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OMINENT RESEARCHERS OF SPACE ERA

The formation and development of cosmonautics in works and scientific projects of prominent researchers of theory and of mastering of circumterrestrial space is lighted in the article. A contribution of native and foreign scientists in the branch of missile technology and their influence on forming of modern space technologies is analyzed here.

One of the greatest achievements of scientific and technological progress in the last century the creation of automated and manned rocket and space systems, which successful launches ied man to overcome Earth's gravity, to get into open space and to set foot on the Moon. The evements of science and technology which are underlying of these bold projects, advanced the when, the founder of Astronautics, an outstanding Russian scientist Konstantyn Tsiolkovsky icted, "... mankind will go beyond the bounds of their planet and begin to develop close and t objects of outer space ...".

This year is rich on prominent dates in history of cosmonautics. In January, 105 years since birth of Sergei Korolev - academician, chief designer of the first rockets-vehicle and manned is celebrated. In June, the scientific community celebrated 115 years since the birth of Yuri iratyuk (Alexander Sharheya), native engineer, researcher, pioneer of astronautics. His «star » opened a way to the realization of one of the boldest ideas of humanity, which was embodied American astronauts - Flight to the Moon. 125 years ago was born a talented designer Frederick der who worked on the first jet reactive engines. 55 years ago, in October, 1957, the first icial satellite (FAS) was placed in a circumterrestrial orbit, the start of which put the beginning actical researching of space.

The way of humanity from fantastic descriptions of space trips to the real embodiment of bold s was protracted and difficult. Although the detailed and systematic research of space began paratively recently (for the point of counting out may be chosen the start of first FAS), however ory of studying space, beginning from the first observations of star sky by an old man lasts for millenniums.

For the development of space particularly important and crucial moment was when, after thy discussions about the possible ways of practical embodiment of idea of interplanetary ecting, scientists and designers came to the idea, that to overcome the force of gravity is ible only on rocket engine which will work on reactive basis. Therefore, the development of onautics and rocketry can outline the following steps: researches of Jet Propulsion by ancient ntists; the usage of powder rockets in military affairs; projects of first aircraft for space flights; oretical substantiation of usage of resources of Jet Propulsion; experiments with the first jet ket engines; the first controlled rocket-propelled ballistic missiles; launch of the first artificial th satellite and the beginning of systematic researching of space by automated spaceships; ts of manned space vehicles and systems.

On each of these stages successes were achieved due to hard work of researchers and gners from different countries.

One of the first mentions about reactive devices is dated by the IV item B.C. Greek Arkhitas ntskiy described a wooden bird which was planned to move using a steam reactive stream ch followed from him. Jet engine in the book "Pneumatics" was considered by Heron of xandria. First gunpowder reactive rockets (and more precisely, gunpowder primers) were known Old China. The Chinese warriors applied darts, charged with gunpowder, which flew and burst, also gunpowder rockets for fireworks. In Middle Ages such devices were met in the countries Asia, Africa and Europe.

Mentions about similar devices with "unknown mixture" were found in the times of K
Rus. About in 1250 Mark Greek described the missiles of different countries in the "Book of F
In 1379 the Italian Murtori first used the word "rocket". Zaporozhian Cossacks at the beginn
the XVI century used "rourke" which flew and hit the target, bursted. By such arrows, stuffed
the gunpowder of own production, they defended their fortifications.

From the end of the XVII century in Europe and Russia various rockets were widely use
fireworks, for the guiding of which the special establishments were created. It is known that
students of the Kiev Mohyla academy started fireworks.

Lieutenant-General of the Russian army artillery Konstantin Konstantinov in 1847 desig
missile ballistic pendulum, at which examined the dependence of change of moving forces of
on time, and the influence of shape and design of rockets on its ballistic properties. The invent
created a missile flight range of up to 5 km. From 1867 year he managed the Mykolaiv
factory.

Among the designers of artillery rockets we should remember our countryman, Lieuten
General Alexander Zasyadko, who was born in the village Lyutenka Hadiach County of P
province, served in the army of Alexander Suvorov. O. Zasyadko constructed missiles of
calibers: 4 -, 2 - and 2.5 - inch, which in range of flight did not yield to European.

In 1881 the project of aircraft for motion of which there was not necessary in atmosphere
offered by Mykola Kibal'chich, which was born in a town Korop of the Chernigiv region. In
M. Kybalchych was imprisoned as a member of the attempted assassination of Alexander II
Kybalchych was accused of making four casting shells for an attempt on March 1. On the wa
the cell researcher whom the prosecutor called "the great specialists and talented inventor," pa
a design of an aircraft. *Marking the contribution of* scientist in the rocketing, a crater on the M
was called by his name.

For practical realization of numerous projects of reactive aircrafts, which appeared in
second half of the XX century, it was necessary to perform the detailed calculations of both de
and the conditions and parameters of their motion. One of the first scientists, who probed
theoretical aspects of this question there was Isaac Newton, which in his work "World Syste
described the leading out a body from a surface to the orbit of satellite of Earth by using gi
the necessary speed.

The end of XIX – beginning of XX century was characterized by new tendenc
development studies about reactive movement. The special place in the developme
cosmonautics belongs to the prominent Russian scientist Kostyantynu Tsiolkovskomu.
executed the detailed theoretical researches and one of the first considered the possibility o
use for practical realization of interplanetary flights. In 1903 the scientist published his cla
work "The researching of world spaces with reactive devices". Konstantyn Tsiolkovsky propos
use multi-stage rockets and circumterrestrial space stations and also expounded the prospe
development of humanity and trips in boundless spaces. Works of K.Tsiolkovskogo ma
considerable influence on development of cosmonautics in the whole world.

Upon the first theoreticians-pioneers of cosmonautics an important place takes
Kondratyuk (Oleksandr Shargey), talented engineer and explorer. Oleksandr Shargey was b
Poltava where being a high school student started to work over manuscript "For those who wi
in order to build". He expounded ideas about reactive movement and the use of reactive devic
the space flights. The researcher examines in detail the design of a rocket. Now the sugges
the researcher to use sun energy to get a rocket fuel (unhitching of the water to components)
relevant.

In 1929 scientist at his own expense published the work "The conquest of interpla
spaces", which summarized his researches. When World War II began, Yuri Kondratyuk we
volunteer on front. A prominent researcher perished in February, 1942 on Kryvtsivskiy spring
By the name of famous compatriot was named a crater on-the-surface of the Moon and
minor planets of the Solar system. Yuri Kondratyuk regardless of Konstantyn Tsiolkovsky b
methods showed out basic equation of motion of rocket. A scientist probed the structure of

of fuel for a ramjet, usage gyroscopes for the orientation of space vehicle, extraterrestrial ons and their services, advanced idea of flight to the bodies of Solar system by the special chart, n later will be named the "star route of Kondratyuk". Just after it was carried out the program OLLON", which was developed by the American scientists, and which was completed with out of man on the surface of the Moon.

In one period the time of Kondratyuk our countryman, Georgy Langemak worked as Pioneer cket production. He was born in city Starobilsk of the Kharkiv province. In 1934-1937 Langemak was a deputy chief and main engineer of the Reactive scientifically-research ute. Together with Boris Petropavlovskij Heorhij Langemak was the main designer of jet-iles on a hard fuel, which became basis of creation of shells for the known guards mortars in ears of Great Patriotic war – "Katyush". G. Lanhemak is the author of several publications.

One of the first researchers of Jet Propulsion, who tried to convert the problems of lanetary flights in the plane of their practical implementation, was Frederick Tsander who in chool days checked the calculations of K.Tsiolkovskij and persuaded in the possibility of space s. From 1917 the inventor worked on the questions of flights to other planets, constructing s and rocket equipment, conducted the mathematical calculations of expedition on Mars, d the systems of life-support.

Fridrih Cander specified on the necessity of researching of difficult, inserted one in other -stage) rockets, and also combination of rocket with airplane (equipment of the interplanetary during a start with wings for a flight in an atmosphere and lowering on Earth), usage as the fuel ed out parts of spaceship. In 1931 year began the collaboration of F.Cander with S.Korolev, was created GRJP (group of research of jet propulsion). The first members of the group were der, Korolev, Vetchynkin, Pobedonostsev, Tyhonravov, Fedorenkov, Chernovskyi, okov, Zabotin, Levitsky. Fridrih Tsander headed the group.

The co-ordinator of large group of researchers of jet propulsion and designers of rockets was a nent scientist and organizer Serhij Korolev, who was born in the city Zhytomyr, studied at the polytechnic institute. In 1923 S.Korolev constructed his first glider which was found suitable a construction by the aviation-technical department. In 1932 S.Korolev became the leader of p of research of jet propulsion. In 1946 he became the main designer of ballistic rockets of t action and in 1947 he became the member-correspondent of Academy of artillery sciences. 1954 S.Korolev made a proposition relatively to creation and start of an artificial Earth satellite, h was realized in 3 years, in October 1957. The first satellite was designed as a sphere of mass 6 kg and a diameter of 580 mm and had four antennas with length 2,4-2,9 m. The first satellite d 92 days and made about 1400 turns around the Earth. In 1958, the scientist was elected to be Academician of the Academy of Sciences of the USSR, and since 1959 he was working on an matic station "Luna-1". Huge success and the result of many years of hard work of the team, by scientist, became the launch of the first space shuttle with the first astronaut Yuri Gagarin d in 1961.

Last November was celebrated the 100th anniversary of the birth of Michael Yangel known ist and designer in the field of astronautics. Yangel surname comes from the "young" - ladle, scoop where Cossacks cooked a meal. Yangel's family (grandfather) lived in Chernihivschyna hen moved to eastern Siberia. Here in the village Zyryanov Michael Yangel was born. In 1931 entered the Moscow aviation institute. In 1938 M.K. Yangel went to the USA at personnel esentation for acquaintance with the best aviation examples. After studying at the Academy n the collaboration of M.K. Yangelya and S.P. Koroleva. In 1954 M. Yangel went in business which was lasted for 17 years. He was appointed chief designer of one of the leading design eau (DB) - Mikhail Kuzmich comes to Ukraine, on Pivdenmash. Scientific potential, anizational capabilities, allowed M.K. Yangelyu to convert DB headed by him into the cradle of ideas which was incarnated in practice. Under the direction of M. Yangelya the new space-ket systems were developed. From 1954 to 1971 M.Yangel worked as the main designer of DB denne" which carries his name today. In DB "Pivdenne" and production association denmash" the strategic rockets of military-oriented of "R-12, - 14, - 16" were developed. From

1962 there work on a long term program "Space" started.

Jet engines are the most important components of rocket and space systems. Over the development and improvement many designers were working. Among them, Valentin Glushko who was born in Odessa. Being a schoolboy, he studied works of K.Ciolkovskogo and corresponded with a prominent scientist. Together with the employees V.Glushko was engaged in the selection of effective components of rocket fuel. In 1974 on the base of experimental design bureaus of V.Mishina, successor of S.Koroleva and V.Glushka, other scientific and production organizations, research and production association "Energy" was established. Valentine Glushko became a leader and general designer. Research assistants of "Energy" carried out projects "Soyuz – "Apollon", it was placed on the orbit the station "Salute" of the second generation. The controlled ship "Soyuz – TM", pilotless "Progress". The biggest achievement was a creation rocket-transmitter "Energy" and ship of multiple-use "Buran". The birth of this new rocket-space system is associated with the name of its chief designer V.Hlushko. The main designers of rockets and engines were Sergij Korolev and Valentine Glushko. The collaboration of prominent scientists lasted many years.

A reasonable part in development of the space system engineering played Volodymyr Chelomej, who was born in a teacher-family, graduated from the Kyiv Institute of Aviation, postgraduate course of the Academy of Sciences (1939). And already in 1940 25-years-old scientist entered to special doctorate in personnel of the 50 best candidates of sciences from all republics. From 1941 Volodymyr Chelomej worked in the Central institute of aviation motor construction. In 1945 a rocket "10 X" was tested which was started from the airplane of "Pe-8". On this wing-rocket was tested the first pulsating ramjet constructed by V.Chelomej. During 1945-1954 under the direction of V.Chelomej a few types of wing-rockets were created. His idea of opening of wings in the air has been widely used in a rocket technique. In 1959 the scientist was appointed a chief designer. In his DB was created a rocket-carrier "Proton" and research stations "Proton".

Except of separate talented researchers, payment of Ukraine to the matter of mastering space is determined by the concrete projects of designer bureau "South" which was created in Dnipropetrovsk in 1954 as one of main enterprises of the USSR in production of strategic missile rockets, and afterwards space systems. M.Yangel was the first general designer of DB "Pivdenne". During more than forty-year activity in DB "Pivdenne" were created 26 space vehicles "Space" – "Interkosmos" for researching Galaxy; a 21 space vehicle is for researching Sun; more than 70 space vehicles for researching planet Earth and circumterrestrial space; 11 space vehicles and more were pertaining to national economy.

The national contribution to the space mastering is not limited with important achievements of theorists and designers. Many representatives of numerous detachments of cosmonauts are our countrymen (see a table 1).

The Ukrainian researchers are in detachment of astronauts

Name astronaut	Place of birth	Name of spaceship	Year of fligh:
Popovych P.	v.Uzyn Kyivskiy region	"Vostok-4" "Soyuz-14"-"Salyut-3"	1962 1974
Beregovyj G.	v. Fedorivka Poltavskiy region	"Soyuz-3"	1968
Shonin G.	c.Rovenki Luganskiy region	"Soyuz-6"	1969
Dobrovolskyj G.	c. Odesa	"Soyuz-11"-"Saluyt"	1971
Zholobov B.	v. Zburivka Khersonskiy region	"Soyuz-21"-"Saluyt-5"	1976
Lyakhov V.	c. Antratsyt Luganskiy region	"Soyuz-32"-"Saluyt-6" "Soyuz T-9"-"Saluyt-7" "Soyuz TM-6"	1979 1983 1988

opov L.	c. Oleksandriya Kirovogradskiy region	"Soyuz-35"-"Saluyt-6" "Soyuz-40"-"Saluyt-6"	1980 1981
yzym L.	c. Krasnyj Lyman Donetsky region	"Soyuz T-3"-"Saluyt-6" "Soyuz T-10" "Soyuz T-15"	1980 1984 1986
olkov O.	c.Gorlivka Donetskiy region	"Soyuz T-14"-"Saluyt-7" "Soyuz TM-7"-"MIR" "Soyuz TM-13"-"MIR"	1985 1988-89 1991-92
rsebarskiy A.	v. Prosyana Dnipropetrovskiy region	"Soyuz TM-12"	1991
alenchenko Y.	v. Pavlivka Kirivigradskiy region	"Soyuz TM-19"	1994
adenyuk L.	v. Klishkivtsi Chernivetskiy region	"Kolumbia"	1997

Among the most essential flights with participation of native astronauts it is possible to mark ight with Leonid Kadenyuk in composition of a crew "Colombia", who together with the erican and Japanese astronauts during 16 days was on an orbit, conducting experiments.

After a historical overview of the history of space exploration, we can conclude that the elopment of this branch of science and technology required and will require association of siderable efforts of a large cohort of scientists and engineers from different countries, among ch an important role always played Ukrainian researchers. And our state has powerful scientific technological potential, which is necessary for further effective research and mastering of ce. and occupies an important place in the association of space countries of the world.

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