

Russian Aerospace Forces and the Syria Campaign: An Assessment

There is no doubt whatsoever that the lion's share of the Russian defence budget funds for the years 2011–20 was allocated to the Aerospace Forces (VKS – *Vozdushno-Kosmicheskiye Sily*) namely, RUR4 trillion out of total RUR19 trillion¹ (or 21 per cent of budget sum US\$ 337 billion). The level of financial allocations clearly highlighted the armed forces priority in the eyes of President Vladimir Putin and the top military brass. The forces proved to be a crucial tool in the hands of President Putin and the military establishment. And the VKS continue to play an important role in President Putin's overall military strategy in particular after a successful operation in Syria. VKS operations in Syria validated the huge investment in the establishment of a new combined command for aerospace forces as a new branch of the Russian military.

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Introduction

The present article deals with the current state of the VKS. First, attention is paid to its new structure and equipment, pilot – aircrew shortages, missions and training, the modernised forces procurement programme compared prior to and after operations in Syria. Second, a careful assessment of the actual lessons learned during that Syrian combat deployment and sustainment operations having involved almost every conventional weapon system and platform operated by the VKS is drawn. Third, it provides analysis of the growing importance and accelerating development of unmanned aerial vehicles (UAVs) that will remain on the Russian military agenda for quite some time. Fourth, concluding remarks offer a summary reminding the Western Alliance of the importance to understand these dramatic and substantive modernisation programmes that have brought the VKS into a premier world class status. As a result, the strength and the growing capabilities of the VKS should neither be underestimated nor ignored. It

should hence be clearly taken into account by the NATO allies within their overall analysis of the Russian military capabilities.

It should be remembered that the Russian economy is primarily geared for military objectives and President Putin as Commander-in-Chief is the one who ultimately decides on the level of defence budget allocations, procurement issue and the overall national security policy. In an article published in the «Moscow Times online», Prime Minister Dmitry Medvedev has announced that the Kremlin will not cut state defence spending despite Russia's economic woes. Prime Minister Medvedev said at a defence industry meeting on 31 January 2017 that: “The Funds have already been set aside for the coming years and their volume would not be changed.” The plan is due to cover a new modernisation programme for the country's military-industrial complex (MIC) between 2018 and 2025² (should be read as 2027).

¹ For the complete article, see Susanna Oxenstierna, “Russian Defence Spending and the Economic Decline”, *Journal of Eurasian Studies*, 7:1 (2016), online at: <https://www.sciencedirect.com/science/article/pii/S1879366515000287>. See in particular Table 1: Allocation of Funds in the Ministry of Defence for the State Armaments Programme (Gosudarstvennaya ProgrammaVooruzheniya – GPV) 2020. Ibid. For some correction in the data provided by Susanna Oxenstierna namely, that for purchasing of aviation hardware was allocated about RUR4.5 trillion, see <https://kommersant.ru/doc/3299342> – online on 18.5.2017. According to Tatiana Shevtsova, Deputy Minister of Defence for Finance, the GPV 2027 foresees allocation of about RUR20 trillion. However, specific allocations for the branches of the armed forces were not disclosed. For the complete article, see http://www.ng.ru/politics/2018-01-26/1_7159_moscow.html. According to a recent article by Andrei Lyubimov citing the Kommersant 2017 report about RUR19 trillion (US\$340 billion) are to be allocated for the GPV 2027 programme. For the complete article, see “Putin Signs New Decree for Military Rearmament, Kremlin Confirms”, *The Moscow Times* online at: <https://themoscowtimes.com/news/putin-signs-new-decree-military-rearmament-kremlin-confirms-60631> – online on 26.2.2018

² For the complete article, see online at: <https://themoscowtimes.com/news/kremlin-refuses-to-cut-russian-defense-budget-57000> – online on 1.2.2017. See also Matthew Bodner, “Russia's Defense Budget – Down, But Not Out”, *The Moscow Times* online at: <https://themoscowtimes.com/articles/russias-defense-budget-down-but-not-out-57467> – online on 17.3.2017. Roger McDermott, “Shoigu Promotes Russia's 'Effective Army' Plans to 2025”, Jamestown Foundation, *Eurasia Daily Monitor*, 14:15 (2017), see online at: <https://jamestown.org/program/shoigu-promotes-russias-effective-army-plans-2025/> – online on 25.4.2017. “NATO Expert: Russia Cuts Defence Spending, but the Military Buildup Will Continue [Interview]”, see online at: <http://www.defence24.com/nato-expert-russia-cuts-defence-spending-but-the-military-buildup-will-continue-interview> – online on 13.11.2017. For the recent article on no intention of reducing defence spending, see online at: http://www.ng.ru/politics/2018-01-26/1_7159_moscow.html. Despite Western misgivings about the ability of Russia to fully fund the GPV 2027 the author does not share such concerns given that the Russian economy is primarily geared for military goals.

Thus far, Western reaction to the speedy modernisation of the Aerospace Forces in particular has been rather muted so far, to say the least. The only noteworthy reaction came from General Frank Gorenc, former Commander of the US Air Forces Europe and Africa, who retired on 1 October 2016.³

Context

In the name of its own security, the Kremlin has developed a doctrine to use military means in pursuit of political objectives, first in Ukraine and later in Syria. The doctrine mandates the creation of modern, deployable forces to conduct swift operations across the full spectrum, from small-scale deniable missions all the way to lethal aerial offensives. The projection of Russian power is central to President Putin's vision to make the country a force to be reckoned with again. The Kremlin strongly believes that it is threatened by the hostile West. As a result, the rearmament programme is seen by the Kremlin as an absolutely essential element for regime survival, while at the same time the hostile West must learn a lesson in deterrence and be pushed back. Whether or not the West agrees with President Putin's approach is irrelevant to the latter.

A subsequent VKS successful aerial operation in Syria from a Russian perspective validated the argument for merging and streamlining the forces.

According to the military doctrine, the VKS plays a pivotal role as a defender of the domestic airspace and a spearhead of the aerial mission abroad. As a result, an establishment of a new combined command for aerospace forces as a new branch of the Russian military was a logical consequence of the military doctrine. The VKS was formed by the merger of the Air Force and Aerospace Defence Forces on 1 August 2015. Sergei Shoigu, Minister of Defence, said at the time that: "Joining the Air Forces and Aerospace Defence was the best option to improve the system of aerospace defence of the country."⁴ A subsequent VKS successful aerial operation in Syria from a Russian perspective validated the argument for merging and streamlining the forces. Another step-in rebranding and expanding the VKS appeal was the announcement of Minister of Defence Shoigu made on 12 August 2017: "Female candidates are to be accepted for the first time to train as pilots for Aerospace Forces. There will be few of them, 15 in all. But given the quantity of applications that we receive (we have received hundreds of letters), we cannot ignore



Figure 1 Colonel General Sergey Surovkin, VKS Commander since November 2017 (Collection Author)

them."⁵ There is a clear understanding among the top military brass that females' participation is no longer a taboo subject and should be encouraged. We can only assume that experience in Israel and the United States in particular of female pilot education, training and actual deployment was carefully analysed and, as a result, led to the decision of Minister Shoigu to open gates of the High Military Aviation School for Pilots in Krasnodar to future female pilots. The result of the female pilot education and training and its overall impact on the VKS is likely to be known in the coming decade.

A subsequent VKS successful aerial operation in Syria from a Russian perspective validated the argument for merging and streamlining the forces.

Colonel General Sergey Surovkin, who commanded the Russian air grouping (also known as the Air Force group) in Syria, was appointed as the new commander of the VKS in November 2017. Even though General Surovkin comes from the army, according to reports, he was able to increase the coordination level of ground troops, air-defence forces and the VKS.⁶ Hence, the key issue in the context of VKS is the coordinating role of General Surovkin ever since, in every military exercise in Russia air combat inter-service coordination is of utmost importance.

VKS Structure

There is an Air Force Command under each military district (MD) with 1st Air Force Command under the West-

³ See online at: <http://www.af.mil/About-Us/Biographies/Display/Article/104632/lieutenant-general-frank-gorenc/>.

⁴ For the complete article, see Nicholas de Larrinaga, "Moscow Merges Services into Single Aerospace Arm", IHS "Jane's Defence Weekly", 12.8.2015, 5; <http://kommersant.ru/doc/2781437> – online on 3.8.2015

⁵ For the complete article, see online at: <https://www.yahoo.com/news/women-train-russian-air-force-pilots-171751260.html> – online on 14.8.2017. Minister of Defence Shoigu added that the VKS will begin training female military pilots for the first time since the fall of the Soviet Union in 1991. And the first group of female pilots will be sent to the High Military Aviation School for Pilots in Krasnodar on 1 October 2017. For the complete article, see online at: <https://www.rt.com/news/399454-russia-female-military-pilots/> – online on 14.8.2017. For confirmation that the first 15 female pilots enrolled in the High Military Aviation School for Pilots in Krasnodar, see Boris Egorov, "Queens of the Sky: The Girls Taking Russia's Air Force by Storm", "Science and Tech" online at: <https://www.rbth.com/science-and-tech/326321-queens-of-sky-girls> – online on 4.10.2017. For the questions and answers related to the place and role of female pilots, see Andrei Polunin, "Shoigu Usilivaet Aviatsiyu Novymi "Nochnymi Ved'mami" ("Shoigu Strengthened the Air Force by (Recruiting) New "Night Witches")", in "Svobodnaya Pressa" online at: <http://svpressa.ru/war21/article/179065> – online on 14.8.2017. Hereafter cited as Polunin, "Shoigu Usilivaet."

⁶ For the complete article, see online at: <https://southfront.org/sergey-surovkin-russian-general-that-turned-tide-of-syrian-war/> – online on 15.12.2017



Figure 2 Russian Military Districts with Air Components (http://www.easternorbat.com/html/russian_air_force_eng.html)

ern MD headquartered in Saint Petersburg, 2nd under the Central MD headquartered in Yekaterinburg, 3rd under the Eastern MD headquartered at Khabarovsk, and 4th under the Southern MD headquartered at Rostov-on-Don, plus the independent Long-Range Aviation Command and Transport Aviation Command. SAM-based air-defence structures and assets are under the Aerospace Defence Command (not part of the Air Force proper). The VKS has about 180 000 personnel.⁷

To the aforementioned structure we need to add the Strategic Defence Forces that came under the Aerospace Defence Forces that were ultimately merged with the Air Force. The A-135 anti-ballistic missile (ABM) network around Moscow currently includes 64 53R6 Gazelle interceptors with conventional warheads. Several S-300 PMU-2, Antey 2500 (improved version of S-300V) and S-400 land-mobile batteries are deployed across the national territory, and these would have the capability to intercept at least cruise missiles.⁸ VKS missions and roles have been defined in general terms as:

- Repelling aerospace threats and defending posts of state management and military control, groupings of troops (forces), administrative and political centres, industrial

and economical regions, most important economic and infrastructure facilities;

- engaging enemy facilities and troops with common conventional and nuclear means of destruction;
- aviation support of troops from other services and branches.

Pilots Shortage, Training and Modus Operandi

According to the Minister of Defence Sergei Shoigu, “the Syrian operation highlighted a shortage of combat pilots. The VKS were short of 1300 pilots in 2016. As a result, the service of the flying staff was extended and the service of the staff with very complex skills was extended for further five years. The shortage of combat pilots are planned to be solved in 2018.”⁹ What Shoigu did not mention was clearly spelled out in an article penned by Dave Majumdar, Defence Editor at the “National Interest”, that according to an unknown Russian source “we have a serious problem with experienced pilots.” This comes, even though a lot of much needed new equipment, such as the Su-30SM,

⁷ “Military Technology World Defence Almanac 2017”, Special Issue XLI (2017), 192. Whether or not 180 000 include Naval Aviation staff (Ibid, 191) is not clear. Hereafter cited as Military Technology World Defence Almanac. Information pertained to the exact location of Western MD originates from the International Institute for Strategic Studies, “Chapter Ten: Country Comparisons and Defence Data”, *The Military Balance 117:1* (2017): 218. For Central MD, Ibid, 220. For Eastern MD, Ibid, 221 and for Southern MD, Ibid, 220. According to the International Institute for Strategic Studies, “Chapter Ten: Country Comparisons”, the Aerospace Forces including conscripts has 165 000 personnel (216) plus 31 000 of the Naval Aviation (215). Hereafter cited as IISS, “Chapter Ten: Country Comparisons.” Thus, a total of 196 000 and not 180 000 as cited in Military Technology World Defence Almanac. Number of pilots under the Long-Range Aviation Command and Transport Aviation Command are not known.

⁸ Military Technology World Defence Almanac, 189.

⁹ <http://kommersant.ru/doc/3226991> – online on 22.2.2017. That was the first time ever that the MoD acknowledged the shortage of pilots. For the complete article, see Sergei Gur’yanov, “Shoigu Zayavil o Nekhvatke 1.3 Tysyachi Voennykh Letchikov” (“Shoigu Announced about Shortage of 1300 Combat Pilots”), in “Vzglyad” online at: <https://vz.ru/news/2017/2/22/859195.html>. In a challenging article published online, the unidentified author mentioned explicitly that the shortage of combat pilots is not going to be solved in 2018 there is currently only one (one been emphasised) High Military Aviation School for Pilots in Krasnodar. 65 pilots graduated in 2016 and 150 are to be graduated in 2017. Therefore, the question was how the pilot shortage can be solved under such conditions in just one year. For the complete article, see online at: <https://www.yaplakal.com/forum7/topic1554713.html> – online on 25.2.2017. For explanation concerning the shortage of pilots, see Polunin, “Shoigu Usilivaet”, op.cit. In another article authors claimed that pilot training will proceed en masse and 600 pilots are to be graduated in 2018. For the complete article, see Nikolai Surkov and Aleksei Ramm, “Podgotovku Letchikov Pustyat na Potok” (“Pilots Training Will Proceed En Masse”), in “Aviation Explorer” online at: <https://www.aex.ru/fdocs/1/2017/10/2/28800>. Hereafter cited as Surkov/Ramm, “Podgotovku Letchikov”.



Figure 3 Yak-130 (COCKPIT Calendar_Mader)

the Su-34 and the Su-35S have been received.¹⁰ Furthermore, the speedy recruiting and training of cadets at the High Military Aviation School for Pilots in Krasnodar may lead to a quantitative leap but at the same time to quality risks and thus is likely to have a long-term negative consequence for the VKS. After all, pilot training is not exactly considered a mass production technique. Furthermore, several of the High Military Aviation Schools for Pilots were closed down and the Aviation School in Krasnodar found itself unable to graduate so many needed pilots due to the shortage of new Yak-130 trainer aircraft and the early retirement of the Czech-built L-39 from service due to the lack of spare parts. At the moment, VKS and Naval Aviation continue to use 150 L-39,¹¹ while the number of Yak-130s will reach 109 aircraft by the end of 2018.¹²

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Furthermore, according to Dave Majumdar, Russian forces have had to reconstitute skills such as aerial refuelling from scratch. The process is long and arduous – and Rus-

sia is only party on the way there.¹³ This point was further reinforced by Anton Lavrov, an independent aviation analyst, who concluded that “the Syrian operation highlighted deficiencies such as the VKS lack of air-refuelling aircraft as well pilots skilled in aerial-refuelling mission.”¹⁴ Therefore, a substantial shortage of pilots is indeed a severe problem for a rejuvenated VKS. It is evident that this problem is not going to be solved in 2018 but may take between three and five years and/or longer to be taken care of.

According to top air force instructor Major Andrei Krasnoperov, “graduates of the High Military Aviation School for Pilots are awarded ‘third class pilot certificate’, ‘second class pilot certificate’, ‘first class pilot certificate’ and ultimately ‘pilot sniper certificate’.¹⁵ According to new plans flight hours will be increasing from the current levels (October 2017) of 60 hours per year to 90 hours per year in the coming years.¹⁶

Back in August 2012, Air Force Commander, General Victor Bondarev, said that “over the past four years, the average annual flight time for junior pilots in tactical fighter

¹⁰ For the complete article, see “Russia’s Military Still has a Long Way to go before it catches up to America”, in “The National Interest” online at: <http://nationalinterest.org/blog/the-buzz/russias-military-still-has-long-way-go-before-it-catches-18824> – online on 22.12.2016. Hereafter cited as Majumdar, “Russia’s Military”.

¹¹ For the complete article, see Dmitrii Litovkin and Aleksei Ramm, “Voennoe Vedomstvo Zakupit Novyi Uchenbyi Samolet s Obratnoi Strelovidnostyu Kryla u Chastnogo Otechestvennogo Razrobotchika” (“Ministry of Defence Purchases New Trainer Aircraft with Forward Swept Wing from the Private Russian Developer”), see online at: <http://iz.ru/621390/dmitrii-litovkin-aleksei-ramm/strannyi-samolet-poluchil-voennyi-kontrakt> – online on 24.7.2017

¹² For the complete article, see Nikolai Novichkov, “Russian MoD to Receive three T-50 Fifth-Generation Fighters Among Aircraft Deliveries in 2017,” see online at: <http://janes.ihs.com/Janes/Display/1798695> – online on 10.3.2017

¹³ Majumdar, “Russia’s Military”, op.cit.

¹⁴ For the complete article, see online at: <http://agitpro.su/rezultaty-dejstviya-vks-v-sirii-vyglyadyat-nastoyashhej-fantastikoj/> – online on 30.9.2017. For the shortage of air-refuelling tankers read the following: Russia’s United Aircraft Corporation (UAC) has rolled out the first Il-78M-90A air-refuelling tanker on 29 November 2017. It is expected to make its maiden flight in 2018. The VKS is expected to order 30 new Il-78M-90A air-refuelling aircraft to supplement and/or later replace 15 Il-78 and Il-78M air tankers. Vladimir Karnozov, “Russia’s New Aerial Tanker Emerges”, see “Aviation International News” online at: <https://www.ainonline.com/aviation-news/defense/2017-12-18/russias-new-aerial-tanker-emerges>. Gareth Jennings reported on behalf of “Jane’s Navy International” citing Russian MoD that the Russian Navy is training its land based combat pilots for aerial refuelling missions for the first time in recent history. For the complete article, see “Russian Navy Begins Aerial Refuelling Training for its Combat Pilots,” online at: <http://janes.ihs.com/Janes/Display/1829449> – online on 20.2.2018. Hereafter cited as Jennings, “Russian Navy”. See also online at: <https://sputniknews.com/russia/201802191061801570-su-30sm-jets-air-refuel/>.

¹⁵ For the complete article, see online at: <http://nsn.fm/society/ekspert-samoletov-vvs-khvataet-ne-khvataet-letchikov.php> – online on 12.8.2014

¹⁶ Surkov/Ramm, “Podgotovku Letchikov”, op.cit.



Figure 4 Su-35S at Dubai Airshow: One of the most potent Russian combat jets (Collection Author).

regiments has been rising steadily to 85 hours, compared with as little as 10 to 12 hours a decade ago. Now we have everything to conduct combat training at a high pace, from jet fuel and money for aircraft repair and servicing, to new aircraft coming off production lines.”¹⁷ According to the “International Institute for Strategic Studies Military Balance 2017”, Russian naval aviation pilots have averaged 80 flight hours annually¹⁸ or 7 hours a month – barely enough just to get the aircraft off the ground and returned safely. Mainstream tactical aviation pilots in front line are getting between 60 and 100 flight hours a year¹⁹ (5 to 8 hours a month or one sortie a week) but those forward alert bases are getting slightly more. Pilots in transport aviation are averaging 120 hours a year²⁰ which is minimally adequate if multiple landings and approaches are made on every sortie.

As a result, pilots continue to make the best of their situation, but the accident rate is continuing to increase. Throughout the whole of the VKS there are delays and shortages but also a slow and proceeding modernisation introducing state-of-the-art competitive equipment.

As for the operational procedures of the VKS pilots, it is to ascertain that pilots often behave brazen and provocative and are intentionally looking for a dogfight with pilots from NATO member states. It can be assumed that such behaviour is likely to be implicitly encouraged by President Vladimir Putin and the top military brass even though it is denied and/or rather dismissed out of hand.

It seems evident that Russia will continue consistently to defend its right for these irresponsible manoeuvres, while Western pilots most likely will continue to resist the urge for the dogfight and behave with restraint.

As for the recurrent issue of transponders that has been repeatedly raised in the past two to three years, Pavel Felgenhauer from “Jamestown Foundation” notes that according to the VKS Commander, General Victor Bondarev, and other air force specialists, Russian military aircraft *are not equipped with transponders* [author’s italics], so it is problematic to “switch them on,” even in response to President Putin’s direct order.²¹ Therefore, the continuing flight activities of Russian military aircraft in the congested airspace of the Baltic States and Northern Europe as well as the airspace of the United Kingdom, the United States and the Black Sea region poses a real danger of collision incidents with commercial airliners. Besides the lack of transponders, Russian combat pilots’ operational mode can be called irresponsible since they wish to show off and send a clear message to their Western counterparts that they are in full control of airspace. It should be emphasised that the flying hours and flight experience over foreign airspace cannot be substituted by simulators. Hence, Russian combat pilots are likely to continue their routine flight patterns. The Russian political and military establishment is not just ignoring and dismissing Western complaints but also claiming Russian fighter manoeuvres to be “standard and absolutely legal and safe”.²² It seems evident that Russia will continue consistently to defend its right for these

17 For the complete article, see Vladimir Karnozov and Chris Pocock, “A Resurgent Russian Air Force Celebrate its Centenary”, “Aviation International News” online at: <https://www.ainonline.com/aviation-news/defense/2012-08-17/resurgent-russian-air-force-celebrates-its-centenary>.

18 IISS, “Chapter Ten: Country Comparisons”, 215, op.cit.

19 Ibid, 216.

20 Ibid.

21 For the complete article, see “Russia and the West Engage in Mutual Deterrence”, Jamestown Foundation, “Eurasia Daily Monitor”, 13:127 (2016), see online at: <https://jamestown.org/program/russia-and-the-west-engage-in-mutual-deterrence/> – online on 14.7.2016. See also Jaanus Piirsalu, “Russian Warplanes Cannot Switch on Transponders”, see online at: <https://news.postimees.ee/3826371/russian-warplanes-cannot-switch-on-transponders-online> on 6.9.2016. Therefore, using the notion that the Russian combat fighter flying with turned off transponders is wrong and misleading.

22 For the recent incident in the Black Sea region and reaction of the Russian MoD, that “The Russian fighter’s manoeuvres on 29 January [2018] were standard and absolutely legal and safe for the U.S. surveillance plane”, see online at: <https://www.rferl.org/a/russia-military-talks-tough-unsafe-flyby/29013148.html> – online on 1.2.2018



Figure 5 Su-30SM: Advanced derivative of the Su-30MK combat aircraft family (Collection Author).



Figure 6 Mi-28N at Kubinka (Collection Author).



Figure 7 Mi-35M at Dubai Airshow (Collection Author).

irresponsible manoeuvres, while Western pilots most likely will continue to resist the urge for the dogfight and behave with restraint. For how long is hard to say.

Procurement and the State of the Aviation Fleet before 30 September 2015

The Russian-Georgian war of August 2008 highlighted serious shortcomings with the air fleet equipment and deficiencies of the Russian air operations in Georgia. As a result, prior to the air force deployment in Syria that began on 30 September 2015, the air force procured a relative large variety of modern and upgraded aircraft and helicopters and increased the flight hours for pilots. This includes about 68 MiG-29s and 188 Su-30SM/34/35 aircraft as well as 63 Ka-52 and 100 Mi-28N and 49 Mi-35M helicopters. The quality of the fleet and pilot training excelled compared to what was known in the West back in 2008.

The only known example of the Western general reaction to what the merger of the Air Force and Aerospace Defence Forces has accomplished so far was made on 14 September 2015, 45 days after the merger. At the Air Force Association's annual symposium, General Frank Gorenc, Commander of the US Air Force Europe and Africa, said that "Russia's military modernisation has diminished NATO's air superiority in Europe. They have closed the gap. The advantage that we have from the air, I can honestly say, is shrinking. But the more alarming is their ability to create

anti-access/area denial (A2/AD)." Following difficulties that Moscow experienced during the 2008 invasion of Georgia, Russia initiated what General Gorenc called "a very large modernisation. They learned a lot along the way, and they made moves to close the asymmetric advantage posed by the quality of our air force; they have done it." General Gorenc was particularly concerned about two A2/AD zones – Crimea on the Black Sea and Kaliningrad on the Baltic Sea. He continued saying that "some of the array that is in Kaliningrad extends into Poland today. That is a fact. Russia's advanced A2/AD capabilities diminishes US air superiority. With air superiority, everything is possible. Without it, nothing is possible."²³

23 For the complete article, see Marina Malenic, "AFA 2015: Russia Has Closed Air Power Gap with NATO, US Warns", see online at: <https://janes.ihs.com/CustomPages/Janes/DisplayPage.aspx?ShowProductLink=true&DocType=News&ItemId=+++1752317> – online on 15.9.2015. Hereafter cited as Malenic, "AFA 2015". For the dramatic expansion of Russian military aviation in Kaliningrad in particular, see Paul Goble, "Moscow Now Wants Missile Rather Than a Base in Belarus, Minsk Analyst Says", Jamestown Foundation, "Eurasia Daily Monitor", 15:10 (2018), online at: <https://jamestown.org/program/moscow-now-wants-missiles-rather-base-belarus-minsk-analyst-says/> – online on 23.1.2018. See also Anna Maria Dynar, "Russia Strengthens Military Presence in Kaliningrad", Polish Institute of International Affairs (PISM) 3 (2018), online at: <http://www.pism.pl/publications/spotlight/no-3-2018#> – online on 15.1.2018 and Jennings, "Russian Navy", op.cit. See also Philip Breedlove, "Toward Effective Air Defense in Northern Europe", Atlantic Council, Issue Brief (February 2018), online at: http://www.css.ethz.ch/content/dam/ethz/special-interest/gess/cis/center-for-securities-studies/resources/docs/Atlantic%20Council%20Toward_Effective_Air_Defense_in_Northern_Europe-2.pdf, pp.1-6 and pay attention to p. 2 in particular.



Figure 8 Su-34 at Kubinka: One of Russia's most modern fighter-bomber/strike aircraft (Collection Author).

The United States and its allies face a different Russia in general and a better combat ready VKS in particular.

The extensive use of the air fleet in Syria has clearly indicated that results accomplished before the Syrian deployment, i.e. a qualitative gap that existed between Russia and the West was “closed” as stated by General Gorenc. The United States and its allies face a different Russia in general and a better combat ready VKS in particular.

Engagement in Syria: Successes and Failures

The Syrian operation was a real boon as well as boost for the VKS in getting their pilots and aircrews back up to proficiency. It also provided pilots with the necessary experience of operating fighter aircraft and helicopters beyond the boundary of Russian Federation in the combat zone of Syria. According to VKS Commander Victor Bondarev, “as of August 2017 the entire army aviation flight staff has rotated through Syria, and some have served two tours already. One should not forget that apart from the combat aircraft and [attack] helicopters, transport aircraft also played an important role”²⁴ as well as two Tu-160Ms deployed in Syrian operations.

²⁴ For the complete article, see online at: <https://southfront.org/russian-aerospace-forces-syria/> – online on 31.8.2017. See also Ruslan Pukhov, “Moscow-based Think-Tank Director: Russia’s Unexpected Military Victory in Syria”, see online at: <http://cast.ru/eng/news/moscow-based-think-tank-director-russia-s-unexpected-military-victory-in-syria.html> – online on 11.12.2017. Hereafter cited as Ruslan Pukhov, “Moscow-based Think-Tank Director.” As of September 2017, 86 per cent of the Aerospace Forces’ personnel gained combat experience, including long-range aviation crews: 75 per cent; tactical aviation crews: 79 per cent; military transport aviation: 88 per cent. 89 per cent of Army aviation crews have also served in Syria. For the complete article, see Andrei Akulov, “Russia has Gathered Immense Military Experience in Syria”, online at: <http://russia-insider.com/en/russia-has-gathered-immense-military-experience-syria/ri22018/> – online on 22.12.2017. Hereafter cited as Akulov, “Russia has Gathered”. For the confirmation of the number of VKS aircraft and helicopters in the Syrian campaign, see Andrei Akulov, “Russia has Gathered”.

The Russian Air Force group in Syria has not been very large. It was estimated at various periods at being between 30 and 50 combat aircraft and between 16 and 40 helicopters. The number of sorties per aircraft, however, has been impressively high. By late August 2017, Russian planes and helicopters had flown more than 28 000 missions in Syria and attacked approximately 90 000 targets, with a loss of only one Su-24 aircraft.²⁵ According to Minister of Defence Shoigu the air grouping deployed in Syria conducted more than 34 000 sorties until late December 2017.²⁶

In addition, Lieutenant General Ben Hodges, Commanding General, US Army Europe, told BBC on 22 December 2016 that “what we have seen in Syria, of course, is a demonstration of capabilities. They are using weapons systems in certain situations that are not necessarily required for that tactical situation but they are demonstrating that they have these capabilities, practicing if you will. It is a live fire opportunity to experiment and train with all of their weapons systems.”²⁷

In a pertinent analysis published on 30 March 2016, Ruslan Pukhov noted that the Russian Air Force group’s activities have not led to a defeat of ISIS or the Syrian opposition yet. However, it is obvious that Russian air attacks did have a slow but real effect and were gradually tipping the balance in favour of the Syrian government forces, which have moved from strategic defence to offensive operations, largely tactical so far.

Despite the unprecedentedly intensive combat actions, Russia’s air group has not suffered combat or non-combat losses yet. The only exception was the Su-24 bomber shot down by a Turkish F-16s fighter in an incident near the Syrian-Turkish border on 24 November 2015. Russia’s

²⁵ *Ibid.*, as of October 2017

²⁶ For the complete article, see Roger McDermott, “A Year in Review: Russia’s Military Leadership Reflects on 2017”, Jamestown Foundation, “Eurasia Daily Monitor”, 15:2 (2018) online at: <https://jamestown.org/program/year-review-russias-military-leadership-reflects-2017/> – online on 9.1.2018

²⁷ Majumdar, “Russia’s Military”, *op.cit.*



Figure 9 ALTHIUS HALE-UAV: The UAV is to become operational in 2020 (Collection Author).

Mi-8AMTSh helicopter, sent to find and rescue the pilots from the crash site, was attacked by pro-Turkish rebels and destroyed after an emergency landing. Those have been the only losses of Russian aviation during the Syrian campaign so far.

In general, the VKS has demonstrated an unprecedentedly high-level of combat and operational readiness and their capability to conduct highly intensive combat operations far away from the Russian territory.

Russia's VKS has for the first time in their history used precision-guided weapons in relatively large numbers, including new KAB-500S precision-guided bombs with a satellite-aided guidance system. For the first time, conventional cruise missiles were used in military operations, including new X-101 and modified X-55 air-to-surface cruise missiles, and the Kalibr sea-launched cruise missiles (SLCM). In addition, Russia actively used UAVs, both domestic and Iranian-made, for reconnaissance, fire adjustment, target designation, and evaluation of strike effectiveness during the air campaign in Syria.

In general, the VKS has demonstrated an unprecedentedly high-level of combat and operational readiness and their capability to conduct highly intensive combat operations far away from the Russian territory. The absence of combat and operational losses during the air campaign was impressive.²⁸

At the same time, Pukhov highlighted a rather moderate effectiveness as well as deficiencies of the Russian air operations in Syria. The effectiveness of combat actions was rather moderate. Apparently, the attacks have inflicted less damage on the rebels than was expected, and the Syrian government army has been slow in exploiting the effects of the air strikes. The interaction between the VKS and Syrian government forces on the ground leaves much to be desired. Russia's air support for ground troops does not appear to be quite effective either. On the whole, VKS' operation has demonstrated the limits of air power – something Western powers encountered earlier, too.

Despite the obvious progress, the technological level of Russia's VKS in the Syrian campaign matches roughly that of the US Air Force during Operation Desert Storm of 1991. In other words, they are far behind the US and, generally, Western military aviation. Speaking of precision-guided weapons, Russia uses in Syria mainly munitions with satellite-aided guidance. This type of guidance has certain limitations, including in terms of accuracy. KAB-500S bombs weighing 500 kg and cruise missiles are often too powerful to be used against typical targets in this war. Russian aviation has few, if any, high-precision weapons for use against moving, small-sized and well-fortified targets.

Russian aviation is experiencing an acute shortage of target designation assets for precision-guided weapons. The only exception is the Platan electro-optical targeting system used by new Su-34 tactical bombers. Russian UAVs do not have a target designation capability either. Russia's VKS still does not have targeting pods, which have been used by Western military aviation for the last 25 to 30 years.

Apparently, the effectiveness of Russia's combat actions in Syria was limited mainly by deficient reconnaissance capabilities, rather than a lack of aircraft or weapons. Russian aviation urgently needs specialized reconnaissance

²⁸ For the complete article, see "A Proving Ground of the Future: Russia's Air Campaign in Syria: First Conclusions", online at: <http://eng.globalaffairs.ru/number/A-Proving-Ground-of-the-Future-18075> – online on 30.3.2016. Hereafter cited as Pukhov, "A Proving Ground".



Figure 10 UAV ORION-01 (Collection Author)

aircraft, UAVs with a wide range of equipment and a long-range capability, as well as efficient space-based reconnaissance systems. There is also a complete lack of UAVs with strike capabilities.

Russia has for the first time used its most advanced aircraft Su-30SM and Su-34 (and now also Su-35S), cruise missiles, precision-guided weapons, and UAVs, and practiced intricate forms of interaction between various forces.

Despite these inadequacies, Syria has become a perfect proving ground for testing new tactics and new weapons on a large scale. Russia has for the first time used its most advanced aircraft Su-30SM and Su-34 (and now also Su-35S), cruise missiles, precision-guided weapons, and UAVs, and practiced intricate forms of interaction between various forces. Russia's VKS have been gaining rich combat and operational experience. The operation in Syria seems to have cost Russia relatively little so far.

Whereas the short conflict with Georgia in 2008 resulted in a radical reform of Russia's Air Force, the participation of Russian military aviation in the Syrian campaign will have even more far-reaching effects since the experience acquired during it is immeasurably greater. This will result, among other things, in more intensive development

of the VKS in the next few years.²⁹ It will take some time for the Russian military in general and the VKS high command in particular to incorporate valuable operational experience both positive and negative into their military doctrine. It should be emphasised that for the first time ever the VKS and Syrian government forces on the ground interacted and therefore Pukhov's assessment that "much to be desired" is understandable but unlikely to be fulfilled in the future since both sides do not train together.

As mentioned before, an additional crucial deficiency was highlighted by Andrei Polunin noting that operations in Syria were accompanied by a shortage of pilots and a limited number of aircraft involved in the air campaign and that, as a result, exposed the limitations of the VKS. For a large-scale air operation VKS is unlikely to have sufficient strength³⁰ and capabilities to fight against and ultimately defeat a strong adversary. Only a future air com-

²⁹ For the complete article, see Pukhov, "A Proving Ground", op.cit. For the lack of a targeting pod in particular, see Dave Majumdar, "Russian Air Forces Closes the Gap with the US in One More Key Area", online at: <http://russia-insider.com/en/russian-air-force/ri14302> – online on 12.5.2016. According to Dave Majumdar who cites "Izvestia", Russian industry made a breakthrough in manufacturing piezoelectric ceramic film strips less than 100 micron in width. That in turn led to a breakthrough in building targeting pods. While initially manufacturers like Zelenograd SRI ELPA had trouble producing the filmstrips consistently, eventually they resolved those problems. That led to the Joint Scientific and Industrial Corporation Precision Instrument Systems completing the first prototype targeting pods by the end of 2015. Production of the new pods was set to start in summer of 2016. With the addition of the targeting pods, the Russian Air Force will more or less have matched all capabilities resident onboard US fourth-generation fighter like the F-15, F-16 or F/A-18. Ibid. For deficiencies with reconnaissance capabilities, see Vladimir Tuchkov, "Obkatka Boem: Kakoe Oruzhie Otlichilos' v Sirii, a Kakoe Net" ("Battle-Tested: Arms that Performed Better and Those that Did Not in Syria"), see "Svobodnaya Pressa" online at: <http://svpressa.ru/war21/article/180093/> – online on 27.8.2017. Thus far Russian open sources did not provide information on production of the new pods. For the effectiveness of Su-34 in particular, see International Institute for Strategic Studies, "Chapter Five: Russia and Eurasia", *The Military Balance* 117:1 (2017): 187. Hereafter cited as IISS, "Chapter Five". For an initial lack of interaction between the VKS and Syrian government forces and different local and Iranian-backed militias, see Pavel Felgenhauer, "Russia's New (Old) Heavy Army", Jamestown Foundation, "Eurasia Daily Monitor", 15:27 (2018), online at: <https://jamestown.org/program/russias-new-old-heavy-army/> – online on 22.2.2018

³⁰ For the complete article, see Polunin, "Shoigu Usilit", op.cit.

bat would reveal whether or not the VKS might defeat an equal adversary.

Given that Russia claims to have flown more than 18 000 combat sorties over Syria, this suggests that the Russian air space co-ordination measures have been relatively effective.

Notwithstanding Pukhov's and Polunin's criticism, Tim Ripley highlighted the complexity of Russian air involvement in Syria. Ripley noted that the operation in Syria for the first time involved significant co-operation with an array of new "allies", including Palestinian militias, Lebanese Hizbullah, Iraqi Shia militia, and Iranian forces. Tehran had a similar advisory mission in Syria, so it had to be co-ordinated with the Russian military. Iranian UAVs and Lockheed C-130 Hercules air drop missions also had to be co-ordinated with Russian air operations. The co-ordination of strategic air movements and missile strikes with countries neighbouring Syria, including Iraq, Iran, and Cyprus, as well as with the US-led coalition, was also a new development for the Russian military. Given that Russia claims to have flown more than 18 000 combat sorties over Syria, this suggests that the Russian air space co-ordination measures have been relatively effective.³¹

Modernisation of the VKS after the Syrian Campaign Continues

Modernisation of the VKS goes on and, as a result, slowly changes the balance of air power in favour of Russia. Army General Valery Gerasimov, Chief of Staff and First Deputy Minister of Defence, told an open meeting of the Ministry of Defence (MoD) leadership on 7 November 2017 that "Operational and tactical aviation can now be committed around-the-clock in difficult weather conditions against active electronic countermeasures (ECM) and air-defences. Army aviation capabilities to conduct night missions, launch guided weapons, and counter enemy air-defence systems have increased considerably. 16 surface-to-air missile (SAM) regiments have been re-equipped with S-400 missiles in five years. 19 Pantsir-S SAM and anti-aircraft artillery units have been formed. Radio-technical warfare forces have been supplied with more than 130 modern radars able to detect small low-flying aerial targets. The overall percentage of "modern weapons" in the VKS has reached 72.8 per cent. The breakdown is 72 per

cent for the air force, 68 per cent for air and missile defence, and 81 per cent for space forces."³² He also claimed that reconnaissance and airspace control capabilities as well as air-defence firepower have increased by 50 per cent.

"the VKS will get more than 900 new aircraft and helicopters as well as 900 repaired aircraft and helicopters up to 2020."

In the words of General Victor Bondarev "about 160 aircraft and helicopters should be delivered in 2017." According to General Pavel Kurachenko, VKS' First Deputy Commander, "the VKS will get more than 900 new aircraft and helicopters as well as 900 repaired aircraft and helicopters up to 2020."³³ According to a recent analysis published in *Izvestia*, the VKS frontal aviation is to be comprised of about 1000 fighter aircraft alone by about 2027. This number is by all means less compared with the numbers in the service of the Soviet Air Force but nevertheless sufficient enough to face the threats. Furthermore, it is evident that the outcome of the conflict in the coming decade will not be decided by the frontal aviation alone but by the other [unspecified] components of the VKS.³⁴ To that number we need to add long-range aviation bombers as well as light, medium and heavy transporters, air-refuelling craft, anti-submarine warfare (ASW) aircraft, maritime patrol aircraft (MPA), various types of helicopters and various types of UAVs with and without strike capabilities. Thus, the VKS is likely to present itself as a formidable adversary in the coming decade and the NATO Allies should pay utmost attention to these developments and be prepared for any eventuality.

Unmanned Aerial Vehicles (UAVs) – A New but Still Undeveloped Tool

Besides the operational and tactical aviation, army aviation as well as SAM regiments, Russia has made substantial progress with development, construction and usage of unmanned aerial vehicles. Back in 2012 President Vladimir Putin had announced a budget of US\$12 billion to be invested in UAV development through 2020.³⁵ Ac-

31 For the complete article, see "Russia Learns Military Lessons in Syria", online at: http://www.janes.com/images/assets/758/69758/Russia_learns_military_lessons_in_Syria.pdf – online on 2017, 7. The exact date of the report was not mentioned. For co-operation effort, see Pukhov, "Moscow-based Think-Tank Director", op.cit. Besides the abovementioned coordination efforts, the Russian MoD Information and Mass Communication Department noted that an exchange of information to avoid an inadvertent clash in Syrian airspace was organised between the Russian Air Forces Group in Syria, the US Central Command (Forward) in Jordan, Air Traffic Management in Qatar, command post of the Turkish Air Force and command post of the Israeli Air Force. For the complete article, see online at: <http://milportal.ru/na-forume-armiya-2017-obsudili-itogi-operatsii-vooruzhennyh-sil-rossii-v-sirijskoj-arabskoj-respublike/> – online on 25.8.2017. See also International Institute for Strategic Studies, "Chapter Five", 187-188.

32 For the complete article, see Nikolai Novichkov, "Russian Defence Chief Announces Improvements in Russian Armed Forces", see online at: <http://janes.ihs.com/Janes/Display/1822138> – online on 13.11.2017. Hereafter cited as Novichkov, "Russian Defence Chief". See also "Natsional'naya Oborona" (National Defence) 11 (2017), online at: <http://www.oborona.ru/includes/periodics/maintheme/2017/1129/125422718/detail.shtml>.

33 For the complete article, see online at: <http://vpk-news.ru/news/35342> – online on 26.2.2017. No confirmation was published in the Russian press in support of General Bondarev statement as of yet.

34 For the complete article, see Iliia Kramnik, "Novye Krylia VVS Rossii" ("New Wings of the VKS"), in "Izvestia" online at: <https://iz.ru/679043/ilija-kramnik/novye-krylia-vvs-rossii> – online on 5.12.2017

35 For the complete article, see Mark Galeotti, "Russia's Shiny New Weapons", Open Democracy, see online at: <https://www.opendemocracy.net/od-russia/mark-galeotti/russia%E2%80%99s-shiny-new-weapons> – online on 10.1.2014. According to Derrick Maple, principle analysts for Unmanned Systems at IHS Jane's, "Russia has pledged to spend about US\$10 billion over the next decade to further develop its UAV fleet, including robust armed UAVs similar to some fielded by the United States". For the complete article, see Michael Pearson, "Russia's Resurgent Drone Program", CNN online at: <https://edition.cnn.com/2015/10/16/world/russia-drone-program/index.html>.

ording to Minister of Defence Sergei Shoigu, “the number of UAVs operated by Russian armed forces has increased from 180 in 2011 to more than 2000 in March 2017. Of the 2000 the army today operates 600 modern UAVs compared with most of the systems in service six years ago that were “outdated pilotless flying vehicles.” Three types are known to have been operated over Syria, although none were apparently armed. The three types include two domestically produced UAVs such as Eleron and Orlan and Forpost, the licensed copy of the Israel Aircraft Industries (IAI) Searcher 2 from Israel.³⁶ According to an unnamed MoD official, “With the help of UAVs we monitored the situation across almost the entire Syrian territory all day around”³⁷ but not at night.

According to information of the Naval Forces Headquarters, it was decided several years ago to form UAV units for the navy, but the formation of the units was slightly delayed. The first units are to be created before the end of 2017 and they are to be armed with Forpost and Orlan-10 UAVs. It is expected that the newly created units will be included in the Black Sea Fleet, the Northern Fleet and the Pacific Fleet. They are to be stationed in Severomorsk, on Crimea and on the Kamchatka Peninsula respectively.³⁸ Even though UAV use in Syria was significant, this importance should not be overstated. After all, one of the serious deficiencies of UAV operations in Syria was that none of the UAVs were armed and possessed a capability for high-altitude and long endurance (HALE) as well as overnight operations. Russian UAV manufacturers have yet to manufacture UAVs with strike capabilities. In that respect, the Russians are still lagging behind the leading Israeli and American manufacturers.

Conclusion

President Putin’s plan to increase the VKS inventory to 70 per cent of modern fleet by 2020 has already been fulfilled in 2017 and not as envisaged in 2020. Nikolai Novichkov, Moscow-based “Jane’s Defence Weekly” correspondent, reported in early January 2015 by citing General Yuri Borisov, Deputy Minister of Defence for Procurement, that: “The segment of *modern equipment* [author’s italics] in the VKS, the Navy and the Strategic Missile Forces (or RVSN in Russian) is at the rate of more than 40 per cent.” Currently, only 28 per cent of the Russian Air Force inventory

consists of modern equipment.³⁹ “RIA Novosti” reported in early October 2015 by citing General Borisov that “modern hardware makes up 45.8 per cent of the VKS.”⁴⁰ “VPK online” cited VKS Commander Bondarev, who said on 27 February 2017 that “the share of modern aircraft and helicopters was about 55 per cent and the procurement of equipment continues.”⁴¹ And Army General Gerasimov concluded that “the overall percentage of ‘modern weapons’ in the VKS has reached 72.8 per cent.”⁴² Thus, we can see an immense increase in delivery of modern equipment to the VKS between January 2015 and November 2017. According to Russian open sources, a new contract for delivery of 114 Ka-52 are included in a new State Armaments Programme,⁴³ while about 50 modernised Ka-27s for the Naval Aviation are to be delivered up to 2020.⁴⁴ Thus, it can be said that consistency in plans to deliver modern and modernised aircraft and helicopters remains a trade mark of President Putin, the top military brass and the leadership of the Military-Industrial Complex despite the Russian economic woes the West at large is paying utmost attention to.

... consistency in plans to deliver modern and modernised aircraft and helicopters remains a trade mark of President Putin, the top military brass and the leadership of the Military-Industrial Complex ...

Even though the Russian pilots have not encountered heavy anti-aircraft fire, the high level of modern and/or upgraded aircraft and helicopters used during the combat mission in Syria combined with the fleet proper and timely maintenance and a high level of pilot proficiency were key to success. Although it was estimated that at various periods between 30 and 50 combat aircraft and between 16 and 40 helicopters flew the missions in Syria, the overall pilot team was comprised of pilots from all over the Russian Federation. As a result, pilots were given a chance to fly under combat conditions, an experience that has been long forgotten.

Still, deficiencies highlighted in this article cannot be overlooked. Therefore, the VKS operation in Syria produced mixed results. But for the first time since the Soviet involvement in Afghanistan, the overall performance of Russian pilots can be rated as between good and very

36 For the complete article, see Vladimir Karnozov, “Russian UAVs Find Combat Missions over Syria”, “Aviation International News” online at: <https://www.ainonline.com/aviation-news/defense/2017-03-14/russian-uavs-find-combat-missions-over-syria>. See also Idem, “Extent of Russian UAV Use Over Syria Revealed”, see “Aviation International News” online at: <https://www.ainonline.com/aviation-news/defense/2017-09-21/extent-russian-uav-use-over-syria-revealed>. Hereafter cited as Vladimir Karnozov, “Extent of Russian UAV.” See also <http://kommersant.ru/doc/3226991> – online on 22.2.2017. For the recent data on the UAVs, see Novichkov, “Russian Defence Chief”, op.cit. See Vladimir Karnozov, “Syrian Experience Urges Russia to IntroduceUCAVs”, “Aviation International News” online at: <https://www.ainonline.com/aviation-news/defense/2018-04-02/syrian-experience-urges-russia-introduce-ucavs>.

37 Vladimir Karnozov, “Extent of Russian UAV.” At the same time wording of Karnozov that UAVs have played a prominent role in the “moderate opposition” accepting a truce on Moscow’s terms was not sufficiently backed up. Ibid.

38 For the complete article, see Aleksei Ramm, “U Voennykh Moryakov Poyavyatsya Bepilotnye Polki” (“The Navy Sailors will have UAV Regiments”), in “Izvestia” online at: <http://izvestia.ru/news/673335> – online on 28.3.2017. No confirmation of the formed units was published so far.

39 For the complete article, see “Russia Modernisation Challenged by Lost Imports”, “Jane’s Defence Weekly”, 28.1.2015, 11.

40 For the complete article, see online at: <http://www.moscowtimes.com/business/article/aircraft/537989.html> – online on 9.10.2015

41 For the complete article, see online at: <http://vpk-news.ru/news/35342> – online on 26.2.2017

42 Novichkov, “Russian Defence Chief”, op.cit.

43 For the complete article, see online at: https://www.kommersant.ru/doc/3541262?from=our_strana – online on 7.2.2018; Iliia Kramnik, “Vertoletnoe Budushchee” (“Helicopters Future”), in “Izvestia” online at: <https://iz.ru/705048/ilia-kramnik/vertoletnoe-budushchee> – online on 7.2.2018. “VPK news” online cited Andrei Boginski, General Director of Russian Helicopters, who said that: “About 25 Ka-52 helicopters to be delivered in 2018 and between 22 and 25 Ka-52s in 2019.” For the complete article, see <https://vpk-news.ru/news/41276> – online on 14.2.2018

44 For the complete article, see online at: <https://vpk-news.ru/41160> – online on 7.2.2018

good. A need to re-establish the High Military Aviation School for Pilots, together with increased flight hours and a substantial increase in delivery of the Yak-130 trainer aircraft might solve a crucial shortage of pilots noted back in February 2017 by Defence Minister Shoigu.

At the same time, we need to remember that Russians are not resting on their laurels but continue to discuss, analyse and implement lessons learned from the Syrian campaign. The Russian defence industry incorporates deficiencies into upgraded versions of aircraft and helicopters. According to “Kommersant online”, two Su-57 fifth generation fighter prototypes arrived at Khmeimim air base in Syria on 21 February 2018 to undergo weapon systems tests under combat conditions⁴⁵ and perhaps also to test it against Western technologies. In addition, as was noted in the supplement to “Nezavisimaya Gazeta Nezavisimoe Voennoe Obozrenie” (Independent Military Observer) the combat tests includes checking of the Su-57 low-observable by radars as well as testing of on-board radiolocation stations. Combat tests may also include electro-optical equipment.⁴⁶ Thus, the strength and the growing capabilities of the VKS should neither be underestimated nor ignored.

Perhaps also frequency as well as complexity level of NATO’s air exercises should be increased.

NATO member states need to acknowledge, carefully monitor and think through what it can do about improved performance of VKS capabilities. Time also has come for NATO allies to increase NATO’s air superiority capabilities in Europe. It should be remembered what General Gorenc said: “With air superiority, everything is possible. Without it, nothing is possible.”⁴⁷ Meanwhile, to counter the Russian threat, General Gorenc added that: “it is pretty clear that we are going to go back and start exercising some of the same stuff we used to do in the Cold War.” Specifically, the United States and its allies will have to develop techniques and train for flying near modern long-range surface-to-air-missile arrays while industry continue developing technology to counter the threat.⁴⁸ Finally, Western attention should be focused on maintenance and quality of the Western air fleet and pilot flying proficiency rather

than useless discussions about numerical strength of the United States and its NATO allies versus Russia. Perhaps also frequency as well as complexity level of NATO’s air exercises should be increased. Finally, the United States and its NATO allies should be vigilant to what VKS has achieved over the last decade and also pay more attention to the overall Russian military capabilities than to the Russian economic woes that has often been at the heart of the Western attention.



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⁴⁵ For the complete article, see online at: <http://www.kommersant.ru/doc/3557683?frpm=hotnews> – online on 22.2.2018. See also Iliia Kramnik, “Ispytanie Boem” (“Combat Tested”), in “Izvestia” online at: <https://iz.ru/712347/ilia-kramnik/ispytanie-boem> – online on 23.2.2018. It needs to be emphasised that the Su-57 has not yet been declared operational and procured by the VKS but continues to undergo flight acceptance tests and the current deployment in Syria is directly related to the combat testing. For the recent and comprehensive analysis of four and not two as earlier reported Su-57s flying to Syria and undergoing there combat testing, see Andrei Romanov, “Su-57: Ekzamen Voinoi” (“Su-57: Battle-Tested”), VPK online at: <https://vpk-news.ru/articles/41453> – online on 27.2.2018. See also Chirine Mouchantaf, “Is Russia Holding Back on Why it Deployed Fifth-Gen Fighters to Syria?”, see online at: <https://www.defensenews.com/industry/techwatch/2018/03/09/is-russia-holding-back-on-why-it-deployed-fifth-gen-fighters-to-syria/>

⁴⁶ For the complete article, see online at: http://nvo.ng.ru/nvo/2018-03-02/2_986_red.html. See also Vladimir Karnozov, “Russia Deploys Su-57s to Syria”, “Aviation International News” online at: <https://www.ainonline.com/aviation-news/defense/2018-02-26/russia-deploys-su-57s-syria>.

⁴⁷ See footnote 23.

⁴⁸ Malenic, “AFA 2015”, op.cit.