street,
Kharkiv, 61054,
Ukraine

Tel. +38 (057) 738-32-00

Fax +38 (057) 738-41-12

E-mail : common@niiri.kharkov.com

<http://www.niiri.com.ua>

At the Radio Measurement Research Institute (RMRI) highly qualified scientists and engineers are engaged in the development of radio engineering equipment and software. In addition to space technologies, the enterprise is able to develop and implement modern competitive products for other sectors of economy and for public purposes, namely medical equipment, satellite navigation systems, industrial gas meters/correctors, computerized control systems of mini oil refineries and others.

PRIMARY SCIENTIFIC DIRECTIONS

Space instrument engineering

- Command and measurement complexes for space crafts (SC) control: on-board equipment (OBE), test and control equipment (TCE) and earth-based stations (ES) for SC MC-1, EgyptSat-1, MC-2-8, Mikrosat
- Systems of telemetric measurements (OBE and TCE) for EgyptSat-1, MC-2-8, Mikrosat, further- perspective national launch vehicles (LV) and SC
- Special information radio lines SD (OBE, TCE and ES) for KAMS-1, EgyptSat-1, MC-2-8, Dnepr LV
- On-board communication transponders for Store&Forward SD (OBE, TCE and email users terminal) for SC , EgyptSat-1, Mikrosat
- Equipment for satellite navigation of SC and LV (OBE, TCE) for SC Sich-1M, MC-1, EgyptSat-1, MC-2-8, LV Dnepr, LV Cyclon-4 and others
- Equipment for remote sensing of the Earth: side-looking radar, radiometer, radar with synthetic aperture of aeriels, bistatic radar (OBE, TCE) for SC Cosmos, Ocean, Sich-1 , Sich-1 M, Sich-3P and others.
- Universal earth stations for information reception from SC and LV for special ground complex of SC Sich -1M, MC-2-8, EgyptSat-1, LV Dnepr, LV Cyclon-4 and others.
- Units, equipment and systems of superhigh frequency (SHF) for radars with extra-long-range base and others for RT-70 (Yevpatoriya) etc.

Special purpose systems

- Multiparametric system of high accuracy trajectory measurements of space and navigation objects (OBE, TCE and ES) – a family of external-trajectory measurements of “Vega” type
- Ground differential accompaniment of satellite radio navigation systems (control-correction stations, regional points of navigation field control, navigation field control centers) - A system of coordinate-time and navigation support of Ukraine – SCTNPU
- Systems and facilities for geophysical monitoring – equipment and software of the Ukrainian Seismic Group – USG (PS-45), created under Main Special Control Center of the National Space Agency of Ukraine

Medical Equipment

- Multifunctional ultrasonic diagnosis complexes – digital Doppler ultrasonic scanners Ulyma -PA, Ulyma -Pro-30, Ulyma - Pro-10»
- UHF diagnostic and treatment machines – a complex of local microwave hyperthermia of prostate ALMGP-01
- Digital fluoroscopic machines – Digital mammography complex Madis

DISTINCTIVE COMPETENCIES

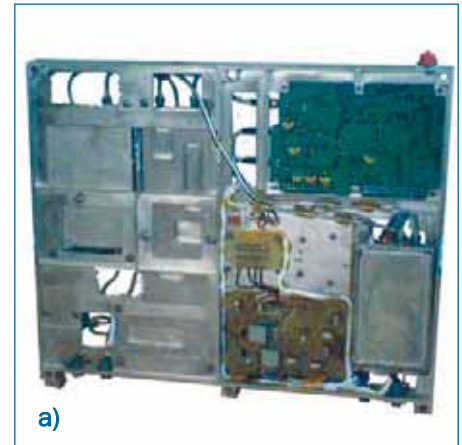
The enterprise has a powerful pilot prototype production performing tasks from metal working to microelectronics. It also has a testing ground.

PARTNERING OPPORTUNITIES

Radio Measurement Research Institute (RMRI) provides a whole cycle of scientific, R&D and engineering services from design to production and 'turnkey' supply of a wide range of radio engineering equipment to systems for space and special purposes including maintenance.

RMRI works in cooperation with many Ukrainian enterprises and RF entities and is interested in extending mutually advantageous partnership in all spheres of its activities.

Specimens of RMRI are shown on the pictures.



a) On-board equipment of command-telemetric and information radio lines for SC

b) On-board equipment for collection of telemetric data from SC

c) On-board equipment for satellite navigation for SC and LV

d) Medical Equipment Ultima PA

SPACE RESEARCH INSTITUTE NASU AND NSAU

KYIV
UKRAINE

Oleg P. Fedorov,
Director, Dr. Sc.

40, korp. 4/1, Acad. Glushkov prosp.,
03680, Kyiv,
Ukraine
tel. (044) 526-41-24,
fax (044) 526-41-24
e-mail: ikd@space.is.kiev.ua

The Space Research Institute NASU-NSAU (SRI) was created in 1996 and is today one of the leading Ukraine centers of organization, realization and coordination of scientific and technical activity in space. The institute has 5 scientific departments and branches in Lviv and Kharkiv.

PRIMARY SCIENTIFIC DIRECTIONS

- solar-Earth connections and space weather
- space information systems and technologies, aerospace data processing methods
- space material science research
- development of new devices for space research
- theory and methods of complex dynamic space systems control

DISTINCTIVE COMPETENCIES

The SRI is the leading organization in R&D of methods and information technologies, provision of information services in the Earth observation (EO) domain. SRI has a strong experience in solving applied problems in agriculture and natural disasters using modern data assimilation and data fusion techniques (fig. a, fig. b);

SRI is a center of excellence in the field of ionosphere exploration and space weather forecasting. In addition it has strong experience in solar-terrestrial physics and is a center of excellence in the field of development, testing and implementation of the advanced instrumentation for space research.

SRI NASU-NSAU extensively collaborates with the Group on Earth Observations (GEO), the Working Group on Information Systems and Services (WGISS) of the Committee on Earth Observing Satellites (CEOS), and participates in several international and national projects in collaboration with the United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER), the European Space Agency (ESA), the National Aeronautics and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), the International Federation of Red Cross (IFRC), University of Florida, Max-Planck institute and SPIE.

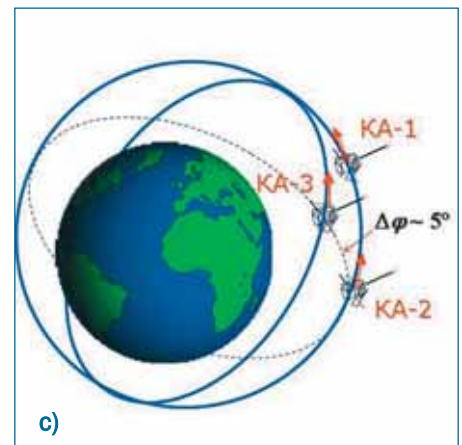
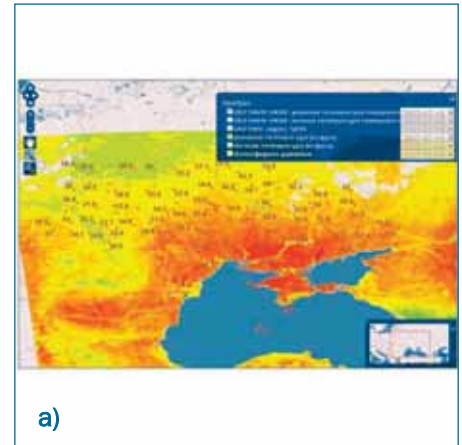
IONOSAT mission is included into Ukrainian National Space Program on 2008-2012, is also proposed for the First European Space Program, Space Weather Program and GMES. SRI NASU-NSAU maintain intensive research collaboration with leading international Institutions in field of space physics: Sweden Institute for Space Physics, Stockholm, Sweden, Laboratoire de Physique et Chimie de l'Environnement (LPCE/CNRS), Orleans, France, Center for Space Research of Polish Academy of Sciences, Warsaw, Poland, Institute of Space Research of Bulgarian Academy of Sciences, Sofia, Bulgaria, Institute of Space Research of Russian Academy of Sciences, Moscow, Russia; Institute of Terrestrial Magnetism, Ionosphere and Radiowave Propagation of Russian Academy of Sciences, Troizk, Russia.

The Institute participated in a number of international projects funded by STCU, CRDF, as well as in inter-government programs of scientific cooperation.

PARTNERING OPPORTUNITIES

SRI has a strong interest in joint development and commercialization of new technologies and services in the following areas:

- geo-information technologies and services
- environmental monitoring and natural disaster management
- grid and distributed computing
- satellite data processing. Fundamental study of upper atmosphere and ionosphere wave activity
- investigations of ionosphere response on anthropogenic and natural hazards
- experiments on LEO satellites:
 - experiment “Variant” onboard Ukrainian remote sensing satellite Sich-1M launched in 2004,
 - preparation of new experiment “Potential” onboard Ukrainian remote sensing satellite Sich-2.
 - preparation of new mission IONOSAT onboard constellation of 3 LEO satellites (fig. c).
- space weather forecasting
- space instruments damage due to space weather impacts
- development of methods and devices for remote sensing of vegetation



a) Example of integration of multi-source data: land temperature derived from satellite observations and meteorological stations

b) Digital map of flooded area

c) Satellite constellation proposed for IONOSAT mission

d) Device for remote sensing of vegetation state

“TECHRESOURCE- MOTORS”

R&D ENTERPRISE

KYIV
UKRAINE

Eugene DRACHKO,
Yury KOSTIRSKY

tel : +38 095 884-32-33;
Fax : +38 044 502-12-56;
R&D Enterprise
“TechResource-Motors”,
Kyiv, Ukraine,
E-mail: DE@turbocenter.kiev.ua

A NEW ENGINE FOR AVIATION & GENERAL APPLICATIONS “TURBOMOTOR (TM)”

Patent protection and unique advantages of a new rotary type engine «TurboMotor (TM)» provides the company with leadership position in the market of general application engines in the range of capacities from 20 to 1200 hp. TM is the optimal combination the best features piston engines (efficiency) and gas-turbine engines (big power), but it has no their specific weaknesses (big weight PE and big consumption small GTE). TM engines compared to PE and GTE for range of capacities from 20 up to 1200 hp:

TM is better piston engines:	TM is better small gas-turbine engines:
15-20% more economical	2-3 times more economical
adapted to biofuels	3-4 times smaller
resistant to external shocks	resistant to external shocks
3-4 times lighter (0.2 kg/h.p. vs 0.8)	10-15% lighter
2-3 times cheaper to manufacture	10 times cheaper to manufacture

Low cost, simplicity, reliability and high work-time resource guarantee TM monopoly in the market compared to other types of engines.

High technological and economic TM performance are the result of:

- the immediate realization of a 4-stroke's working thermodynamic process (intake, compression, working stroke, exhaust) between turbine vanes;
- extremely simple and reliable engine kinematics mechanism has only 3 simple moving parts.

Due to technical and economic advantages TM capable to force out market a piston and small gas-turbine engines (capacity from 20 to 1200 hp) at short time.

A huge variety designs of internal combustion engines (2 and 4-stroke engines, 2 -, 4 -, 6 -, 8 -, 12-cylinder Otto and diesel engines, gas-turbine engines) means that each of these types engine has its own specific both advantages and disadvantages, but in general - there is no engine leader.



«TurboMotor» will be absolute leader in the market of engines for various applications:

- Business Aviation (light helicopters, light aircraft, «aircars» - a new town transport), the market \$3 billion a year;
- Road transport (vehicles with hybrid power-plant, cars and trucks, buses, special use transport, motorcycling, etc.), the market \$420 billion a year;
- Small vessels (outboard and stationary engines), the market \$2 billion a year;
- Agricultural machinery (combines, tractors etc.), the market \$6 billion a year;
- Power unit, the market \$1.5 billion a year;

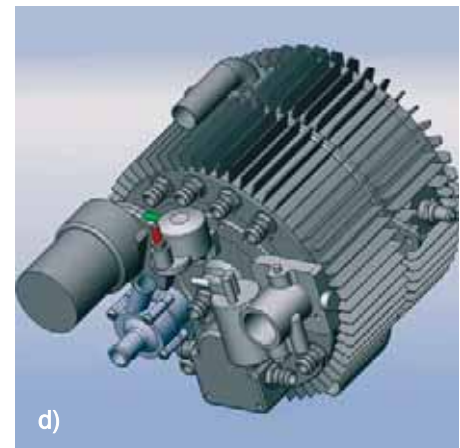
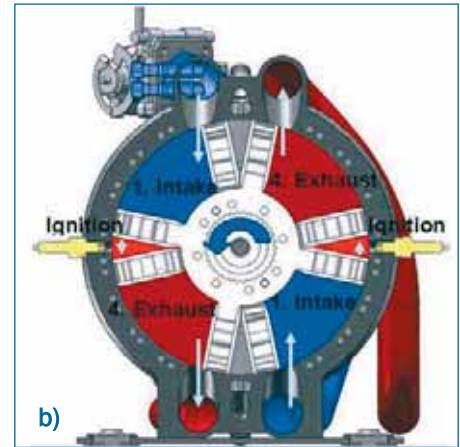
General TM construction is very simple (4 simple cage's details, 2 rotor, 3 co-axial shafts and 3 simple details of kinematics' mechanism - total 12 main parts.). This feature allows to organize a mass TM production with minimal costs as well a production equipment as engine producing for different applications and power. Small TM costs guarantee its sales.

Stage of development:

- There is an original application package for calculation and optimization «TurboMotors» of different power and applications.
- There is standard «TurboMotor» construction of 200 h.p.
- There are testing the base TM-technologies: the aluminum covering by 0.3±05 mm ceramic layer & ion-plasma method nitration of alloyed steel covering.
- The 200 h.p. «TurboMotor» is building.

PARTNERING OPPORTUNITIES

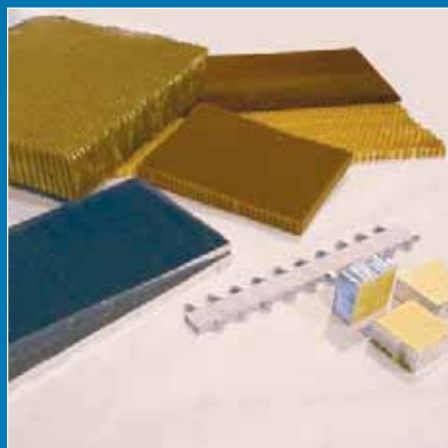
We search for Strategic Partner for the creation of Joint Ventures.



- a) The potential «TurboMotor» application
- b) Mode of functioning
- c) , d) and e) Engine design

“UKRAINIAN SCIENTIFIC RESEARCH INSTITUTE OF MANUFACTURING ENGINEERING” PUBLIC JOINT STOCK COMPANY (USRIME)

DNIPROPETROVSK
UKRAINE



Vasily Zevako
Director

46 Kirova str.,
Dnipropetrovsk, 49054,
Ukraine
Tel.: +38(0562) 37-72-11
+38(056) 370-72-15
e-mail: oao@ukrniitm.dp.ua
www.ukrniitm.dp.ua

Public Joint Stock Company “Ukrainian research institute of manufacturing engineer” (UKRNIITM) is the lead organization of National Space Agency of Ukraine in the area of rocket - space technique production

PRIMARY SCIENTIFIC DIRECTIONS

Over the years, the Institute has developed and applied complex and special-purpose technologies for production of four generations of liquid and solid propellants, designed by Design Office “Yuzhnoe”. Among them “Satan”, “Cyclone”, “Dnepr”, “Zenit” and also carrier rockets and space vehicles developed by Design Offices of the former USSR

DISTINCTIVE COMPETENCIES

Control Operations

- Highly sensitive hermeticity test of closed surfaces
- Sensitive test $1 \cdot 10^{-5}$ litre-mkm/s
- Cubing of large dimension cavities by gas method
- Inaccuracy of measurements – 0,2%
- Technologies may be combined in the same workplace
- Physical configuration of the vacuum chamber with volume 400m^3 (800m^3)

Horizontal High Accuracy Assembly of Big Length and Massive Items

Assembly techniques are applied in the manufacture of big-volume articles with high requirements to the parameter maintenances of extrinsic geometry

Technology list:

- coaxiality assurance of the articles during their horizontal joining with divergence at most 1 mm on length up to 50 m
- gravity center element wise measuring of the units to $\pm 5\text{mm}$
- mass centering characterization of article in assemblage by extrinsic geometry control of article and its component parts with error up to 2%
- data base generation of mass characteristics of article subject to its length and geometric parameters of joints among component parts

Technologies have been worked out on the articles with mass up to 200 tones with dimension: up to 4 metres in diameter, length up to 50 metres

Highly Productive Tree-Lock Chamber Unit For Metal Construction Welding in Controlled Medium of Rare Gas and Vacuum

Unit for welding of titanic sphere-cylinders (up to $\varnothing 600$ mm) and welding of connection pipes to half-spheres by hollow cathode in vacuum and non-consumable electrode welding in controlled air of shielding gas

Technology and Equipment for the Bellmouth Manufacture from Carbon-Carbon Composite Materials

Furnaces for Pyrocarbon Precipitation and the Silicon-Carbide Covering

NDT Device

Means for: The unit is intended for automated ultrasonic (US) testing of quality of heat-shielding rubber coating gluing to metal housing, and control of delaminations inside rubber coating

On picture: Technological manufacture of honeycombs and its structures

Unmanned Transport Reusable Airborn-Space Vehicle

DESCRIPTION

Unmanned transport reusable aerospace vehicle (ASV) "Sura" is designed for putting into the Earth's orbit and reentry satellites and other payloads. The aerospace vehicle is two-stage one. Full weight is 60 tons, full thrust of air-fed and liquid propellant jet engines (LPJE) is 90,2 tons, length - 16,8 m, wings span-10 m, height - 5,5 m. The first stage can be used in autonomous mode as cargo sub-orbital plane. The second stage can be used as a space ship.

The second stage has a cargo module, which can be used for putting satellites into an orbit or removing them from orbit. Then the body returns back and is put on its place for further flight in the atmosphere. During reentry cosmic speeds and flight along a chosen trajectory, the thermal protection shields prevent overheating. Unmanned, maximal quick-responsive variation allows reducing transitive processes time up to minutes, seconds and microseconds. Application of air-fed engines and LPJE, produced serially, makes it possible to reduce the time for development three times less, compared with analogues, and cost of development to cut two times less (for example-compared with Russian project TU-2000). ASV construction decisions allow reducing space-launching cost.

INNOVATIVE ASPECT AND MAIN ADVANTAGES

ASV construction are distinguished by the following constructional features:

- plane stages have modular construction
- there are no aerodynamic guiding elements
- flight guidance is realized by LPJE
- an advantage of the atmosphere is used (wing lifting force and using atmospheric oxygen)
- the principle of fire dynamic staging is used

Constructive solutions of the ASV make it possible to reduce space launching cost. Having been planned index of the specific cost of putting into an orbit with height of 300 km a cargo with the weight of 300 kg is \$ 1000 per one kg.

AREAS OF APPLICATION:

- putting of commercial satellites into an Earth orbit
- space research and Earth remote sensing.

STAGE OF DEVELOPMENT

Conceptual development of the construction has been patented in Ukraine.

Picture of the dimensional model of two-stage airborne-space vehicle

O. MAKAROV YUZHNY MACHINE- BUILDING PLANT

PRODUCTION ASSOCIATION
(YUZHMAH)

DNIPROPETROVSK,
UKRAINE



Viktor Shchyogol
General Director

1 Krivorizka St.,
Dnipropetrovsk,
Ukraine, 49047
tel.: (0562) 34-39-04
tel./fax: (0562) 39-95-00
e-mail: umz@yuzhmash.com
www.yuzhmash.com

“UKRKOSMOS”

STATE ENTERPRISE

KYIV
UKRAINE

«Ukrkosmos» SE head office:
37, Pobedy Ave.,
KPI 4030, building 28,
Kyiv, 03056,
Ukraine.

Tel./Fax: +3(044) 241-84-72,
(044) 241-84-73.

E-mail: admin@ukrkosmos.kiev.ua

**Teleport -
central broadcasting satellite station:**
42, Melnikova Street,
Kyiv (NTBU territory). Bodies.
Tel./Fax: +3(044) 483-99-60.
E-mail: info@ukrkosmos.kiev.ua

Oleksandr Makarov
Director General
Tel./Fax: +3(044) 241-7036,
+380(44) 241-8472.
E-mail: admin@ukrkosmos.kiev.ua

"Ukrkosmos" State Enterprise was founded in 1996. Its primary activities are:

- Research and development in the field of engineering science;
- Creation and operation of a unified satellite system of information broadcasting (USSIB) and separate satellite systems, which are part of USSIB, other satellite telecommunication systems;
- Acting as operator of USSIB, separate satellite systems, which are part of USSIB, other satellite telecommunication systems, and satellite communication special systems;
- Acting as operator of operator functions of TV and radio satellite network, Internet broadcasting, and corporate and departmental data transmission networks;
- Designing, testing, and operation of ground space infrastructure of satellite telecommunication systems and its components, equipment, which is part of the satellite telecommunication system space segment;
- Research and development, design and implementation works in the field of telecommunications, communication, management, radio electronics and telemechanics;
- Performance of the system projects, extension of the telecommunication networks as well as international satellite communication networks;
- Provision of scientific and technical and production services with regard to the control systems and communication means;
- Integration of the advanced scientific and technical findings in the technology of communication organization, transmission systems and data storage;
- Provision of technical expertise, consultations, production marketing as well as information support of the consumers, training of the customer's technical staff in operation of the equipment and communication systems, rendering services in procurement of equipment, creation of high-speed scientific, technical, and other data banks;
- Organization and launching of the space equipment, information technologies, and communication technologies exhibitions;
- Construction and maintenance of the satellite communication transmission and receiver stations and provision of the support services in their operation;
- Construction and maintenance of the communication networks

“UKRKOSMOS” PROJECTS:

Regional TV

“Ukrkosmos” SE Teleport is the modern receiver and transmitter complex equipped with hardware manufactured by the leading producers of broadcasting equipment. The teleport consists of:

- satellite TV and radio broadcasting center,
- broadcast television complex,
- VSAT network control center,
- Internet broadcasting center,
- Complex of the technical means for maintenance and communications.

MPEG-4 broadcasting

“Ukrkosmos” has established the first stage of a primary digital satellite distribution network. The ground CPCIO segment comprises: 2 transmission and receiving complexes of the technical means in Kyiv; 41 satellite receiving stations (SRS) in the territory of oblast radio and television transmission centers (ORTTC), including remote locations in the Zakarpatska region; 4 satellite receiving stations in the city of Moscow and Minsk (in the territory of embassies and representative offices of Ukraine); receiving network of the cable television operators across all Ukraine (more than 200 terminals).

Internet broadcasting

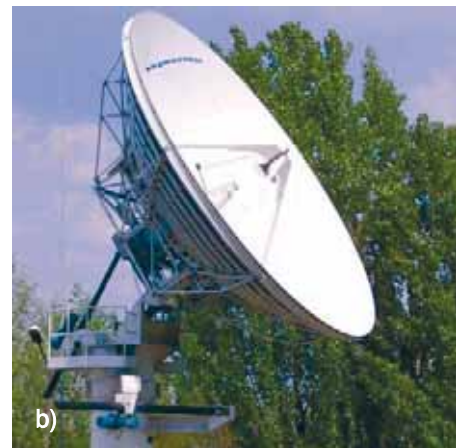
“Ukrkosmos” provides simultaneous transmission of audio and video programs and digital data to an unlimited number of computers via global network of Internet. As of today, “Ukrkosmos” carries on Internet broadcasting of UTN television channel – the "World broadcasting service of Ukraine". Internet diagram: the channel broadcasting consists of three servers that are geographically located in New York, London, and Kyiv. Internet broadcasting is an ideal solution for provision of information about the country to the world, most important information about the world – to Ukraine, as well as educational information for the educational institutions, organization of the distance learning and training, etc.

VSAT networks:

“Ukrkosmos” offers construction of corporate and departmental networks on the basis of the existing HUB-station of own teleport for the companies, which require uninterrupted communication with their operational branches in other cities of Ukraine or in other countries. In such a case, each branch shall be equipped with VSAT satellite station (Very Small Aperture Terminal). “Ukrkosmos” provides the services of satellite communication and broadcasting, which may become the solid basis for the cooperation with Canadian broadcasting companies engaged in the international broadcasting and demanding extension of their broadcasting to the territory of Ukraine.

PARTNERING OPPORTUNITIES

“Ukrkosmos” expresses its interest in the cooperation with Canadian satellite operators and cable network operators in the field of supporting presence of the Ukrainian international broadcasting channels in Canadian satellite digital packages and in the cable network packages. The enterprise is also interested in mutually advantageous cooperation with the Canadian companies - manufacturers of the telecommunication equipment.



a) Complex of transmitter-receiver antenna

b) Transmitting satellite antenna (Up-Link)

c) Construction of the satellite transmitting antenna (Up-Link)

“YUZHNOYE” STATE DESIGN OFFICE STATE ENTERPRISE

**DNIPROPETROVSK
UKRAINE**

Stanislav Konyukhov
Chief Designer,
Director General of the State Enterprise
Yuzhnoye State Design Office

Kryvorizka str., 3
Dnipropetrovsk,
Ukraine, 49008,

Tel. 38 (056) 770 04 47;
fax: 38 (056) 770 01 25;
e-mail: info@yuzhnoye.com,
space@yuzhnoye.com;
www.yuzhnoye.com

The State Enterprise “Yuzhnoye” State Design Office was founded in 1954 for development of ballistic missiles whose full-scale production was implemented at the Yuzhny machine-building plant. The experience gained in creation of combat missile complexes allowed the setting up of powerful research and engineering facilities, which eventually produced unique and world-class technologies and products for space and civilian applications.

The “Yuzhnoye” State Design Office together with Yuzhny machine-building plant developed 13 combat missile systems, 7 space missile systems, more than 70 types of space devices, about 50 types of rocket engines and propulsion installations for different purposes, more than 50 new materials and technologies. Joint work of the Yuzhnoye State Design Office and Yuzhny machine-building plant implemented more than 900 launch vehicle operations, more than 400 orbital injections for astrophysical observations, global research, remote sensing of the Earth and the World’s Oceans as well as for national security purposes.

PRIMARY SCIENTIFIC DIRECTIONS

Development of the following types of space sector products and provision of the following services:

- system design and development of missile space systems of ground, sea and air basing
- system design and development of missile carriers
- development of combat missile systems
- development of space devices for remote sensing of the Earth, space devices for research purposes
- development of solid propellant and liquid engines and propulsion systems
- providing launch services using missile carriers of the series “Zenit”, “Dnepr” and “Cyclone”
- development of products for national economy purposes
- development and commercialization of innovative technologies for various purposes including wind-powered generating plants, water desalinating plants, vaporization machinery for processing of industrial and liquid nuclear wastes, steam generators and others
- test performance such as strength, pneumohydraulic, electric, climatic, radiofrequency and other tests
- firing and bench tests of engines
- development of new materials and technologies
- conducting calculation-theoretical works on ballistic strength thermodynamics etc

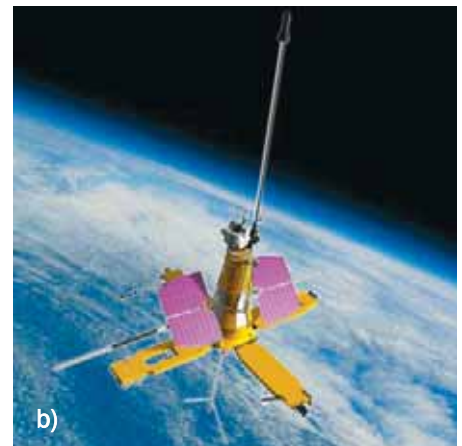
The State Enterprise “Yuzhnoye” State Design Office is working on the creation of the national geostationary systems for communication satellite designed to provide services of regional and national television and broadcasting, Internet and telephone services. New launch vehicles of the “Mayak” family are currently under development. They rationally combine the advantages of economic efficiency and easy operation. Aviation space launch vehicles are also under development.

PARTNERING OPPORTUNITIES

The State Enterprise “Yuzhnoye” State Design Office is interested in cooperation with foreign organizations in the following spheres:

- Provision of launch services with different variants of space device injections into the near-earth and geostationary orbits using LVs “Zenit-3SLB”, “Zenit-2SLB”, “Zenit -3SL”, „Cyclone-4”, „Dnepr”.
- Joint development and development by orders of rocket and space complexes for civil and military purposes.
- Joint development and development by orders including operation of space systems for scientific researches of the Earth, the World Ocean, space, remote sensing of the Earth and provision of telecommunication services.
- Development of space systems on “turnkey’ basis (providing launch services, training and other related services).
- Development of systems and units of rocket and space engineering, new materials and technologies for creation of rocket and space devices (explosion welding).
- Cooperation in the sphere of creation of solid and liquid propellant engines and propulsion systems.
- Cooperation in the sphere of development, creation and commercialization of innovative technologies for different purposes.
- Cooperation in the sphere of space research and resolution of scientific and research problems.
- Military engineering cooperation in creation of rocket technologies within MTCR.
- Cooperation in the sphere of new technologies of power engineering and other technologies for civil purposes (injection of radioactive wastes into space, solar power engineering and wind power engineering etc.).
- Provision of services on experimental basis (firing and bench tests of engines, strength tests and others).
- Cooperation in the sphere of education and training of specialists in the field of rocket and space industry.

The State Enterprise “Yuzhnoye” State Design Office is involved in numerous international programs and projects such as “Sea Launch” (USA, Russia, Ukraine, Norway), “Dnepr” (Ukraine, Russia), “Land Launch” (Ukraine, Russia, USA), “Cyclone-4” (Ukraine, Brazil), “Vega” (EU, Ukraine), “Taurus-2” (USA, Ukraine) etc.



a) Cyclone-2 Launch Vehicle

b) Sich-1M satellite

c) Sea Launch

UKRAINIAN AEROSPACE AND AVIATION MARKET OVERVIEW

UKRAINE'S COOPERATION WITH OTHER COUNTRIES OF THE WORLD

Aviation industry projects

Ukraine has concluded the intergovernmental cooperation agreements with Germany, France, Russia, China, Belarus, Poland, Vietnam, Turkey, Israel and many other countries. It ensures state support for industrial cooperation in the field of advanced technologies.

The main projects in the aviation industry of Ukraine are the programs for manufacturing the aircrafts: An-148, An-140, An-74, An-70, manufacturing resumption of An-124-100 («RUSLAN»), modernization of the operating fleet of "Antonov" cargo aircrafts.

The domestic market of Ukraine consumes from 5 to 10 % of products from the aviation enterprises. The other products are delivered to foreign customers and partners. It also establishes out-of-Ukraine aviation manufacturing (Russia: the Voronezh joint-stock aircraft constructing company (An-148), Samara aircraft plant "Aviakor" (An-140), Ulyanovsk aircraft plant "Aviastar" (An-124), Omsk aircraft plant (An-70), Iran: Aircraft company HESA (An-140), China: AVIC (Y-7, MA60 and MA600)), etc.

Customers requirements dictate the preparation of the various modifications of the base aircraft versions.

Space industry projects

THE STRUCTURE OF SPACE INDUSTRY OF UKRAINE IS COMPOSED OF GOAL-ORIENTED SPACE PROGRAMS:

- Scientific space research
- Remote sensing of the Earth
- Satellite telecommunication systems
- Development of the ground-based infrastructure for navigation and special information system
- Space activities in the interests of national security and defence
- Space complexes
- Development of base elements and advanced space technologies
- Development of research, test and production base of the space sector

Integration with the EU is driving the strategic developments in the space sector in Ukraine. Basic aspects of cooperation with the EU include:

1. Development of joint projects aimed at restructuring the Ukrainian space industry in the context of cooperation in the field of high technology and industrial conversion
2. Development of Global Navigation Satellite systems
3. Development of Cooperation in space science, life sciences and micro gravitation, earth exploration from space
4. Exchange of information on Earth remote sensing in case of emergency

5. Providing data on monitoring of space environment and seismic observations
6. Data sharing received from space crafts of Ukraine and those of other EU countries, and the exchange of data received from man-made satellites

Currently “Yuzhnoye” SDO and “Yuzhny” machine-building plant, which is the Ukrainian national manufacturer of space rocket equipment, is concentrated on realization of the “Cyclone-4” project. Universal “Cyclone-4” booster rocket is also intended for operational high-precision putting of the space apparatus into low circular, sun synchronous and high elliptical (including transfer-to-geostationary) orbits. During the development of this project the main aim was posed: to develop the “export oriented” (for utilization from foreign cosmodromes) space rocket system (SRS) on the base of “Cyclone-3” LV, but with new “Ros-1” control system. Nevertheless in practice the upgrading of the system moves forward to a great extent. Now the “Cyclone-4” is not only most modern and perfect, but also most powerful LV in its family. The booster rocket obtained new RD-861Zh liquid-propellant rocket engine (LPRE) for III stage with possibility of multiple (up to 5 times) launch and increased thrust (7,796 kgf), more fuel quantity in tanks of III stage, fairing (useful load compartment) of new design. A number of other important improvements in design and onboard equipment of LV has been carried also.

One more branch of the “Cyclone” family may be considered with a good reason the “Dnepr” system. “Symbolically light” silo launching “Dnepr” LV is the result of conversion of heavy P-36M ICBM (SS-18 Satan, which is well-known as RS-20A and 15A14). nose cone”) from the working orbit after separation of all space equipment.

“Dnepr” LV has very high accuracy of putting of the payload into the scheduled orbit. By orbit altitude it is equal to ± 4.0 km (2.5 miles), by inclination ± 2.4 angl.min (0.04 deg) and by right ascension ± 3 angl.min (0.05 deg). Its flight reliability is also high and is equal to 97 % according to the statistics of launches of R-36M, R-36M UTKh (RS-20B) and “Voyevoda” R-36M2 (RS-20B) ICBM. As regards the “Dnepr” LV namely, 11 from 12 of its launches during 1999 – 2008 were carried out absolutely successfully. One more unique feature of this LV is possibility of “cluster” launch of satellites: up to 10 at the same time (not counting the micro-satellites attached not to the suspension points of space nose cone, but to the “mother’s” satellites. Adaptation of the carrier for simultaneous putting into orbit of 20 and even 36 AES is possible, if necessary.

At present time the “personal satellite record” (which at the same time is, obviously, also world record in this field) of “Dnepr” LV is 14 satellites per one launch (on April 17, 2007 it was successfully put into orbit such satellites as Egyptsat-1, Saudisat-3, five satellites of Saudicomsat family and seven research micro-satellites developed in different universities of the world.

For the first time in history in June 2004 it was carried out the precise launching of the group of satellites (DEMETER and some of mini-AES) into the solar-synchronous orbit with the “Dnepr” LV. This event has wide response among the users and operators of launch service market and permits to enlarge the circle of users interested in the LV. Three years later, in June 2007, it was the first launch of the “Dnepr” modification with elon-

UKRAINIAN AEROSPACE AND AVIATION MARKET OVERVIEW

gated fairing which was developed by the “Yuzhnoye” SDO and manufactured by the “Yuzhny” machine-building plant by the order of “Kosmotras” company for launching of large dimensions space apparatus (length more than 5 m and diameter up to 2.7 m): the German AES TerraSAR-X was successfully launched into the solar-synchronous orbit from the Baykonur cosmodrome. And last for the time being launch of “Dnepr” LV was carried out on October 1, 2008; on this day Ukrainian-Russian rocket successfully put into orbit the Thailand THEOS Earth remote sensing satellite.

The Ukrainian space rocket family includes also “Zenit-2” middle class space LV, some versions of the “Zenit-3” (also middle class) used in frames of «Sea Launch» and «Land Launch» programs, and a number of projects of aerial LV launches.

Brazil is one of the major partners of Ukraine in the field of space recently. The developed international-legal base for realization of the joint project on development of the launch vehicle “Cyclone-4” at Alcantara Launching Center has been established. In 2004, realization of “Cyclone-4” program came into a practical phase. Realization of this large-scale project is a priority for the subsequent development of the space industry of Ukraine as it will allow developing a launching center for Ukrainian launch-vehicle at the space port that has a favorable geographical position. The negotiations with Brazil concerning cooperation under the other joint projects, including development of the space system of the Earth remote sensing, modernization of Brazilian launch-vehicle VLS, implementation of scientific projects have begun.

Priority areas of cooperation with the Russian Federation include fulfillment of works under the joint projects of space-rocket systems development, conducting of scientific researches and experiments, and also works in the field of satellite navigation.

The Framework agreement in the exploration and peaceful use of outer space has been signed between the Government of Ukraine and the Government of the United States of America. The agreement has established legal basis for cooperation development between the both Ukrainian and American enterprises and the companies in the field of space.

Cooperation of Ukraine with China is carried out on the basis of the inter-governmental working agreement on the exploration and peaceful use of outer space, dated 04.12.1995 and the Plan of Ukrainian-Chinese cooperation for 2006-2010. The plan contains 29 long-term Ukrainian-Chinese projects on the joint development of space engineering, realization of scientific programs, in particular, creation of monitoring grouping of earthquakes and studying of the „space weather”, development of remote-sensing instruments of the Earth.

In the past years the cooperation in the field of space with the Arabian Republic of Egypt, Republic of Korea, India, Turkey and other countries has quickened. In particular, there has been signed the Agreement between the Government of Ukraine and the Government of India on cooperation in the exploration and peaceful use of outer space. These frameworks foresee the joint projects implementation in development of the elements of space-rocket engineering.

Cooperation with Canada in the S&T area

Cooperation with Canada in the field of industrial production is limited due

to the lack of cooperative history between Ukrainian and Canadian enterprises. Utilization of the different technical standards is not an obstacle in cooperation for Ukrainian enterprises. In the last 15 years they have acquired experience in fulfillment of the works and industrial orders under the technical projects of foreign customers.

At the same time, there is a basis for development of industrial cooperation in manufacturing of the aircrafts and engines as the share of Ukrainian enterprises in production of such products does not exceed 50%. It gives the chance to optimize a choice for control systems, constructional materials, communication networks, elements of avionics and to involve the Canadian companies in solving of such issues.

The possibility of the joint technical training, certification and advancement of "Antonov" aircrafts on the North - American market provides a special interest to Ukraine.

Ukraine possesses capabilities for elaboration of scientific principles for development of new technologies in the field of new materials, optoelectronics, processing of materials, energy transformation, and use of electromagnetic fields. It is reasonable to restore the closed cycle of development and practical use of intellectual production in the industry. Such projects can be the most effective in the field of aviation and space industry.

The Ukrainian coordinator for such projects in the aviation industry can be JSC Ukrainian Research Institute of Aviation Technologies.

Ukrkosmos was established in 1996 for implementation of integrated technical policy in satellite technologies, creation of and operation by Integrated Satellite System for Information Transfer (YSSPI), and acting as a customer and co-ordinator of related works. The job of high priority for Ukrkosmos is providing with appropriate YSSPI resources for the needs of special and governmental communication systems. Ukrkosmos State Enterprise is a Ukrainian participant for the Exploitation Agreements of INTELSAT and INMARSAT international organizations.

Science & Technology Centre of Ukraine (STCU). Through its primary mission of non-proliferation of WMD (weapons of mass destruction) expertise, the STCU has compiled a treasure trove of experience and knowledge about many highly talented scientists and their technologies in Azerbaijan, Georgia, Moldova, Ukraine, and Uzbekistan. The Centre is ideally positioned to match this unexploited supply of scientific and technical expertise to meet your commercial or non-commercial needs. The STCU, itself, is a well-established, multilateral organization with over 12 years of operational experience that can help steer you through the uncertainties of the business and investment environments in these emerging economies. The STCU has:

- Legal status, diplomatic accreditation, tax and custom exceptions for financed projects and activities, all guaranteed under the intergovernmental agreement establishing the STCU;
- Proven experience in project management; in over 1175 research projects totaling approximately \$168 million USD
- Over 180 private sector and governmental agencies which have joined the STCU's Partnership program to finance their own, tailored S&T projects (totaling more than \$59 million USD) through the STCU

UKRAINIAN AEROSPACE AND AVIATION MARKET OVERVIEW

The STCU's staff of professionals is experienced in working with industry and business representatives, including protecting their business-sensitive information and interests. In this way, the STCU can serve as a trustworthy and cost effective bridge to the yet-to-be tapped opportunities for contract research and technology development in Azerbaijan, Georgia, Moldova, Ukraine, and Uzbekistan.

MAJOR OPPORTUNITIES FOR CANADIAN, EUROPEAN UNION AND US COMPANIES

The major opportunities lie in the following areas:

- production expertise outsourcing
- joint production of components for aircraft industry
- joint space projects
- remote sensing and earth observation
- space materials science
- satellite systems
- export of avionics, simulators and aircraft systems
- composite materials

IMPORT REGULATIONS OF THE AVIATION AND SPACE INDUSTRY, CERTIFICATION, STANDARDS

The functioning of export control system of Ukraine is based on the national legislation of Ukraine and also on international agreement and arrangements in the sphere of non-proliferation of the weapons of mass destruction and conventional arms.

Ukraine is member of such international regimes of export control as Wassenaar Arrangement (control over international transfers of conventional arms and dual-use goods and technologies), Nuclear Suppliers Group, Missile Technology Control Regime. Besides, Ukraine adheres to the requirements and principles of Australia Group.

The realization of international transfers of goods, technologies and services subject to export control, is authorized under condition of reception by the subject of foreign trade activities the power to realize export and import of the military goods and permission for export, import and transit of the goods subject to export control. This subject of foreign trade activities shall give the information on end-use of the exported goods, technologies or services (International Import Certificate, End-user Certificate), in which the importer undertakes to use the received goods, service or technology only for the stated destination/In specific cases is carried out a pre-licensing inspection (that is before issuing permission) check and an inspection of delivery, and also an inspection of use of the goods, technologies or services imported from Ukraine for stated purposes.

Acting national and branch standards in the aviation and space industry of Ukraine are harmonized with the relevant standards of the Russian Federation.

The new Ukrainian aircrafts have to obtain the Type Certificate of Aviation register of the CIS Intergovernmental aviation committee confirming the total conformity of the aircraft with the demands of AP-25 Air regulations (which is harmonized with CS-25 European standards).

Aviation Committee Aviation Register (IAC AR) is responsible for certification for granting authorization to develop civil aviation aircraft to Ukrainian aircraft enterprises.

Ministry for Industrial Policy Certification is responsible for certification for aviation and military production to enterprises in Ukraine.

State Aviation Administration of Ukraine is responsible for certification for aircrafts to flight using in Ukraine.

National Space Agency of Ukraine is responsible for certification for granting authorization to develop spacecraft and spacecraft production in Ukraine.

Recent aerospace legislation - The Parliament of Ukraine recently passed a Law on Space making the industry top priority for this country. This means that the financing and guarantees for the relevant Government programs will be secured. In order to prepare for the EURO 2012 football tournament Ukraine needs to build its own communication satellite and a lot of resources will be allocated towards this project and well as modernisation of the ground satellite navigation infrastructure.

MAJOR TRADE PROMOTION EVENT

International Aerospace Salon "AviaSvit-XXI", Kyiv 2010

(<http://www.aviasvit.com.ua/en/about.php>)

- Exposition of modern aviation and space machinery, units and components, airport equipment and services, technological processes, equipment and materials for machine-building;
- Practical scientific conferences and seminars on vital aviation and space topics, science-absorbing machine-building issues, business meetings and round tables with participation of executives and representatives of state and commercial organizations, scientific institutions from Ukraine and abroad;
- Demonstration flights of aircraft, press conferences for journalists, presentations of exhibiting companies, show programmes;
- Expositions of enterprises, aviation show with demonstration flights of airplanes, gliders and other aircraft, press conferences and companies' presentations, excursions, business and cultural programmes. Modern samples of machinery and technology, retro aircraft and functioning models of airplanes;
- Scientific and technical symposiums and conferences, seminars and creative discussions, where tendencies and development trends of aviation and aeronautics in the XXI century are defined;
- The most trustworthy information at first hand about Ukrainian manufacturers and products for foreign partners.

CONTACT INFORMATION:

CONTACT INFORMATION:

National Space Agency of Ukraine

Oleksandr Zinchenko
General Director
8 Moskovska St.
01010 Kyiv, Ukraine
Tel: +38 044 281-6200
Fax: +38 044 281-6209
zinchenko@nkau.gov.ua
www.nkau.gov.ua

Antonov Aeronautical Scientific/Technical Complex

Dmytro Kiva
General Designer
1, Tupolev st.,
03062, Kyiv, Ukraine
Tel.: (+380 44) 454 31 49
Fax: (+380 44) 400 81 44
info@antonov.com
www.antonov.com

AVIANT Kyiv Aviation Plant

Valery Kozorezov
General Director
100/1 Peremohy Av.,
03062, Kyiv, Ukraine
Tel.: +380 44 454 52 01
Fax.: +380 44 442 62 13
info@aviant.ua
www.aviant.ua

Motor Sich Joint Stock Company

Vyacheslav Boguslayev
Chairman of the Board of Directors
15, 8th of March St.,
Zaporizhyya, 69068, Ukraine
Tel: +38(061) 720-47-77
Fax: +38 (061) 720-50-00
motor@motor.comint.net
www.motorsich.com

Production Association "Yuzhny Machine-Building Plant" ("Yuzhmash")

Victor Shchyogol
General Director
1, Krivorizka St., Dnipropetrovsk,
49008, Ukraine
Tel.: 380 (44) 469-3519
Fax.: 380 (562) 343904
www.yuzhmash.com

State Design Office "Yuzhnoye" (in Ukrainian: "Pivdenne")

Stanislav Konyukhov

General Director
3, Krivorizka St., Dnipropetrovsk,
49008, Ukraine
Tel.: 380 (562) 420-022
Fax.: 380 (56) 770-0125
info@yuzhnoye.com
www.yuzhnoye.com

Kharkiv State Aircraft Manufacturing Enterprise

Anatoly Mialitsa

General Director
134, Sumska Str,
Kharkiv, 61023, Ukraine
Tel.: +38 (057) 700-34-39
Fax: +38 (057) 707-08-34
Info@ksamc.com
www.ksamc.com

"FED" Joint Stock Company

Aleksandr Zhdanov
President
132 Sumskaya Str.
Kharkiv, 61023, Ukraine
Tel.: 38 (0572) 40-22-01
Fax.: 38 (0572) 43-51-90
root@fed.tikom.net
www.fed.kharkov.ua

Ukrainian Aviation Research Institute

Grigory Kryvov
Chairman of the Board
Tel.: 380 (44) 417-5046
Fax.: 380 (44) 417-3048

Konotop Aircraft Repair Plant "Aviacon" (Concern AviaVoenRemont)

Oleg Yenin
Director
Tel: (+38 044) 502 6223
Fax.: (+38 044) 502 6201
27/6 Sholudenko St.
04116 Kyiv, Ukraine
www.kavr.com.ua

Research Institute "Kvant"

5 Dimitrov St.,
Kyiv, 03150, Ukraine
Tel.: 380 (44) 227-4056
Fax: 380 (44) 227-3257, 220-9351

State Corporation "Vektor"

Leonid Zvorykin
General Director
19-21 Frunze St.
04080 Kyiv, Ukraine
Tel: +38 044 462-5367
Fax: +38 044 462-5364
vektor@dgtel.com.ua

USEFUL INDUSTRY WEB SITES:

Science & Technology Centre of Ukraine –	www.stcu.int
National Space Agency of Ukraine –	www.nkau.gov.ua
Antonov –	www.antonov.com
National Aviation University of Ukraine –	www.nau.edu.ua/en
Ministry of Transport of Ukraine –	www.mintrans.gov.ua
Ministry of Industrial Policy of Ukraine –	www.industry.kmu.gov.ua
State Aviation Administration of Ukraine –	www.avia.gov.ua
Ukrainian aerospace portal –	www.space.com.ua
Association of Civil Aviation Industry Support – (<i>Russian language</i>)	www.asavia.org
Design Office “Yuzhnoye” –	www.yuzhnoye.com
Konotop Aviation Repair Plant “Aviakon” of Concern AviaVoenRemont –	www.kavr.com.ua

CONTACT INFORMATION:

*Science & Technology Center
in Ukraine Headquarters
7a Metalistiv Street
Kyiv 03057, Ukraine
Tel.: +380-44-490-7150
Fax: +380-44-490-7145
e-mail: stcu@stcu.int
website: www.stcu.int*

STCU SECRETARIAT

Andrew A. Hood
Executive Director (USA)
e-mail: andrew.hood@stcu.int

Igor Lytvynov
Senior Deputy Executive Director
(Ukraine)
e-mail: igor.lytvynov@stcu.int

Landis Henry
Deputy Executive Director (Canada)
e-mail: landis.henry@stcu.int

Michel Zayet
Deputy Executive Director
(European Union)
e-mail: michel.zayet@stcu.int

Victor Korsun
Deputy Executive Director (USA)
e-mail: vic.korsun@stcu.int

Curtis "B.J." Bjelajac
Chief Financial Officer (USA)
e-mail: curtis.bjelajac@stcu.int

David Cleave
Chief Administrative Officer
(European Union)
e-mail: david.cleave@stcu.int

STCU Funding Parties:

CANADA

Andrew Shore
Global Partnership Program
Foreign Affaires Canada
Board Member
125 Sussex Dr.,
Ottawa, ON, Canada,
K1A 0G2
e-mail: andrew.shore@international.gc.ca

Contact person at the Canadian Government

Sabine Hey
Senior Program Manager
Redirection of Former Weapons Scientists
Global Partnership Program
Foreign Affaires Canada
125 Sussex Dr.,
Ottawa, ON, Canada, K1A 0G2
Tel: +1-613-944-2429,
Fax: +1-613-944-1130
e-mail: sabine.hey@international.gc.ca

EUROPEAN UNION

Anneli Pauli
Board Member (Chairperson)
Deputy Director-General,
DG RTD European Commission
SDME 2/123 B-1049
Brussels, Belgium
e-mail: Anneli.PAULI@ec.europa.eu

Contact person at the European Commission

Robert Burmanjer
Head of Unit RTD D3
International Scientific Cooperation Policy
Directorate General for Research
European Commission
Brussels, Belgium
Tel.: +32-2-296-8944,
Fax: +32-2-296-6252
e-mail: robert.burmanjer@ec.europa.eu

UKRAINE

Yaroslav Yatskiv
Board Member, Academician
National Academy of Sciences of Ukraine
54 Volodymyrska Street
Kyiv, 01030, Ukraine
Tel.: +38-044-239-6567,
Fax: +38-044-234-6387

USA

Contact person at the US Government

Charles Jacobini
ISN/CTR - Room 3327
United States Department of State
2201 C Street, N.W.
Washington, DC 20520
Tel: +1-202-736-7137
Fax: +1-202-736-7698
e-mail: JacobiniCB@state.gov

NATIONAL SPACE AGENCY OF UKRAINE

Eduard Kuznietsov
Deputy Director General
8 Moskovska str.,
Kyiv, Ukraine 01010
Tel. +38-044-281-6200
e-mail: yd@nkau.gov.ua

Volodymyr Fedotov

Deputy Director of International Relations
and European Integration Department
8 Moskovska str.,
Kyiv, Ukraine 01010
Tel. +38-044-281-6281
e-mail: fedotov@nkau.gov.ua

EMBASSY OF CANADA

Michael Reshitnyk
Commercial Counsellor
Embassy of Canada
31 Yaroslaviv Val Street,
Kyiv, Ukraine 01901
Tel. +38-044-590-3100
Fax: +38-044-590-3157
e-mail: michael.reshitnyk@international.gc.ca

Yury Mardak

Trade Commissioner
Embassy of Canada
31 Yaroslaviv Val Street,
Kyiv, Ukraine 01901
Tel. +38-044-590-3100
Fax: +38-044-590-3157
e-mail: yury.mardak@international.gc.ca

