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Chapter 10

The History of the Beginning of the Russian Plesetsk Cosmodrome*

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There are three main dates in the history of the beginning and the founding of the Plesetsk cosmodrome, each of which may more or less be considered as the birthday of the cosmodrome.

On January 11, 1957, the Soviet Government passed a resolution regarding the founding of a special military facility with the secret name “Angara,” which later became known as the Plesetsk cosmodrome. This secret facility had to be situated in the Plesetsk region of the Archangelsk territory. It was named after the Plesetsk railway station and the town of Plesetsk.

The first Soviet combat formation of R-7 intercontinental ballistic missiles of General Designer Korolev had to be located in that place, in the thick of northern taiga to the south of Archangelsk. July 15, 1957 was the official birthday of the proving ground. That day Colonel Gregorjev assumed his post as the missile unit commander.

That was the time of the “cold war” between two super-states. Almost nobody thought about a space employment for Plesetsk. First of all it was founded as the missile base for the combat patrol of intercontinental ballistic missiles. And by July 15, 1961, four missile complexes for the R-7 ballistic missile were on combat patrol.

March 17, 1966 was the birthday of Plesetsk. That day was the first missile launching of the Vostok rocket booster with the Cosmos 112 space vehicle.

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Since that time the Angara rocket base has become the Plesetsk cosmodrome. It is interesting to know that until that time the US intelligence service knew practically nothing about the Plesetsk proving ground. The confirmation was the fact that there were two peaks of reconnaissance satellite launching intensity: during the Cuban Missile Crisis in 1962 and after the launching of Cosmos 112 in 1966. Within a year after the first space launching, the proving ground near Plesetsk had become the main place in the USSR to launch automatic vehicles.

During the following years Plesetsk has become the world's most intensively working cosmodrome. More than 60% of all space launchings were made from there. These were scientific, economic, commercial, and military vehicles, such as Cosmos, Molniya, Meteor, Resource, Photon, Bion, Ocean, Nadezhda, Musson, Tsicada and international co-operation vehicles of the Intercosmos and Oreal series and the interplanetary space station.

Unraveling the history of the cosmodrome was rather difficult. There is, however, one historical fact. In the middle of 1959, during a conference the Head of the Soviet state, Nikita Khrushchev, introduced a resolution to stop building the facility "Angara." But more than two years of intensive building of the cosmodrome had passed by that time, and in half a year the first combat complex had to be on combat patrol. And if that resolution had been approved Russia would not have had such a cosmodrome as Plesetsk, where more than half of the world's space launchings were made.

In this paper one can find some interesting and almost unknown facts about the history of the founding of the Russian proving ground known as Plesetsk.

Cosmodrome History

About 170 km to the south of Archangelsk, not far from the workers settlement in the thick north taiga was hidden a mysterious unit; today it is known to the whole world as the "Plesetsk" cosmodrome. It is situated on the plateau with a bit of a hilly plain. Its ground area is 1762 sq km, covering 46 km from north to south and 82 km from east to west.

The climate in this place is temperate-continental. Snows and frosty winters last six months and it has rather cool summers. The average annual air and earth temperature is +1.0°C, absolute minimum: -46.6°C, absolute maximum: +35.5°C. The highest level of snow cover is 75-85 cm. The nature of the Russian North is very rich and unusual for cosmodrome territory.

The cosmodrome's history begins on the 11th of January, when the government passed a resolution about a military unit with the secret name "Angara" – the first formation of intercontinental R-7 ballistic rockets.

A number of places were examined but it was decided to settle the launching ground on the south hills of the Yemets River. High and steep banks and also the rocky ground allowed a reduction in the volume of groundwork.

The official date of the creation of the northern cosmodrome is July 15th, 1967. More than 1500 space vehicles were launched from this cosmodrome (60% of the entire quantity). This cosmodrome is located 800 km from Moscow among forests and lakes. It covers nearly 10000 sq km of territory (120 km from north to south, 80 km from west to east).

This place was not chosen by accident. A lot of science, national economic and military programs require putting space apparatus into low polar or nearly polar orbits. And for this we must use launch complexes, situated in the high latitudes. Besides, the greater part of the flight of the rocket-carrier passed over uninhabited territory; that makes it simpler to choose a safe place for the landing worked out for the rocket stages (north of Tjumen; the Tayimir peninsula). It was also taken into consideration that the cosmodrome was not far from the scientific and industrial centers of the country.

There is a town named Mirnyi seven km from Plesetsk station which is not marked on the maps. In Mirnyi there is an instrument-making technical school, the "Novator" science research institute, and the "Pero" airdrome. Not far from the town there is a technical position for the launch preparation of space apparatus. Every apparatus would test zones of the earth with special equipment. The testing process is automatic. Some apparatus, "Meteor" for example, can be taken by airplanes to the "Baikonur" cosmodrome to be put into sun synchronous orbit.

A rocket ready for launching goes to the starting position which is situated 50 km from Mirnyi. There it is placed on the starting point and during pre-launch starting preparations it remains inside a mobile service tower. The height of this structure is 100 m, its area at the bottom is 2000 sq m, weight 450 tons. Before launch the tower moves away from the rocket along the railway road. With the help of this tower, unlike at other launch complexes, we may change space apparatus on the rocket vertically. Besides, it allows the service staff to work at any time and in any weather. Not far from the start complex there is a special building, where they store the rocket fuel components, and technical and technological systems.

The space apparatus was checked and prepared to launch the rocket-carrier "Tsiklon." It was moved from the technical facility to the mounting-testing building, lying 40 km from the town. There it was joined with the rocket and moved to the start complex. Everything is automatic here, from installation to switching on all communications. Control over the workings of the rocket's on-board and on-earth systems and equipment is accomplished by an automatic managing system with technological graphics on the main operator's screen. A launch by hand is possible if it is necessary. Pre-launch facilities (storage for

rocket fuel, and the building for on-earth testing equipment, etc.) are absolutely safe for the professional staff during the launch.

The start-technical facilities are situated 40-45 km from Mirnyi, on the bank of the Yimets River. These start complexes are placed at a distance of 10-15 km from one another; this allows not only simultaneous pre-launch preparation, but also full technical service and modernization. Their special feature is that in the interest of fire-security, gas withdrawal drains lead into the river. All launchings may be used for piloted flights.

The measuring complex includes the outer-trajectory measuring system "Vega," two measuring points on the cosmodrome territory, and four along the rocket course near Vorkuta, Norilsk, Siktivkar and near Novaja Zemlja. Information coming from them is processed in the calculating center in Mirnyi.

The power-capacity of it is such that it can satisfy the whole region of Archangelsk to solve its national economic problems. An oxygen-nitrogen plant supplies all the launches.

The cosmodrome continues to develop. In the near future start and technical complexes for the "Zenith" rocket-carrier and the space apparatus which are carried aloft by these rockets, will become operational.

On July 15th, 1957, the building of the "Angara" base began not far from Archangelsk, where the R-7 rockets were to be situated. Two years later at a meeting, Nikita Khrushchev announced his decision to stop building this facility. Perhaps, from a military point of view, he was right, but Barmin spoke up at this meeting and stated that it was necessary to build: "I think this decision is hasty and mistaken. We need this facility desperately, and we must not stop developing the facility." In 1966 the "Angara" rocket base became the "Plesetsk" cosmodrome. If Barmin had not resisted Khrushchev, Russia wouldn't have the cosmodrome which accounted for half of the space launches in the world.

The building of the first launching arrangement, intended for launching the R-7 intercontinental rocket, was begun in April 1957 and finished in December 1959.

The first R-7 rocket facility with its launching arrangement No. 1 began its battle service. Then, in July 1961, another set of complexes and arrangements with the launching facilities Nos. 2, 3, and 4 began duty.

The decision concerning the use of these launching units as intercontinental ballistic rockets (IBR) for launching sputniks was approved in 1963, and in June 1964 the organizational arrangements were made for reorganizing the "Angara" unit into the science research testing ground (SRTG) with a 2nd department for testing space apparatus and rocket-carriers. Up to this time, during the short period in the Russian North, 15 launching settlements for four types of rockets (R-7a, R-9a, R-16, and R-16a) were built and put on battle duty.

These starting complexes were geographically very successfully situated. The ballistic conditions of the newly created northern cosmodrome allowed the fulfillment of all "Baikonur" space programs during those years without excep-

tion, including launchings of intercontinental stations and manned flights involved in the "Vostok" and "Voshod" programs.

There were distinct benefits resulting from this newly created Northern cosmodrome compared to "Baikonur." The main space-carriers of those years were known as "the seven": a family of rocket-carriers, which were created on the basis of the R-7 and R-7a intercontinental ballistic rockets. There were two starting complexes for these types of rockets at "Baikonur" and four in the North.

On March 17th, 1966, from the No. 1 starting facility, the "Vostok" rocket-carrier opened the space page of the "Angara" unit, as it implemented the launching of the "Cosmos 112" space vehicle. This moment began the change in the orientation of the battle rocket complexes to peaceful space purposes.

A year after the first space launch of a space-rocket near Plesetsk, it became a major testing ground because of the quantity of automatic space apparatus launchings not only in the USSR, but in the whole world.

A Short Chronology of the Main Dates in the History of the Plesetsk Cosmodrome

1957. Resolution No. 61-39 of the Soviet Government on January 11th regarding the creation of the "Angara" unit. This began the building and joining of the department with rocket regiments.

1960. The beginning of the battle roster launching arrangements for the "Angara" unit.

1963. The resolutions of the Soviet Government (No. 15-5 at the end of January and No. 999-347 on September 14) regarding the creation of a scientific-research proving ground on the basis of the "Angara" unit.

1964. The creation of a scientific-research proving ground, with a test-proving department for using and adapting space capabilities forming a part of it.

1966. On March 17 the first launch of the "Cosmos 112" space vehicle took place.

1968. On December 20 the "Cosmos 261" was launched: the first international co-operation satellite of the USSR.

1972. On April 14, simultaneously with putting the "Molniya 1" satellite into orbit, a French satellite was launched by a soviet rocket. On July 10 the "Cosmos 500" was launched.

1978. On March 31 the "Cosmos 1000" ("Tsikada") was launched.

1983. On September 28 the "Cosmos 1500" ("Ocean") was launched. On December 14 the "Cosmos 1514" ("Bion") was launched with two monkeys on board.

1989. The chief center for testing and employing the space menace (CCTESM) was formed. On February 10 the “Cosmos 2000” satellite was launched.

1992. In April 21-29 Russian President B. N. Yeltsin made a visit to the “Plesetsk” cosmodrome – the first state testing cosmodrome.

Mirnyi: The Administrative Center of the Plesetsk Cosmodrome

The city of “Mirnyi” was built along with the cosmodrome. It lies along Lake Plestsiy in the taiga. In the town with a population of nearly 40,000 people live testers of this cosmodrome together with their families. “Mirnyi” became as a town for the builders of “Angara” and for military families who carried out the battle mission.

In 1966 “Mirnyi” received the status of a city when the first space apparatus was launched from the northern cosmodrome. The city and its inhabitants are young. Their average age is not more than 30 years. There are many children. There are four schools and fourteen nursery schools, there is also a school for young cosmonauts. Children, grown-ups, and adults can study in art and sport schools. There are two stadiums, tennis courts, and a sports complex with a swimming pool for those who like the sport.

Not far from the forest lake there is a children’s sanitarium, the only one in the Archangelsk region. Among strictly official buildings you can see hospitals and polyclinics. Monuments and memorials are devoted to the history of the cosmodrome, rocket space details are used in the architecture of the town, and its streets give the town a space image. As you enter the town, you can see a memorial monument on the lake where cosmodrome testers, who died due to rocket explosions in 1973 and 1980, are buried. The citizens remember their heroes.

International Cosmodrome Programs

The “Cosmos 261” satellite, placed into orbit on the 20th of December in 1968, became the first international satellite of the USSR and marked the beginning of mutual experiments on the “Intercosmos” program.

Regular launchings of foreign space apparatus took place at the “Plesetsk” cosmodrome starting in 1972. The first foreign satellite was the French SRET satellite. Together with “Interspace,” Czechoslovak satellites of the “Magion” type were put into orbit. The Italian “TEMISAT” satellite was put into orbit as an additional payload, and in 1994 the German “TUBSAT” satellite was launched. On the 24th of January in 1995 two satellites—“ASTRID” and “FAISAT” (US) – were launched.

The International space program includes the following directions:

In the sphere of space physics researching the structure and dynamics of the upper atmosphere and ionosphere of the earth, sun activity and sun-earth mutual influences and connections takes place.

These investigations are made with the help of automatic universal orbit stations (AUOS), on which are placed different types of science equipment and subspatniks produced in Germany, France, Poland, Czechoslovakia, Hungary, Romania and Bulgaria.

In the realm of space meteorology in 1970-1972, with the help of "Meteor" satellites, mutual investigation of the sky cloud surface over France were held, and together with German scientists in 1976 the intensity of atmospheric absorption of infra-red earth radiation was investigated.

In 1991 American equipment (TOMS) for investigating the ozone layer was added.

Starting in 1979 mutual experiments in space biology were held with the help of equipment placed on board the "Bion," "Foton," and "Resurs" satellites. Eight Russian satellites permitted experiments by the national programs of France, Germany, and Italy. Tests were held to learn the influences of space conditions on biological objects, and they got semi-conductor and medicine materials, and preparation with properties which were impossible to get on the earth.

With the help of the international system KOSPASSARSAT, damaged, wrecked, and crashed ships, airplanes, and also people can be located. The first satellite of this type was launched on the 30th of June, 1982. It was "Cosmos 1383" ("Nadezhda"). At the cosmodrome 7 "Nadezhda" satellites were prepared and launched.

The Plan Development of the Plesetsk Cosmodrome

The only one in Europe, the Plesetsk cosmodrome permits launchings of space apparatus of a military, national-economic, and scientific nature, and even international cooperation programs. Here, at the cosmodrome, design and flight tests of state space-rocket complexes and estimations of technical flight characteristics are held.

The earth experimental-testing cosmodrome base includes 9 starting (launching) arrangements for the "Soyuz-4," "Molnja M," "Tsiclon-3," and "Cosmos-3M" rockets, 7 mounting-testing facilities for testing space-rocket technical capabilities, the biggest nitric-oxygen plant, the "Plesetsk" airdrome, 2 filling stations for refueling space engines and more than 600 km of transport highways.

At the "Plesetsk" cosmodrome more than 20 space programs are implemented. There are also sputniks for local communication such as "Molniya" and navigation such as "Tsikada," rescue-satellites such as "Nadezhda", meteorolog-

ical satellites such as "Meteor," ocean exploration satellites such as "Ocean," "Resurs" satellites for researching the natural resources of the earth, geodesic satellites such as "Musson," "Foton" satellites for biological experiments in space conditions and receiving unusual materials, production satellites such as "Bion," and automatic universal orbit stations such as AUOS for making fundamental investigations in geo- and heliophysics.

At the end of 8 years there was a joining and unification of the space departments with ground facilities into a chief center of testing and usage of space means and resources. On the basis of this center the 1st state proving cosmodrome relating to the Ministry of the Russian Federation (the Plesetsk cosmodrome) in the structure of space-military forces was created.

There is a much work to be done to implement the transformation of the "Baikonur" space programs. The first ten were those for which there were seminal ballistic conditions ("Prognoz," etc.). There is a finished building at the starting complex for the "Zenit" rocket-carrier and a new mounting-proving (testing) complex. This will double the quantity of space programs which are carried out at the Plesetsk cosmodrome.

NAME	mass	BEGINING\ FINISHING		Number launchers launched SA
	(orbit km)	EXPLUATATION		
VOSTOK-M	1,5 Hkp= 900	28.10.66\	28.10.83	85\84
VOSHOD	5,7 Hkp= 200	06.04.66\	06.06.76	166\156
COSMOS-2	0,5 Ha=500	16.03.67\	18.06.77	90\84
SOIUZ-4	6,6 Hkp=200	27.12.71	IN	417\408
MOLNJA-M	1,9 Ha=40000	19.02.70	EXP-	203\203
COSMOS-3M	1 Hkp=1000	15.05.67	LUA-	384\688
TSIKLON-3	2,5 Hkp=1000	24.06.77	TATION	113\199
RUSS	6,8 Hkp=200	1997		
ZENIT	13,2 Hkp=200	1997		
VZLET	1,2 Hkp=1000	1998		
ANGARA	24 Hkp=200	>2000		
ROKOT	1,8 Ha=200	1999		

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