

# The Design, Construction, Service and Disposition of the Yak-50 Aerobatic Sports Airplane

Researched and written by

Roy F. Cochrun



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Roy F. Cochrun

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Father and son Yakovlev at work in 1972.<sup>1</sup>

## INTRODUCTION

This study attempts to answer a number of questions about the design, construction, service and disposition of the Yakovlev-designed Yak-50 aerobatic sports airplane. Those questions are:

1. Explanation of how DOSAAF worked as it related to being trained to fly, and why they would have Yak 50's. If they were a training organization, why a single seat aircraft?
2. The process by which the aircraft was created: Reason the aircraft was created, how the design came to be accepted and ordered into production.
3. Did Yakovlev decide he could build a better mouse trap and engineer it on his own hoping it would win government acceptance?
4. How did the decision to produce it as a production airplane come about?
5. Did it win a competition at some point against any other designs?
6. Arseniev in the Russian far east built them all, how did they leave the factory? By train? Trans-Siberia rail? Truck? Flown?

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<sup>1</sup> Aleksandr Sergeevich Yakovlev, **Zapiski Konstruktora (Notes of a Designer)** (in Russian), Moscow, Politizdat, 1979, facing p. 241.

7. Organizations who used the aircraft, and for what purpose. Aero Club(s), DOSAAF, World team?
8. Who received them as new? World team first, then DOSAAF, then Aero clubs?
9. Airbases it served at.
10. Were they split into batches for each organization?
11. Did they leave the factory painted in the livery of their assigned units?
12. To whom were they handed down after their initial assignment? Provincial flying clubs?
13. I understand they were to be flown 40 hours, have the wings changed, and fly another 40, then I believe they went to DOSAAF, or flying clubs? I really wonder about this process?
14. How did you get on the Russian world team? Invitation, assignment? Military, DOSAAF, Aero Club?
15. Backgrounds of World team members during the Yak 50 era, how did they become pilots? How did they get good enough/noticed to be invited to join the Worlds team. Where were they trained, and discovered, before joining the team
16. Once they joined the team was this their full time job?
17. Training center was in Barki, or Borki, outside Moscow. How did being a team member work? Did you live at the base in Borki, and work on aerobatics daily, or did the pilots travel to "work" on a part time basis, to train?
18. Some of them were test pilots, or instructors. Did being on the team earn one a paycheck?
19. Championships other than the world event the Yak 50 may have won.
20. Any photographs of the airplane in its native (eastern) settings.

## DOSAAF

Before any discussion of the Yak-50 takes place, it is important to understand a little about the All-Union Volunteer Society for Assistance to the Army, Air Force and Navy<sup>2</sup> (DOSAAF), for it is DOSAAF who needed the airplane and for DOSAAF it was built. There was nowhere else for the airplane to be delivered in the Soviet Union, as private flying organizations did not then exist.

The lessons of the Great Patriotic War, the name given to World War II by the Soviets, were not lost on the country's leadership: In the event of renewed aggression against the country, perhaps this time by an even more formidable foe than Nazi Germany, the military had to be filled with and augmented by well-trained, even experienced troops who were indoctrinated politically in the spirit of the *Great Il'ich* (Lenin) and in the military lessons of the past.

Prior to the Great Patriotic War, OSOAVIAKHIM (the Society for Cooperation with Defense and the Aviation and Chemical Development of the USSR) attracted young people to learn some basic military skills and to be indoctrinated politically.

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<sup>2</sup> This is the official translation used by the U.S. Government. See, among others, M.O. Norby, **Soviet Aerospace Handbook**, Department of the Air Force, Air Force Pamphlet 200-21, Washington: U.S. GPO, 1978, p. 138.

But after the war, OSOAVIAKhIM was broken up into three independent organizations which were not well regulated, did not have the necessary operating funds and were not widely publicized. For that reason, the Council of Ministers decreed on 20 August 1951 that the three smaller societies be merged into DOSAAF for the purposes of “improving popular military work among the population, the elimination of parallelism in the management of this work and the reduction of expenditures for the maintenance of [the three organizations.]”<sup>3</sup>

DOSAAF became an all-embracing organization which attracted young people between the ages of 16 and 18 years of age by offering them fun and training and experience in skills which might apply to the future defense of the country. Not only could they learn skills such as heavy equipment operation, swimming, flying, or shooting, but they also had the opportunity to participate in competitions using those skills and to win prizes for such competition. Those members who were good enough could become members of local and regional level teams, possibly rising to membership in world-class team, representing the USSR in European or worldwide competition.

The national-level teams, therefore, were subordinated to DOSAAF as a way of attracting the youth. For this reason, DOSAAF received funding, for instance, for its own aerobatic airplanes and lightweight trainers, equipment, and training facilities. There were no local or regional clubs in the country that were not subordinate to DOSAAF.

Because DOSAAF was a paramilitary organization, reserve air force and air defense pilots maintained their proficiency at DOSAAF aeroclubs. Furthermore, it was budgeted by the state. It had its own funding which was not part of the military budget although it was an adjunct of the Defense Ministry. Moreover, because of its relationship to the military, some secrecy surrounded the organization. Many training bases, in particular airfields, went unnamed in news reports about the society's European and World victories. In addition, there were never any references in the press about how team members were compensated beyond the award of their medals or the occasional victory cup. It is known, however, that team members held regular positions, some within DOSAAF, for which they were paid. Perhaps world team membership had other perks, but that statement too is unsubstantiated.

Instructors, mentors and docents were attracted from all levels of society. Of particular importance in the early days of DOSAAF were former military personnel who had achieved some glory, however slight, in the defense of the motherland during the Great Patriotic War. These individuals probably were believed to hold an attraction for the youth at whom DOSAAF was aimed. In addition, DOSAAF tried to attract to its cadres well-known heroes and teachers from prestigious schools such as the Moscow State University for the same reason. Instructors were paid for their

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<sup>3</sup> G.M. Egorov et al, ed., **Dvazhdy Ordenonosnoe Oboronnoe (Two-Times Defense Order-Bearing)** (in Russian), 3rd Ed., Moscow: DOSAAF Publishing House, 1983, p.174.

services.<sup>4</sup> And it was from among those instructors, mentors and docents (and occasional student) that the national-level team members emerged.

Based on the research, training of a young person who eventually became a pilot generally proceeded in this manner:

1. The individual joined the nearest DOSAAF club that provided flight training.
2. As most new members were 16 at time of entry, they were offered and usually took parachute jump training, being still too young to learn to fly.
3. By the age of 17 or 18, they could apply to fly and were taught by the paid instructors of the local club. By the 1970s, training usually was in a Yak-18 model of aircraft.
4. After they soloed, pilots could apply to compete in local DOSAAF-sponsored aerobatics competitions if they desired. Those who were good enough could apply to compete at higher levels. Other pilots normally entered military service. By the time those pilots joined their military organization, they had the equivalent of 1 year of flight training by U.S. standards based on their DOSAAF training.
5. Further aspirations, either as an aerobatic pilot onto the National Team, or within the air force, normally were based on merit, although such things as upper education, Party membership and nepotism, especially nepotism, entered into the equation.

DOSAAF, then, was a national-level club for young people. It provided fun, competition, education, training, glory and honor, as well as very probably a future military or even civilian career. In fact, it was the only place the youth of the country could channel their energies, regardless their interest. And, of course, it helped to attain higher goals if one were a member of the Komsomol – the Young People’s Communist League, and later, the Communist Party itself.<sup>5</sup>

## DESIGN OF THE YAK-50

The DOSAAF Central Committee itself drafted the requirement<sup>6</sup> (the so-called TTT<sup>7</sup> -- "tactical technical requirement") for a new sports and aerobatic single-seat airplane with the participation of the nation’s leading sporting pilots when it became obvious that the competing Yak-18 designs were no longer up to the task of competing well. The requirement also called for a trainer to be based on that basic single-place airframe. As pointed out on one Russian Website, *the renovation of the*

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<sup>4</sup> For a complete history of DOSAAF, the attempts to attract instructors and members alike and the building of world-class sports teams, see Egorov et al, *Dvazhdy...*

<sup>5</sup> If one really wanted to get ahead, the future hero would be a member of the Pioneers at a very young age, move into the Komsomol and finally, become a card-carrying member of the Communist Party. Of course, it never hurt to have a well-connected parent or grandparent, also a Party member.

<sup>6</sup> Various sources. See bibliography.

<sup>7</sup> This acronym and its expansion, along with explanations, commonly appears in Soviet and Russian aeronautical literature.

*DOSAAF air sports clubs airplane fleet began in the '70s in our country. It was proposed to equip them with new single-seat aerobatic and sports and twin-seat sports training airplanes. For simplification of production, a reduction of service expenses and an increase in the quality of flight training, it was recognized as advisable to have aircraft of the same type with identical power plants.*<sup>8</sup>

Certain aerobatic pilots added a requirement that the airplane's inertial properties be lessened in order to improve spin performance, thereby decreasing the airplane's weight and changing some other features of the aircraft.<sup>9</sup> The requirement, in particular, called for specific wing loading to be 60 kilograms per meter square, and power loading to be 2.5 kilograms per horsepower.<sup>10</sup> But primarily, the aerobatic design was needed to help the Soviet Union in its goal to become the aerobatic champions of the world!<sup>11</sup>

The concept of "fly-before-buy," although not called that in Russian, long had been a leading principle of Soviet aircraft design even if one design never took to the air and this development was no different. The Yakovlev Experimental Design Bureau (OKB) and Antonov OKB were assigned the task of designing the new aircraft.<sup>12</sup> However, because Antonov chose to use a turboprop engine, which was banned by FAI competition regulations, for his design, the aircraft lost out to the Yak-50 design and never went into production.<sup>13</sup>

A young team under the leadership of Sergey Yakovlev, son of the famous designer, Aleksandr Yakovlev, developed the airplane. According to several sources, this team of youths had been assembled solely for the design of lightweight airplanes. The team decided to stay with the Yak-18 concept, itself a development of Yakovlev's UT-2 trainer of 1935,<sup>14</sup> and in particular with the Yak-18PS design, with which aerobatic pilots were so familiar, but to make it slightly smaller and lighter and to design it around the much more powerful M-14P engine. In addition, they had to

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<sup>8</sup> *Second Moscow Aeroclub Home Page*, date unknown, **Samolet Yak-52 (The Yak-52 Airplane)** (in Russian), <<http://aeroclub.msk.ru/club/articles/yak52.html>> (01 November 2003)

<sup>9</sup> L. Tarasov et al, **Samoletnyy Sport v SSSR (Airplane Sports in the USSR)** (in Russian), Moscow: DOSAAF Publishing House, 1978, p. 79.

<sup>10</sup> Sergey Aleksandrovich Yakovlev, **Sportivnye Samolety (Sporting Airplanes)** (in Russian), Moscow: DOSAAF Publishing House, 1981, p. 61.

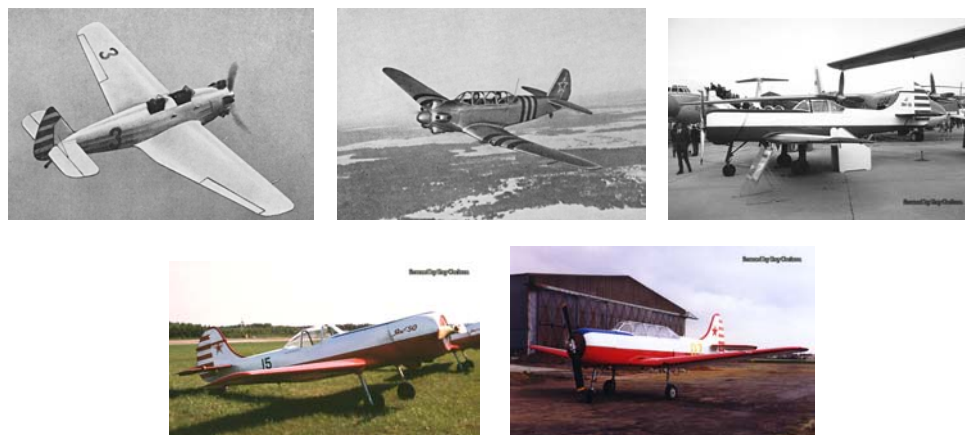
<sup>11</sup> As the Soviet Union under Gorbachev was reaching its end, this researcher attended a session at the Brookings Institution on the changes the Russians were enduring. As pointed out there by one lecturer, the Soviets wanted to be best in everything. For them, it was important to be the first (man in space, supersonic transport flight), have the largest (helicopter, airplane) and to have the best (the Bolshoy ballet), the most records (time-to-climb, speed in a closed circuit, altitude), the best chess masters, and the arguably the greatest composers (Khatchaturian, Shostakovich), and more!

<sup>12</sup> Miroslav Balous, *Jakovlev Jak-50 (Yakovlev Yak-50)* (in Czech), **Letectvi a Kosmonautika (Aviation and Cosmonautics)** (volume and issue unknown), (1981): p. 512.

<sup>13</sup> A. Yakovlev, V. Kondrat'ev, *Sportivno-Pilotazhnyy Samolet: Idei i Problemy (The Aerobatic Sports Airplane: Ideas and Problems)* (in Russian), **Kryl'ya Rodiny (Wings of the Motherland)**, 2 (1979): p. 29

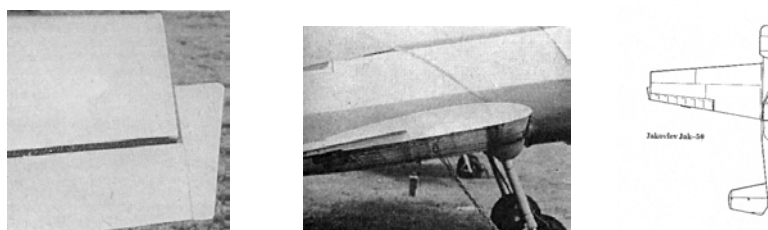
<sup>14</sup> Aleksandr Sergeevich Yakovlev, **Tsel' Zhizni (Aim of a Lifetime)** (in Russian), 5<sup>th</sup> ed., Moscow: Politizdat, 1987, p. 427.

balance the single-place design of the new aerobatic craft with the construction of the twin-place trainer that would follow. The result was the Yak-50.<sup>15</sup>



**Evolution of a design:** From top left, UT-21<sup>16</sup>, Original Yak-18<sup>17</sup>, Yak-18 aerobatic sports airplane; from bottom left, Yak-50, Yak-52

The prototype Yak-50 was flown for the first time on 25 June 1972 by 39-year-old Yakovlev OKB test pilot Yuriy V. Petrov.<sup>18</sup> When handed over shortly thereafter for state tests, Flight Research Institute (LII) test pilot Vladislav Il'ich Loychikov became the lead pilot for the test program.<sup>19</sup> Deliveries to DOSAAF began when the first series-built airplane reached the team in early 1976.<sup>20</sup> By 1978, the Yak-50 had received a minor modification to the wing's end, described as a "load-removing aileron."<sup>21</sup>



**"Load removing aileron" modification.**<sup>22</sup>

<sup>15</sup> For additional details of the design team's considerations in the projection of the Yak-50, see Translated Attachment 1, *The Aerobatic Sports Airplane: Ideas and Problems*.

<sup>16</sup> Aleksandr Sergeevich Yakovlev, *Sovetskie Samolety (Soviet Airplanes)* (in Russian), Moscow, Nauka Publishing House, 1982, p. 216.

<sup>17</sup> Yakovlev, *Sovetskie Samolety*... p. 219.

<sup>18</sup> *Aerokosmicheskiy Kalendar' (Aerospace Calendar)* (in Russian), date unknown, <<http://subscribe.ru/archive/tech.aerocalendar/200306/25011405.html>> (29 October 2003).

<sup>19</sup> The usual practice was for OKB pilots to test an aircraft until it was ready for state testing, after which testing was performed both by OKB and LII pilots. Once LII certified the aircraft as airworthy, it entered into service. This practice continues today.

<sup>20</sup> Balous, *Jakovlev*..., p. 512

<sup>21</sup> Martin Lukac, *Letadla, Ktera Jsme Videli nad Hosinem (Aircraft We Saw over Hosino)* (in Czech), *Letectvi a Kosmonautika (Aviation and Cosmonautics)*, 23 (1978): pp. 900 & 901; Pavel Kucera, *Aerodynamicke Zvladnost Akrobatickych Letadel (Aerodynamic Properties of Acrobatic Airplanes)* (in Czech), *Letectvi a Kosmonautika (Aviation and Cosmonautics)*, 24 (1978): p. 944.

<sup>22</sup> Lukac, *Letadla*..., p. 900 & 901, Kucera, *Aerodynamicke*..., p. 944.

By 1981, West Germany, Austria, England, Japan and Hungary reportedly had applied to obtain the airplane.<sup>23</sup> Through the end of 1981, some 196 of the airplanes had been built.<sup>24</sup> There are reports a few aircraft went to other countries, such as Australia, Great Britain, Denmark, Czechoslovakia and Poland,<sup>25</sup> although those deliveries cannot be substantiated; however, of the 312 Yak-50 built, by 1985 the majority had been delivered to DOSAAF, with eight reportedly delivered to East Germany and six to Bulgaria.<sup>26</sup> It had been thought the airplane would be produced at Smolensk<sup>27</sup>, where other Yakovlev-designed aircraft and in particular the wings for the prototype were produced in 1973 and 1974<sup>28</sup>, but instead it was built at Arsen'ev. There is no information on how the plant delivered the Yak-50 to the customer, although, because they could be equipped with an additional tank for cross-country flights and had two-way radios, ferry flights cannot be discounted without further evidence.

Soviet practice was to paint airplanes usually before they left the plant. While it is known that all Yak-50 had the same light grey interior scheme<sup>29</sup> which was applied at the Arsen'ev plant, it cannot be ascertained if they were painted at the factory in keeping with standard Soviet practice or were painted at the receiving DOSAAF airfield. Today, a company in Lithuania both paints and overhauls Yak-50 airplanes.<sup>30</sup> By the time the USSR world team participated in the competitions in Karl-Marx Stadt, East Germany, in 1980, at least three different red and white schemes had been used. All of these schemes had the same alternating red and white horizontal stripes on the tail rudder.



*National color scheme.*



*Alternate color scheme.*

<sup>23</sup> Yakovlev, *Sportivnye...*, p. 62.

<sup>24</sup> Yakovlev, *Sovetskie Samolety...* p. 211.

<sup>25</sup> **Sovremennaya Aviatsiya Rossii (Russia's Modern Aircraft) Yak-50** (in Russian), date unknown, <<http://ephf.ispu.ru/avio/yak-50.htm>> (03 November 2003).

<sup>26</sup> Richard Goode Aerobatics Home Page, unknown date, <<http://www.russianaeros.com/yak50product.htm>> (01 November 2003)

<sup>27</sup> Balous, *Jakovlev...*, p. 512

<sup>28</sup> *Smolensk Aviation Plant Home Page* (in Russian), 29 October 2001, <<http://smaz.ru/rus/history.htm>> (29 October 2003).

<sup>29</sup> V. Kondrat'ev, *Samolet-Champion Yak-50 (The Yak-50 Champion Airplane)* (in Russian), **Kryl'ya Rodiny (Wings of the Motherland)**, January (1977), DOSAAF, Moscow, p.27.

<sup>30</sup> **ZAO Termikas. Kaunas Airport Home Page** (in Russian), unknown date, <[http://www.kaunasair.lt/rus/k\\_aviakomp.htm](http://www.kaunasair.lt/rus/k_aviakomp.htm)> (01 November 2003)



Color scheme of Lithuanian team's Yak-50, 1979.<sup>32</sup>



The world team practices in 1980.<sup>31</sup>

### YAK-50 DEFICIENCIES<sup>33</sup>

It soon emerged that world champion pilots were beginning to die because of “folding wings” on the Yak-50. According to Igor’ Egorov, when Martem’yanov died, the airplane did not explode on impact. The absence of a fire gave investigators the all-important evidence they needed to discover that a manufacturing defect in the main wing spar had been the cause of the accidents.<sup>34</sup> There is no evidence the aircraft was to be recalled after 40 hours for new wings, however, with the exception of aircraft used in actual world competition, and then only after the Yakovlev people had ascertained the cause of the accidents. The design bureau took steps to preclude future accidents from those acknowledged structural problems. Eventually they ordered the following division of categories for the aircraft:<sup>35</sup>

1. Aircraft used for training and actual flying in world championships: 45 hours or 105 landings or 3,750 figures.
2. Aircraft used within the USSR: 110 hours or 280 landings or 6,000 figures.
3. Aircraft used for training in a few selected aeroclubs: 300 hours and 1000 landings, with no limitation on aerobatics.

According to remarks attributed to the manager of the 2nd Moscow Aeroclub in March 2003, however, the Yak-50 always was a very bad airplane. As a matter of fact, mere mention of the airplane caused the man to tremble.<sup>36</sup> Because of the problem with the spar, log books supposedly were to be returned to Moscow,<sup>37</sup> all aircraft were ordered

<sup>31</sup> Kryl’ya Rodiny, August (1980), back cover.

<sup>32</sup> Kryl’ya Rodiny, November (1979), front cover.

<sup>33</sup> For a complete list of Yakovlev Design Bureau service bulletins for the Yak-50 and the construction numbers to which they apply, see the attachment *Bulletins50\_eng.pdf* (in English) from Aeroconcept Trading (<http://www.aero-concept.com/>).

<sup>34</sup> Dmitriy Abramov, *okoshki (windows)* (in Russian), 25 February 2003 <Fido7.ru.aviation> (02 November 2003)

<sup>35</sup> Aeroconcept Trading, 2003, <[http://www.aero-concept.com/Pages/Pages\\_reserved/50\\_pages/50\\_TBO.html](http://www.aero-concept.com/Pages/Pages_reserved/50_pages/50_TBO.html)> (02 November 2003)

<sup>36</sup> Oleg Tchernychenko, *Drop-Zona (Drop Zone)* (in Russian), 28 March 2003 <fido7.su.pilot> (02 November 2003).

<sup>37</sup> Richard Goode *Aerobatics Home Page*, unknown date, <<http://www.russianaeros.com/yak50product.htm>> (01 November 2003)

withdrawn from service by DOSAAF and the spar drilled in such a way the airplane could not be flown again. These actions were supported by the design bureau. However, some *wise guys* decided to claim they had modified the main spar and offered the Yak-50 for sale abroad, in particular to the U.S., where it was felt the pilots wouldn't overstress the airplane.<sup>38</sup> These sales were contrary to instructions from Moscow.

At any rate, by 1986, the design bureau itself acknowledged publicly that the design had a low service life and limited structural integrity, which were its primary deficiencies. However, the principles proven on the Yak-50 were embodied by Yakovlev in the Yak-55 and by Sukhoy in the Su-26 aerobatic sports airplanes.<sup>39</sup>

## NOTED ACCOMPLISHMENTS

Even before its first real victory, Soviet women flying the Yak-50 won a silver and a bronze in a competition at Mlada Boleslav, Czechoslovakia.<sup>40</sup> Then came the 1976 world aerobatics championships in Kiev, where the Soviet team visibly was embarrassed by the evident cheating of the Soviet judges: for example, they called a Soviet team member "in" even when he obviously had flown out of the "box." Nonetheless, members of other national teams told **Aviation Week and Space Technology** magazine that even without the cheating of the judges, the Russian deserved to win.<sup>41</sup> See Annex I for a table of all significant achievements in the Yak-50.

## THE WORLD TEAM

In the 1960s, the DOSAAF Central Committee decided to form the All-Union Federation for Aeronautical Sport which was to be headquartered at Tushino airfield, in the northern part of Moscow. Tushino was the home of the Valeriy Chkalov Central Aeroclub (today, the V.P. Chkalov National Aeroclub) and the place where DOSAAF held its flying and parachuting competitions. Included in the federation besides DOSAAF were representatives from the air force, the air defense forces, the Ministry of Civil Aviation, the Ministry of the Aviation Industry and unspecified others. The federation brought in professional, experienced aviators who rendered practical aid to the DOSAAF Central Committee for the purposes of achieving significant sporting victories both within and outside the USSR, in other words, to build a winning team!<sup>42</sup>

### **Borki**

There was no mention in any source that the winning Yak-50 national team actually trained at Borki, only at the "Central Aeroclub." The name "Borki" itself appears

<sup>38</sup> Oleg Tchernychenko, *Drop-Zona (Drop Zone)* (in Russian), 24 March 2003 <fido7.su.pilot> (02 November 2003).

<sup>39</sup> V. Kondrat'ev, *Yak-50 (The Yak-50)*, **Kryl'ya Rodiny (Wings of the Motherland)** (in Russian), March 1986, p. 34.

<sup>40</sup> Balous, *Jakovlev...*, p. 512.

<sup>41</sup> Reference lost long ago, but from a summer 1976 issue.

<sup>42</sup> Tat'yana Viktorovna Leont'eva, & Nikolay Yakovlevich Gladkov, compilers, **Tsentr Aviatsionnogo Sporta (The Aerosports Center)** (in Russian), Moscow, DOSAAF Publishing House, 1989, p. 137.

only once in the history, in a Soviet-era issue of **Kryl'ya Rodiny (Wings of the Motherland)**. According to a notice published in the April 1979 edition, the finals of the piston-engined airplane competitions for the 7<sup>th</sup> Peoples of the Russian Soviet Federated Socialist Republic (RSFSR) Sports Day and the 12<sup>th</sup> RSFSR Championships were to be held there from 24 June through 2 July 1979.<sup>43</sup>

A reluctance to note training at the Borki location would have been typical of Soviet-era thinking and security; in addition, it would allow the team to practice away from the prying eyes of anyone who might have leaked information about the team's performance and especially of their new aircraft to foreign competitors. Only since the break up of the Soviet Union does the name Borki appear regularly. In particular, **Moskovskie Novosti** took pains to make the tie-in between Tushino and Borki in a note to an article about the sorry state of affairs today of the two airfields, Tushino and Borki, associated with the Central Aeroclub: *The Chkalov National Aeroclub is a unitary enterprise, belongs to the Russian Ministry of Property Relations and is based at the famous Tushino airfield. The Borki airfield is a subsidiary enterprise of the National Aeroclub which is located outside Kimry in the Tversk Oblast.*<sup>44</sup>



Borki lies approximately 60 miles northwest of Tushino, which is approximately where the “M” in “Moscow” is on the map.

Borki today is used primarily by parachute enthusiasts. Facilities have included hangars, a reportedly unpaved runway (but see the photo), a maintenance area and a hotel. Today Borki has its own Web site: <http://www.borki.ru/>, which is operated by the Fly SPN parachute club. The National Aeroclub has a Web page devoted to its subsidiary at Borki at <http://www.aero-club.ru/borki.html>. Both sites are in Russian only.

<sup>43</sup> 1979 *Sportivnyy Kalendar' (1979 Sports Calendar)*, **Kryl'ya Rodiny (Wings of the Motherland)** (in Russian), April 1979, p. 24.

<sup>44</sup> *Moskovskie Novosti (Moscow News)*, 28 November 2002, **Opustevshee Nebo (The Desolate Sky)** (in Russian), <<http://www.mn.ru/issue.php?2002-11-28>> (03 November 2003).



Borki as it appears today.<sup>45</sup>

Soviet aerobatic pilots appear to have progressed to the world team much the way pilots of any national team -- through hard work, although being a member of the Komsomol (Young Communist's League) or the Communist Party or the offspring of a famous person certainly gave one a leg up. Below are short biographies that could be found of several of the key members of the 1976 Soviet World Team.



1980 National team. Left to right: Frolov, Artishkyavichyus, Nazhmudinov (trainer), Leonova, Yaikova, Kayris, Smolin.<sup>46</sup>

## Viktor Letsko



Viktor Letsko didn't even see an airplane in the village where he was growing up until he was 14 years old, and that was a small crop duster; but a short hop in the cabin convinced him he wanted to be a pilot. After high school, he worked for a short time at a factory, then entered the Omsk Aviation Center where he received top scores in all his classes. Subsequently, he was permitted to take examinations for all the DOSAAF courses without attending classes. By the time he was 19, he was a candidate for the

<sup>45</sup> *Natsional'nyy aehroklub Rossii im. Chkalova (Chkalov National Aeroclub)* (in Russian), date unknown, <<http://www.aero-club.ru/borki.html>> (03 November 2003).

<sup>46</sup> **Kryl'ya Rodiny, (Wings of the Motherland)**, August, 1980, front cover

USSR team and became a permanent member when he was 21. A year later he won his first gold medal. At the age of 25 he became absolute champion of the world at the 1976 Kiev competitions.<sup>47</sup>

### Valentina Yaikova

Valentina Yaikova dreamed from childhood of flying. She was motivated toward this dream by her paratrooper father who had served in the Great Patriotic War. She herself started as a DOSAAF parachutist, as had her older sister before her. Valentina learned to jump at the Perm' DOSAAF aeroclub because she still was too young to fly. As soon as she turned 17, however, she moved to aircraft. At the same time, she was taking classes at a technical school, working as a grinder at an electrical plant and was a relief secretary for the Komsomol. She joined the Communist Party at the plant. By the time she was 19, she was competing in national competitions as the youngest participant. Yaikova subsequently was honored as a Master of Sports of the USSR and named to the national team in 1968, where she also was its Komsomol organizer. Eventually she moved to Kaluga where she became one of that DOSAAF club's flight instructors while maintaining her position on the team. She also flew helicopters.<sup>48</sup>



### Lidiya Leonova



Little was learned about Lidiya Leonova for this study; however, it is known that she was a member of the Communist Party and already was flying by the time she began working with youth at the DOSAAF flying club in Tula in the early 1960s, where, among other duties, she was a flight instructor. Because of her achievements in Tula, she was selected for the National team in the 1970s.<sup>49</sup> More recently, she has been a judge at some international events. Awards include Honored Master of Sports.<sup>50</sup>

### Svetlana Savitskaya

Svetlana Savitskaya reflects the nepotism so common in the Soviet era. Daughter of a famous military officer, she followed in his footsteps, becoming first a parachutist, subsequently a pilot and member of the World Team (1970 world champion and member of the 1976 winning women's team in a Yak-50<sup>51</sup>), then a test pilot, a



<sup>47</sup> Natal'ya Belova, *Donskaya Pravda v Seti (The Don Pravda on the Net)*, 21 August 2003, **Prervannyi Polet (Flight Interrupted)** (in Russian), <<http://www.vdonsk.ru/~dp/dp508.htm#a07>> (02 November 2003). Photo from **Kryl'ya Rodiny (Wings of the Motherland)**, October (1976): Front cover.

<sup>48</sup> Egorov, *Dvazhdy...*, pp. 360 & 361. Photo from same source, p. 361.

<sup>49</sup> I. Yunak, *Traditsii Zhivut, Traditsii Vospityvayut (Traditions Live, Traditions Train)*, **Kryl'ya Rodiny (Wings of the Motherland)** (in Russian), February, 1978, pp. 11-13.

<sup>50</sup> *Ikh Nagradila Rodina (The Motherland Awarded Them)* (in Russian), **Kryl'ya Rodiny (Wings of the Motherland)** (in Russian), April 1977, p. 6. Photo from this source.

<sup>51</sup> Kondrat'ev, *Yak-50...* p. 34.

record-setting pilot and finally, culminating her career, the world's second female cosmonaut. It is easy to understand why she was chosen, in this instance to establish the world's record for women in the Yak-50, her 13<sup>th</sup> record by 1979.<sup>52</sup>

## YAK-50 DISPOSITION

As noted above, most of the Yak-50 went to DOSAAF clubs for training and competition by regional or national team members. The Yak-50, in addition to Tushino and Borki, was delivered to Tula,<sup>53</sup> probably Kiev, since the World and Communist competitions were held there, probably the Ishim club in Tyumen', as there is a monument to one there now.<sup>54</sup>

Soviet practice was to hold annual national aerobatic competitions where everyone flew the same type airplane. Unlike international and world events where not only the pilots compete against each other, but the aircraft themselves as well, within Russia everyone trains on and flies the same type airplane for competition. For the 1980 annual event, which was held at the Chayka airfield outside Kiev, two teams arrived from within the RSFSR (one is known to be Tula), and one each from the Armenian (probably Erevan), Kazakh (possibly Alma Ata), Kirghiz, Lithuanian (probably Kaunas), and Ukrainian (probably Kiev) republics, as well as the Central Aeroclub at Tushino. The assumption would be, then, that Yak-50 were delivered to DOSAAF airfields at the major cities within these republics, as noted.

The aircraft should have remained at the DOSAAF airfields at these cities, except when ferried elsewhere to participate in competitions. It is known that once an aircraft's service life is exhausted, it often remains rotting in a remote corner of the airfield or is cut up for scrap.<sup>55</sup> As noted above, however, it is known that many were sold abroad, especially to customers in the U.S and Britain.

Today, Yak-50 are known to be at airfields in Arsen'ev, Khabarovsk, Komsomol'sk<sup>56</sup> and Starodub.<sup>57</sup> They may have been delivered to these locations originally, or they could have been brought there after the break-up of the Soviet Union

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<sup>52</sup> Russell Naughton, *Aviation Pioneers : An Anthology*, 15 September 2003, **Svetlana Savitskaya**, <<http://www.ctie.monash.edu.au/hargrave/savitskaya.html>> (02 November 2003). Photo from **Kryl'ya Rodiny (Wings of the Motherland)**, August 1980, p. 23.

<sup>53</sup> ...*Imeni B.F. Savonova (...Named after B. F. Safonov)*, (in Russian), **Kryl'ya Rodiny (Wings of the Motherland)**, September 1980, p. 2

<sup>54</sup> *Tyumenskiy Kur'er (Tyumen' Courier)*, 31 December 2002, **Prizemlenie Del'fina (The Dolphin's Landing)** (in Russian), <<http://www.tk.tyumen.net/tcourier/article.shtml?cat=news&num=06&date=20021231>> (04 November 2003).

<sup>55</sup> Personal observation at several airfields in the former USSR: Ulan-Ude (2 airfields), Kiev Borispol' Moscow Sheremet'evo and Moscow Chkalovskoe airports.

<sup>56</sup> <[bigman@citypage.ru](mailto:bigman@citypage.ru)> *S Parashyutom Prygnut' – Net Problem!!! (Jumping with a Parachute – No Problem!!!)*” (in Russian), 19 May 2001, <<http://www.vladivostok.ru/forum/read.php?f=22&i=19&t=17>> (04 November 2003)

<sup>57</sup> *Aviatsiya Obshchego Naznacheniya (General Aviation)*, 1999, <[http://www.aviation.ru/aon/1999/1299/st1g\\_1299.html](http://www.aviation.ru/aon/1999/1299/st1g_1299.html)> (October 2003)

for cost-cutting purposes and resurrection of the flying clubs. There is at least one either at a place called Ozernye Klyuchi (in Artem) or Novonezhino, or one each at both locations.<sup>58</sup> These locations are in addition to the excellent list at <http://home.earthlink.net/~yakpilot/yak-50C.htm> which purports to show every known Yak-50 still in existence by serial (construction) number (C/N) but apparently does not. In addition to those on the list, C/N 82-5905 was seen in April 2000 in Bicester, England. Assuming the C/N is correct, its status today is unknown. As of August 2001, Pierre Holländer was supposed to have one which is registered in Estonia, but it may be the one listed as located in Barkarly, Sweden.<sup>59</sup> C/N 84-2808 is not on this list and is supposedly in Australia.<sup>60</sup> Also, there is one at a museum in the Oregon Air and Space Museum.<sup>61</sup> Finally, there is one mounted on a pedestal at the Tyumen' ROSTO club in Ishim.<sup>62</sup>



The Yak-50 at Ishim.<sup>63</sup>

## AN AFTERWORD

This study has attempted to answer the questions posed on pages 1 and 2; however, the limited information about the aircraft in the years before the break-up of the former Soviet Union that is available on the Internet made answering them difficult. Additional information was found in books and journals published in the Soviet era during and immediately after the heyday of the Yak-50 and there are books and journals, all secondary sources, as yet unopened which may reveal even more about the history of this obviously popular little machine.

<sup>58</sup> Olga Shurat, *ZR Press*, 24 December 2002, **Iz Istrebitelya – v Biznes (From the Fighter – to Business)** (in Russian), <<http://www.zrpress.ru/2002/100/b010.htm>> (04 November 2003).

<sup>59</sup> *Molodezh' Ehstonii (Estonian Youth)*, 18 August 2001, **Vy Ch'i, Samolety? (Whose Are You, Airplanes?)** <<http://www.moles.ee/01/Aug/18/7-3.php>>, (04 November 2003)

<sup>60</sup> Aeroclub Pty Ltd., 2003, *Aeroclub.com.au*, **VH-YVO**, <<http://search.aeroclub.com.au/showac.php?rego=YVO>>, (04 November 2003).

<sup>61</sup> Brian Bell, **Insight Guide: Pacific Northwest**, 4<sup>th</sup> ed., Maspeth, NY, Langenscheid Publishers, 2002, P. 240.

<sup>62</sup> **Tyumenskiy Kur'er...**

<sup>63</sup> Ishimskiy Klub ROSTO (Ishim ROSTO Club), Home page, 2002, <<http://www.ishim-sky.com/photos/yak50.jpg>> (04 November 2003).

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## ANNEX I

### Table of Significant Achievements in the Yak-50

The following table lists all major accomplishments with the Yak-50 uncovered during the research for this study. All-Union meets are not reflected, as all pilots flew Yak-50, so obviously, the Yak-50 took first place. With the exception of the 1976 event in Czechoslovakia, all competitive events listed below resulted in first place and gold medals and/or cups. The table also includes two world records and a flight made for possible inclusion in the Guinness Book of Records.

<b>Date</b>	<b>Location/Event</b>	<b>Pilot</b>	<b>Remarks</b>	<b>Source</b> (where required)
1976	Mlada Boleslav, Czechoslovakia/ Competition of Socialist States	Women's team		Footnote 27
23 July – 05 August 1976	Kiev, USSR /World Championships	Letsko et al.		
1977	Kiev, USSR/ Competition of Socialist States	Igor' Egorov		<b>Kryl'ya Rodiny</b> , September 1979, p. 21
1977	Chateauroux, France/ European Championships	Viktor Letsko		
26 July 1977	Podmoskovnoe <sup>64</sup> /Class C-1.B, Group I Light Airplanes World Record	O. Bulygin	319.5 kilometers per hour in level flight over 15- 25 kilometer course	<b>Kryl'ya Rodiny</b> , September 1977, p. 29
1978	Ceske Budejovice/World Championships	Yaikova and women's team		Footnote <sup>65</sup>
17 January 1979	Podmoskovnoe/Class C-1.B, Group I Light Airplanes World Record	Svetlana Savitskaya	Time-to-climb to 3,000 meters 4 min 21.4 seconds. World & women's record.	Footnote <sup>66</sup>
1981	Punits, Austria/ European Championships	Viktor Smolin	Men's	Footnote <sup>67</sup>
1981	Punits, Austria/ European Championships	Valentina Yaikova	Women's	Footnote 36

<sup>64</sup> A euphemism for Zhukovskiy airfield during the Cold War.

<sup>65</sup> *World Aerobic Championships Overall*, 2003 <[http://www.haute-voltage.com/inter/results/archives/wac/70\\_78\\_results.htm#05](http://www.haute-voltage.com/inter/results/archives/wac/70_78_results.htm#05)> (02 November 2003).

<sup>66</sup> Milton M. Brown, Ed., **Aviation & Space Records World and United States**, National Aeronautic Association, 1984, pp. 24 & 148.

<sup>67</sup> *Winners of European Championships*, 2002, <<http://www.eac2002.lt/en/history/champions.htm>> (02 November 2003).

1982	Spitzerberg, Austria/World Championships	Viktor Smolin	Lyubov' Nemkova won silver for women	Footnote <sup>68</sup>
2001	Parkes, New South Wales/ New South Wales Championships (Australia)	Hans Litjens	Intermediate class	Footnote <sup>69</sup>
2001	Wangarata, VIC/Victoria Championships (Australia)	Hans Litjens	Intermediate class	Footnote <sup>68</sup>
2002	Parkes, New South Wales/ National Championships (Australia)	Hans Litjens	Intermediate class	Footnote <sup>70</sup>
2002	Victoria Championships (Australia)	Hans Litjens	Intermediate class	Footnote <sup>69</sup>
4 October 2002	Three Yak-50 fly beneath bridge across Nyaris River not far from Vil'nyus, Lithuania, in an attempt to get into the <b>Guinness Book of Records</b> .	Ex-Lithuanian Premier Rolandas Paksas and two friends	Paksas was a member of the Lithuanian DOSAAF aeroclub and participated in national-level meets in the 1970s and 1980s. <sup>71</sup>	Footnote <sup>72</sup>

<sup>68</sup> *World Aerobic Championships Overall, 2003* <[http://www.haute-voltige.com/inter/results/archives/wac/80\\_88\\_results.htm#01](http://www.haute-voltige.com/inter/results/archives/wac/80_88_results.htm#01)> (02 November 2003).

<sup>69</sup> *Australian Aerobic Club Home Page*, 03 September 2003, <<http://www.aerobaticsoz.asn.au/2001results.htm>> (06 November 2003)

<sup>70</sup> *Australian Aerobic Club Home Page*, 03 September 2003, <<http://www.aerobaticsoz.asn.au/2002results.htm>> (06 November 2003)

<sup>71</sup> A. Koss, *Na Porshnevykh Samoletakh (On Piston Airplanes)*, **Kryl'ya Rodiny (Wings of the Motherland)** (in Russian), November 1980, p. 21.

<sup>72</sup> *Russian Air Force Fight & Storm Squadron*, News: **Litovskie Politiki Proleteli pod Mostom na Yak-50 (Lithuanian Politicians Fly Beneath Bridge in Yak-50)**, <<http://www.rossteam.ru/modules.php?op=modload&name=News&file=article&sid=163>> (04 November 2003).

## ANNEX II

### Access to Photographs

The following is an unedited list of Web links to sites which have at least one photograph of the Yak-50. Most photos were taken since the break-up of the Soviet Union and not during the aircraft's Communist era.

[http://www.cals.lib.ar.us/miller/images/YAK\\_YAK50.jpg](http://www.cals.lib.ar.us/miller/images/YAK_YAK50.jpg)

<http://www.bearcraft-online.com/museum/museum.htm?mid=93>

<http://home.swipnet.se/~w-75411/yak50.html>

<http://avia.russian.ee/air/russia/jak-50.html> has perhaps best photo of East German Yak-50

[http://www.france-voltige.org/Photos/Yak\\_50.jpg](http://www.france-voltige.org/Photos/Yak_50.jpg)

<http://www.ksak.se/klubbar/VasterdalarnasFK/alu/su.jpg>

<http://www.aardvark-aviation.com/hg-funk.html>

<http://www.aardvark-aviation.com/hg-bwfm.html>

[http://www.redstaraviation.com.au/YAKS/YAK\\_50\\_55\\_55M/yak\\_50\\_55\\_55m.html](http://www.redstaraviation.com.au/YAKS/YAK_50_55_55M/yak_50_55_55m.html)

<http://www.russianaeros.com/yak50product.htm>

<http://www.aviation.ru/Yak/Yak-50.jpg>

[http://www.geocities.com/bulgarian\\_aviation/after1945/yak50a.htm](http://www.geocities.com/bulgarian_aviation/after1945/yak50a.htm) (small photo of one in Bulgarian museum)

<http://aviabvvaul.narod.ru/barnaul/bar017.jpg> at Barnaul

<http://aviation.zonebg.com/air/planes/yak-50/index.php> (Bulgarian and German)

[http://www.foxbat.ru/maks/museum\\_vs/museum\\_vs\\_03.htm](http://www.foxbat.ru/maks/museum_vs/museum_vs_03.htm)

<http://yakpilots.org/yak52.html> (US owned, probably already seen)

[http://www.bredow-web.de/Berlin\\_Schoenefeld/Yak\\_50/yak\\_50.html](http://www.bredow-web.de/Berlin_Schoenefeld/Yak_50/yak_50.html)

[http://www.bredow-web.de/diverse\\_Flugtage/Yak\\_50/yak\\_50.html](http://www.bredow-web.de/diverse_Flugtage/Yak_50/yak_50.html)

<http://www.yakuk.com/yak50pics.htm>

<http://www.pilotlist.org/tagazous/yak50.html>

<http://www.acf.clara.net/scale/scale-pics-1/low-wing/yak-50/yak-50.html>

<http://www.aerobatics.lt/products50.htm>

<http://www.shanaberger.com/images/Yak-50.jpg>

[http://www.geocities.com/aerobob\\_images/Warbirds/Yak-50-2.html](http://www.geocities.com/aerobob_images/Warbirds/Yak-50-2.html)

[http://www.geocities.com/aerobob\\_images/Warbirds/Yak-50-1.html](http://www.geocities.com/aerobob_images/Warbirds/Yak-50-1.html)

<http://www.jetphotos.net/showphotos.php?aircraft=Yak%2050>

<http://www.jetphotos.net/showphotos.php?aircraft=Yakovlev%20Yak-50> (probably same photos as above)

<http://perso.wanadoo.fr/aviationjp/GALERIE/YAK50.htm>

<http://www.ppl.flyer.co.uk/aerofair2000/ra44533.html>

<http://www.ppl.flyer.co.uk/aerofair2000/g-bwjt.html>

<http://www.yakclub.org/shopHicksphoto.html>

<http://www.airmuseumsuk.org/Shut030601/1024/pages/072%20Yakovlev%20Yak%2050.htm>

<http://lsss.homestead.com/yak50.html> (Interesting recordings included)

<http://members.lycos.nl/aviator/aviation/images/G-BWXX-12847-big.jpg>

[http://www.yak-aviation.com/50\\_aircraft.html#50\\_preoh](http://www.yak-aviation.com/50_aircraft.html#50_preoh)

<http://www.biic.de/aviation-museum/planes/country/russia/planes/183.htm> (Photo is of East German marked aircraft)

<http://www.qccuk.com/pfa/G-BWYK.htm>

<http://www.qccuk.com/pfa/LY-JDR.htm>

<http://www.aerowebpace.co.uk/props/0yak-50.htm>

<http://home.arcor.de/grisu18/yak-rechlin.htm>

<http://www.southportairshow.freesevers.com/cgi-bin/i/G-IVAR.jpg>

<http://www.yakovlevs.com/gallery.cfm> Yakovlevs Photo Gallery (a British team)

<http://www.qccuk.com/pfa/G-FUNK.htm>

<http://pages.eidosnet.co.uk/~hawkerhurricane/ra-44461.htm>

<http://pages.eidosnet.co.uk/~hawkerhurricane/ra-44549.htm>

<http://pages.eidosnet.co.uk/~hawkerhurricane/ly-agg.htm>

[http://www.nutrocker.co.uk/images/slidescans/yak50\\_barton\\_89b.jpg](http://www.nutrocker.co.uk/images/slidescans/yak50_barton_89b.jpg)

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## AUTHOR'S NOTES

Text from this study may be lifted in whole or in part verbatim and without attribution, with the understanding that this study may at some time in the future be sold or given to others who will have the same right. Text quoted within the study that might be used should, of course, be attributed to the appropriate source.

Unattributed photographs are part of the author's collection; remaining photographs are copyright by the source publication or Web site. Most photographs were scanned at a high resolution; therefore, they can be enlarged by two or three times in software without any loss of resolution.

The map was created using the search facility of the National Geographic Web site (<http://www.nationalgeographic.com/maps/>) and merging the results of two searches together into one map using Adobe Photoshop software. As such, the map is copyrighted by the National Geographic Society.

<http://www.glavpryg.ru/photo/borkymay/borkymay.html> has numerous photos of Borki (and people) today.

Some Russian Web sites referenced in this study only operate during the Moscow business day (approximately 1:00 a.m. to 10:00 a.m. U.S. East Coast time.)

The following tools were used:

- The *Copernic Professional* Internet search tool, which yielded a disappointingly small number of Russian sites to review.
- Yandex Russian-language search engine (<http://www.yandex.ru/>) where over 680 Web site descriptions were reviewed.
- The Russian-language search engine at <http://www.mail.ru/> where about 500 Web site descriptions were reviewed.
- The Russian-language search engine at <http://www.aport.ru/>, which basically was worthless and where over 800 descriptions were reviewed.
- The Google (<http://www.google.com/>) Russian-language search capability, where about 300 Russian-language site descriptions were reviewed. A search in English for "Yak-50" on the Google search engine resulted in approximately 850 site descriptions being reviewed. A search for "Jak-50" yielded only several European sites to review.

Of the more than 3,100 site descriptions reviewed, many were duplicates. Approximately 5 percent of the sites actually were visited and explored for information relevant to the study.

Dozens of issues of **Kryl'ya Rodiny (Wings of the Motherland)** from January 1972 to December 1981 were reviewed for this study.

This study has been converted to Adobe Acrobat; it is available in Microsoft Word format on request, which is discouraged because of the size of the file.