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PRESENT STATE AND PROSPECTS FOR DEVELOPMENT OF BELARUSIAN AIR FORCE

ABSTRACT

After the dissolution of the Soviet Union, Belarus inherited a substantial fleet of warplanes. The Treaty on Conventional Armed Forces in Europe, effective since 1992, obliged Belarus to reduce its air force. In 1996–2010 Belarusian air force underwent the majority of organizational changes. Limited technological and financial resources contributed to gradual reduction of Belarusian military aviation. Today Belarusian air force is not able to replace the recalled warplanes with new constructions. In the immediate years the difficulties of Belarusian air force should be expected to grow as the combat potential decreases.

Key words

Belarus, security, army, air force, modernization

Introduction

In 1991 Belarus proclaimed independence. At the end of January 1992 the process of recalling tactical nuclear weapons from its territory to Russia was initiated. As early as in August 1991 the armed forces deployed in the Belarusian territory, except the strategic forces, went under supervision of the Council of Ministers.

In March 1992 the Supreme Council passed the law “On the Armed Forces of the Republic of Belarus”, which paved the way for the formation of the state’s own armed forces. At that time in Belarus there were stationed around 700 warplanes of various kinds (e.g. fighters, bombers, attack helicopters, cargo planes) that earlier belonged to the Soviet Air Defence Forces, the Soviet Air Forces, Long-Range Aviation, Military Transport Aviation, and the Baltic Fleet of the Navy. Additionally, in Belarus there were deployed around 350 helicopters, which were at the disposal of the Soviet regiments and squadrons of the Air Defence Forces, the Air Forces, and the Strategic Rocket Forces. Also the former Soviet Air Forces became a part of the Belarusian Armed Forces on 1st January 1992. The Belarusian authorities entered into negotiations with the Russian party on allotment of the former Soviet troops deployed in the Belarusian territory. Certain Soviet regiments had already been disbanded, and their aircraft had been withdrawn to Russia. Under the Treaty on Conventional Armed Forces in Europe (CFE) of 1990 and the Tashkent Agreement, signed by eight post-Soviet republics in 1992, on the rules for implementing CFE, Belarus covenanted to reduce its air force to 260 combat aircraft and 80 attack helicopters (Górski, 1996, pp. 8–9; Mróz & Maj, 1995, pp. 16–18; Spatkaj, 2016a).

Under bilateral agreements signed in 1994–1996 Belarus yielded over to the Russian Federation the aircraft deployed in its territory, e.g. long-range aircraft of the 46th Air Army of the Supreme High Command, the 28th Fighter Aviation Regiment of the Moscow Air Defence District, and some aircraft from the 201 Fighter Aviation Regiment of the 2nd Independent Air Defence Army. In order to fulfill its obligations resulting from CFE, Belarus placed some of the aircraft in its military aircraft storage facilities. In 1991–1995 Belarusian air force underwent reorganization. As a result, some fighter regiments were disbanded and older aircraft were disposed of. A similar process was applied to attack helicopters squadrons. The structural-organizational changes in Belarusian air force were completed in 1995. As part of the Belarusian-Russian military cooperation, both countries signed in 2012 an agreement on creating a joint regional air defense system. This agreement has been implemented unusually slowly, and one of the contentious issues is still the location of the Russian air base in the Belarusian territory. For some time, four Russian Su-27 SMs in a state of constant combat readiness were stationed at Baranovichi air base. Russia also planned to deploy additional aircraft at the air base in Lida (Czwótek, 2019, pp. 17–38; Grenda, 2014, p. 80; Main, 2002, pp. 1–12; Spatkaj, 2016b).

1. Belarusian air force in 1996–2001

In 1996 the *International Institute for Strategic Studies* (IISS) estimated the number of Belarusian air and air defence forces at 25.7 thousand soldiers. At that time, Belarusian military aviation was supposed to have at its disposal: 42 Su-24 bombers, 99 Su-25 attack aircraft, 45 MiG-23 fighter planes, 83 MiG-29 fighters, 25 Su-27 fighters, 42 Su-24 reconnaissance aircraft, 74 Mi-24 attack helicopters, and 167 combat support helicopters (9 Mi-24K, 10 Mi-24P, 148 Mi-8). Additionally, the air forces had 84 transport aircraft (29 IL-76; 6 AN-12; 7 AN-24, 1 AN-26, 1 Tu-134, 26 Mi-2, 14 Mi-26). One of the most difficult problems is how to precisely determine the size of Belarusian air force as this data is kept confidential. It is also unknown how many aircraft are actually still in use. There is no reliable information either on the number of Soviet military aircraft left in its area after 1991. Nevertheless, after 1995 there was a clear decrease in the size of Belarusian air force, mainly as a result of the withdrawal of older aircraft from service and the inability to replace them with new types of aircraft due to financial reasons. This trend has not been reverted to this day. The air force inherited from the USSR was too big for Belarus' budget to finance and keep fully operational. As early as in 1997, Belarus fulfilled its obligations resulting from the Treaty on Conventional Armed Forces in Europe as well as from subsequent agreements to limit the number of its combat aircraft to 260 and its attack helicopters – to 80. In 1995–2001 there was a significant decrease in the number of combat aircraft from 349 to 177 (1995 – 349; 1996 – 349; 1997 – 230; 1998 – 276; 1999 – 152; 2000 – 230; 2001 – 177). Additionally, the number of attack helicopters also dropped from 74 to 58, although some of them were modernized at that time. Also the military air transport was reduced. Only the number of combat support helicopters remained at a similar level. Older types of military aircraft were withdrawn, including MiG-25 PD/PB/BM, Su-17, Yak-28PP, etc. Part of aircraft were transferred to air force reserve, including MiG-23 ML and MiG-29 fighters, as well as a number of Mi-6 and Mi-26 transport helicopters. Some aircraft were transferred to other services, subordinate to e.g. the Ministry of Emergency Situations. In 1993, Belarus had about 120 long-range bombers (Tu-16, Tu-22), which were handed over to the Russian Federation (Belarus, 2019; *The Military Balance*, 1993, p. 69; *The Military Balance*, 1994, p. 83).

Table 1. Belarusian air force in 1995–2001

Year	Fighter, Ground-Attack (FGA)	Fighter (FTR)	Reconnaissance (RECCE)	Helicopters			Transport (TPT)	Air Force	Flying hours
				Attack	Combat support (CBT SPT)	EW			
1995	42 Su-24; 99 Su-25	45 MiG-23 13 MiG-25 83 MiG-29 25 Su-27	42 Su-24	74 Mi-24	9 Mi-24K 10 Mi-24P 148 Mi-8		29 Il-76 6 AN-12 7 An-24 1 An-26 1 Tu-134 26 Mi-2 14 Mi-26		
Total	141	166	42	74	167		84	13 700	40
1996	42 Su-24; 99 Su-25	45 MiG-23 13 MiG-25 83 MiG-29 25 Su-27	42 Su-24	74 Mi-24	9 Mi-24K 10 Mi-24P 148 Mi-8		29 Il-76 6 AN-12 7 An-24 1 An-26 1 Tu-134 26 Mi-2 14 Mi-26	13 700	40
Total	141	166	42	74	167		84	13 700	40
1997	30 Su-24; 99 Su-25	67 MiG-29 22 Su-27	12 Su-24	74 Mi-24	4 Mi-24K 6 Mi-24P 100 Mi-8	25 Mi-8	29 Il-76 6 AN-12 7 An-24 1 An-26 1 Tu-134 26 Mi-2 14 Mi-26	11 000	40
Total	129	89	12	74	110	25	84	11 000	40
1998	30 Su-24; 99 Su-25	82 MiG-29 26 Su-27 27 MiG-23	12 Su-24	74 Mi-24	4 Mi-24K 6 Mi-24P 100 Mi-8	25 Mi-8	29 Il-76 6 AN-12 7 An-24 1 An-26 1 Tu-134 26 Mi-2 14 Mi-26	11 000	40
Total	129	135	12	74	110	25	84	11 000	40
1999	20 Su-24; 42 Su-25	61 MiG-29 23 Su-27	6 Su-24	44 Mi-24 (30 in store)	Unknown Number of Mi-8, Mi-24	3 Mi-8	16 Il-76 3 AN-12 7 An-24 1 An-26 1 Tu-134 1 Il-20 10 Mi-26 (4 in store) 5 Mi-6	12 250	28

Year	Fighter, Ground-Attack (FGA)	Fighter (FTR)	Reconnaissance (RECCE)	Helicopters			Transport (TPT)	Air Force	Flying hours
				Attack	Combat support (CBT SPT)	EW			
Total	62	94	6	44		3	44	12250	28
2000	36 Su-24; 80 Su-25	50 MiG-29 23 Su-27 35 MiG-23	6 Su-24	55 Mi-24 4 Mi24R 1 Mi24K	29 Mi-6 131 Mi-8 8 Mi-24K 4 Mi-24R	0	16 Il-76 3 AN-12 1 An-24 6 An-26 1 Tu-134 14 Mi-26	12300	28
Total	116	108	6	60	172	0	41	12300	28
2001	29 Su-24; 80 Su-25	45 MiG-29 23 Su-27	0	53 Mi-24 4 Mi24R 1 Mi24K	29 Mi-6 125 Mi-8 8 Mi-24K 4 Mi-24R	0	4 Il-76 (plus 12 IL-76 civilian but available for mil use) 3 AN-12 1 An-24 6 An-26 1 Tu-134 14 Mi-26	12000	15
Total	109	68	0	58	166	0	29	12000	15

Source: *The Military Balance* 1995, Vol. 95, Issue 1, p. 79; *The Military Balance* 1996, Vol. 80, Issue 1, p. 83; *The Military Balance* 1997, Vol. 97, Issue 1, p. 77; *The Military Balance* 1998, Vol. 98, Issue 1, p. 77; *The Military Balance* 1999, Vol. 99, Issue 1, p. 82; *The Military Balance* 2000, Vol. 100, Issue 1, p. 88; *The Military Balance* 2001, Vol. 101, Issue 1, p. 83.

2. Reorganization of Belarusian air defense system after 2001

The most significant changes in the structure of Belarusian air force were introduced at the beginning of the 21st century. At the end of 2001, the air force and the air defense force were joined to form the Air Force and Air Defence Forces of the Republic of Belarus, consisting of three types of troops: air, rocket and radio engineering. The restructuring of the air force and air defense was aimed at shortening the response time and increasing the combat potential of the air defense system. One commander was put in charge of air force and air defense, which made their use more efficient. It also created opportunities for developing a coherent concept for the development of the air defense system. Analogously

to the land troops, in 2002 the air force and air defense were divided into two operational-tactical commands: Western Operational-Tactical Command (Baranovichi) and North-Western Operational-Tactical Command. After joining the air force with air defense, the command and control system for individual units was also reorganized. The airspace of the Western Operational and Tactical Command bordered the airspace of Poland, Lithuania and Ukraine. Most air defense measures were concentrated there, as in Belarusian military doctrine the western direction was treated as a potential threat. Two operational-tactical commands operated until 2014, when the decision to merge them was made (Belta, 2014; Istorija, 2019; Zbytniewski, 2009, pp. 37–38).

After 2001, the structure of military airports was also reorganized. When the joint air force and air defense system were established, the Ministry of Defense of Belarus supervised: the 61th Fighter Air Base (MiG-29, Su-27), the 927th Fighter Air Base in Bereza (MiG-23, MiG-29), the 116th Fighter-Bomber Base in Rosa (Su-24M and Su-24MP), the 206th Assault Air Base in Lida (Su-25 and L-39), the 181st and 276th Combat Helicopter Base in Pruzhany and Borovitsy (Mi-8, Mi-28), the 65th Transport and Combat Helicopter Base in Kobryn (Mi-8T / MT, Mi-26, Mi-8 SMW, Mi-8PPA, Mi-8MTP and Mi-8MTPI) and the 50th Mixed Air Base in Machulishchy (An-12, An-24, An-26, IL-76, Tu-134, Mi-8 and Mi-26). In 2001–2005 the structure of air military bases changed significantly. In 2002, the 65th Transport and Combat Helicopter Base in Kobryn was transformed into the 65th Independent Mixed Helicopter Squadron, which was disbanded in 2003 and most of its aircraft were moved to the 181st Combat Helicopter Base in Pruzhany. Other combat helicopters were scrapped or transferred to other departments. Some of the Mi-26 helicopters went to the 50th Mixed Air Base. In 2002–2003, the 276th Combat Helicopter Base was also disbanded and the machines that were stationed there were mostly sent to the 181st Combat Helicopter Base. The remaining part were withdrawn from service to be dismantled for spare parts. In 2010, the 116th Fighter-Bomber Base was also closed down and its aircraft were transferred to the 206th Assault Air Base, which was transformed into the 116th Assault Air Base. The 116th Fighter-Bomber Base was replaced by the newly-established 206th Training Center for Aircrew. In 2014 it became subordinated to the 116th Assault Air Base. In 2010 the 927th Fighter Air Base was also disbanded and its aircraft transferred to the 61st Fighter Air Base, where also the 927th Unmanned Aircraft Systems Training and Applications Centre (Irkut-3, Irkut-10, Supercam S100) was established some time later. In 2015 the 181st Combat Helicopter Base was removed from the air defense system, and its helicopters were transferred to the 50th Mixed Air Base, where they were re-formed into

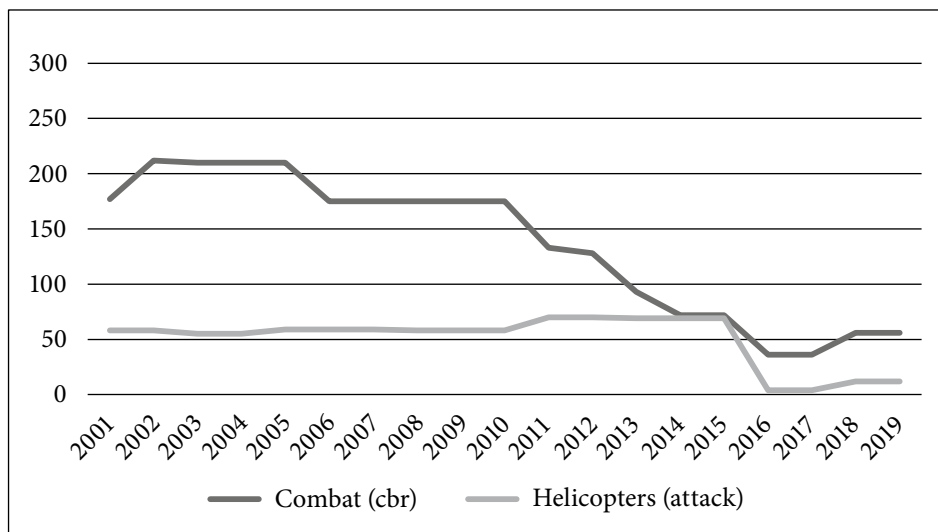
three helicopter squadrons of 25 Mi-24 and Mi-8 each. Currently only three military air bases remain (the 61st Fighter Air Base in Baranovichi, the 116th Assault Air Base in Lida, and the 50th Mixed Air Base in Machulishchy). Additionally, the command of the Air Force and Air Defence Forces of the Republic of Belarus has various specialized air defense support units (Ministerstwo Obrony RB, 2013; Reform.by, 2019; Siły zbrojne Białorusi w 2016 r., 2016; Spatkaj, 2016b).

It turned out that one of the most serious problems of Belarusian air force was rapid degradation of its air fleet. After establishing the joint air force and air defense forces in 2001, Belarusian military aviation had theoretically 212 combat aircraft and 58 attack helicopters. As early as in 2002, Belarus sold two MiG-29 fighters to Algeria. Some of the fighters, though included in various statistics, flew occasionally or never due to their poor technical condition. Such situation concerned e.g. MiG-23 fighters, but probably also other aircraft. In 2002–2006 the number of combat aircraft decreased from 212 to 175, while the number of attack helicopters remained steady (55–59 helicopters). In 2006 MiG-23 fighters, which had previously been kept in the air force although they did not fly, were officially withdrawn from service. In 2001 Belarus handed over four Su-25 / UB aircrafts to Ukraine, and in 2001–2004 four others were sold to Peru. On the other hand, combat support aviation and military air transport did not suffer major losses (*The Military Balance*, 2002, p. 66; *The Military Balance*, 2003, p. 66; *The Military Balance*, 2004, p. 83; *The Military Balance*, 2005, p. 112; *The Military Balance*, 2006, p. 118; Topwar, 2013).

At least until 2010 the number of military aircraft remained the same. As early as in 2010 Belarusian air force had 175 combat aircraft, 58 attack helicopters, 180 combat support aircraft and 27 military transport aircraft. Although many experts questioned the credibility of these statistics, as some aircraft did not fly although they remained on the air force records, until 2010 Belarus upheld the illusion of having strong military aviation. In 2009–2017 at least 8 military aircraft of Soviet production crashed in aviation accidents (2009 – Su-27, 2010 – two MiG-29s; 2011 – Mi-24; 2012 – Su-25, 2014 – two MiG-29s and Su-25), which was a clear evidence of the growing problems of Belarusian air force (By24.org 2017; Tut.by 2011; Tut.by 2013). Despite Belarusian attempts to modernize the air force, its degradation cannot be denied. In 2010–2019 the number of combat aircraft decreased from 175 to 56, attack helicopters – from 58 to 12, military support aircraft – from 180 to 26 and military transport aircraft – from 27 to 8. Only the number of jet trainers increased, as 8 Yak-130 trainers and fighters were purchased. In 2012, 34 Su-24MK / MR bombers and 21 Su-27P / UB fighters were removed from the military aviation record. All of these aircraft reached the end

of their service life and their modernization proved impractical. For example, Su-24 MK / MR bombers were not used for several years as allegedly they were being modernized, but then they were unexpectedly withdrawn from service in 2013. At that time, a great part of Su-25 attack fighters were stored as a reserve. In 2011 Belarusian air force officially had 70 attack helicopters, although probably only a dozen or so remained operational. In the following years, further attack helicopters were withdrawn from service: some of them were moved to the reserve's warehouses, some sold to other countries, and some were turned into museum exhibits. According to *The Military Balance* of 2019, Belarusian air force had only 56 combat aircraft and 12 Mi-24 attack helicopters (*The Military Balance*, 2010, p. 178; *The Military Balance*, 2011, p. 90; *The Military Balance*, 2012, p. 94; *The Military Balance*, 2013, p. 219; *The Military Balance*, 2014, p. 174; *The Military Balance*, 2015, p. 178; *The Military Balance*, 2016, p. 182; *The Military Balance*, 2017, p. 204; *The Military Balance*, 2018, p. 185; *The Military Balance*, 2019, p. 83).

Graph 1. Changes in the number of combat aircraft and attack helicopters of the Belarusian Air Force in 2001–2019.



Source: *The Military Balance* 2010, Vol. 110, Issue 1, p. 178; *The Military Balance* 2011, Vol. 111, Issue 1, p. 90; *The Military Balance* 2012, Vol. 112, Issue 1, p. 94; *The Military Balance* 2013, Vol. 113, Issue 1, p. 219; *The Military Balance* 2014, Vol. 114, Issue 1, p. 174; *The Military Balance* 2015, Vol. 115, Issue 1, p. 178; *The Military Balance* 2016, Vol. 116, Issue 1, p. 182; *The Military Balance* 2017, Vol. 117, Issue 1, p. 204; *The Military Balance* 2018, Vol. 118, Issue 1, p. 185; *The Military Balance* 2019, Vol. 119, Issue 1, p. 189.

In 2002–2019 there was a clear decrease in the number of all types of military aircraft owned by Belarusian air force. Apart from the aforementioned reduction in the number of combat aircraft and attack helicopters, most of the combat support aircraft were withdrawn from service. In 2002 Belarusian air force had 166 of them, and in 2019 – only 26. Dramatic decrease was reported after 2016, when most of them were withdrawn from service. The situation in military air transport was not better (29 aircraft in 2002; 13 aircraft in 2019). Only the training capabilities of military aviation slightly improved due to the purchase of Russian Yak-130 trainers and fighters. While in 2002 Belarusian air force had as many as 465 military aircraft (not including trainers), in 2019 there were only 102 of them (combat, attack helicopters, combat support, transport). In 2019 Belarusian air force owned only 21.9% of the number of its aircraft from 2002. Currently all military aircraft are stationed in three military air bases: the 61st Fighter Air Base in Baranovichy (two squadrons of MiG-29/S/UB), the 116th Assault Air Base in Lida (two squadrons of SU-25K/UBK), the 50th Mixed Air Base in Machulishchy (2 Il-76, 1 An-24; 4 An-26; 1 Tu-134, several squadrons of Mi-8, Mi-24, Mi-26) (Spatkaj, 2016b; *The Military Balance*, 2019, p. 188).

Table 2. Belarusian air force in 2002–2019

Year	Combat (cbt)	Helicopters (attack)	Combat support (CBT SPT)	Transport (TPT)	Training (trg)
2002	FGA: 35 Su-24 MK/MR; 76 Su-25/UB FTR: 35 MiG-23 MLD/UB; 43 MiG-29S/UB; 23 Su-27P/UB	53 Mi-24 4 Mi-24R 1 Mi-24K	29 Mi-6 125 Mi-8 8 Mi-24K 4 Mi-24 R	4 IL-76 (plus 12 IL-76 civilian but available for mil use) 3 An-12 1 An-24 6 An-26 1 Tu-134 14 Mi-26	
Total	212	58	166	29 (+12)	
2003	FGA/RECCE: 35 Su-24MK/MR; 76 Su-25/UB FTR: 35 MiG-23 MLD/UB; 41 MiG-29S/UB; 23 Su-27P/UB	50 Mi-24 4 Mi-24R 1 Mi-24K	29 Mi-6 125 Mi-8 8 Mi-24K 4 Mi-24 R	4 IL-76 (plus 12 IL-76 civilian but available for mil use) 3 An-12 1 An-24 6 An-26 1 Tu-134 14 Mi-26	
Total	210	55	166	29 (+12)	

Year	Combat (cbt)	Helicopters (attack)	Combat support (CBT SPT)	Transport (TPT)	Training (trg)
2004	FGA/RECCE: 35 Su-24 MK/MR; 76 Su-25/UB FTR: 35 MiG-23 MLD/UB; 41 MiG-29S/UB; 23 Su-27P/UB	50 Mi-24 4 Mi-24R 1 Mi-24K	29 Mi-6 125 Mi-8 8 Mi-24K 4 Mi-24 R	4 Il-76 (plus 12 Il-76 civilian but available for mil use) 3 An-12 1 An-24 6 An-26 1 Tu-134 14 Mi-26	Some L-39 <i>Albatros</i>
Total	210	55	166	20 (+12)	
2005	FTR 23 Su-27P/Su-27UB trg; recce; 35 MiG-23MLD/MiG-23 /MiG-23UB trg; 41 MiG-29S/MiG-29 /MiG-29UB/MiG-29U trg; FGA 35 Su-24MK/Su-24MR; 76 Su-25/Su-25 UB trg.	ATK: 50 Mi-24; RECCE: 9 Mi-24K	14 Mi-26 29 Mi-6 8 Mi-24R 125 Mi-8	3 An-12 1 An-24 6 An-26 4 Il-76; 12 Il-76 (civil available for mil use); 1 Tu-134	Some L-39 <i>Albatros</i>
Total	210	59	176	27	
2006–2007	FTR 23 Su-27P/Su-27UB trg; 41 MiG-29S/ MiG-29/MiG-29UB/ MiG-29U trg FGA 35 Su-24MK /Su-24MR recce; 76 Su-25/Su-25 UB trg.	ATK: 50 Mi-24; RECCE: 9 Mi-24K	14 Mi-26 29 Mi-6 8 Mi-24R 125 Mi-8	3 An-12 1 An-24 6 An-26 4 Il-76 12 Il-76 (civil available for mil use); 1 Tu-134	Some L-39 <i>Albatros</i>
Total	175	59	176	27	
2008–2010	FTR 23 Su-27P/Su-27UB trg; 41 MiG-29S/ MiG-29/MiG-29UB/ MiG-29U FGA 35 Su-24MK /Su-24MR recce; 76 Su-25/Su-25 UB trg	ATK: 50 Mi-24 RECCE: 8 Mi-24K	14 Mi-26 29 Mi-6 8 Mi-24R 125 Mi-8 4Mi-24R	3 An-12 1 An-24 6 An-26 4 Il-76 12 Il-76 (civil available for mil use); 1 Tu-134	Some L-39 <i>Albatros</i>
Total	175	58	180	27	
2011	FTR: 40 MiG-29S /MiG-29UB FGA: 21 Su-27P /Su-27UB FGA/ISR: 34 Su-24MK (FGA)/Su-24MR (ISR); ATK: 38 Su-25K FGA/Su-25 UBK	ATK: 50 Mi-24 ISR: 8 Mi-24K;12 Mi-24R	29 Mi-6 14 Mi-26 125 Mi-8	4 Il-76 (+12 Il-76 (civil available for mil use) 3 An-12 1 An-24 6 An-26 1 Tu-134	Some L-39 <i>Albatros</i>
Total	133	70	168	15	

Year	Combat (cbt)	Helicopters (attack)	Combat support (CBT SPT)	Transport (TPT)	Training (trg)
2012	FTR: 38 MiG-29S /MiG-29UB FGA: 21 Su-27P /Su-27UB FGA/ISR: 34 Su-24MK/Su-24MR (ISR); ATK: 35 Su-25K FGA/Su-25UBK	ATK: 50 Mi-24 ISR: 8 Mi-24K; 12 Mi-24R	29 Mi-6 14 Mi-26 125 Mi-8.	4 Il-76 (+12 Il-76 (civil available for mil use) 3 An-12 1 An-24 6 An-26 1 Tu-134	Some L-39 <i>Albatros</i>
Total	128	70	168	15	
2013	FTR: 38 MiG-29S /MiG-29UB FGA: 21 Su-27P ATK: 34 Su-25K/UBK	ATK: 49 Mi-24 ISR: 8 Mi-24K; 12 Mi-24R	29 Mi-6 14 Mi-26 125 Mi-8	2 Il-76 (+9 Il-76 (civil available for mil use) 3 An-12 1 An-24 6 An-26 1 Tu-134	Some L-39 <i>Albatros</i>
Total	93	69	168	13	
2014	FTR: 38 MiG-29S FGA: (21 Su-27P <i>poss. non-operational</i>) ATK: 34 Su-25K/UBK	ATK: 49 Mi-24 ISR: 8 Mi-24K; 12 Mi-24R	29 Mi-6 14 Mi-26 125 Mi-8	2 Il-76 (+9 Il-76 (civil available for mil use) 3 An-12 1 An-24 6 An-26 1 Tu-134	Some L-39 <i>Albatros</i>
Total	72	69	168	13	
2015	FTR: 38 MiG-29S /UB FGA: (21 Su-27P <i>non-operational</i>) ATK: 34 Su-25K/UBK	ATK: 49 Mi-24 ISR: 8 Mi-24K; 12 Mi-24R	29 Mi-6 14 Mi-26 125 Mi-8	2 Il-76 (+9 Il-76 (civil available for mil use) 3 An-12 1 An-24 6 An-26 1 Tu-134	Some L-39 <i>Albatros</i>
Total	72	69	168	13	
2016	FTR: 24 MiG-29S /UB FGA: (21 Su-27P /UB <i>non-operational/stored</i>) ATK: 12 Su-25K/UBK	ATK: 4 Mi-24	5 Mi-26 8 Mi-8	2 Il-76 (+9 Il-76 (civil available for mil use) 3 An-12 1 An-24 4 An-26 1 Tu-134	Some L-39 <i>Albatros</i> 4 <i>Yak-130</i>
Total	36	4	13	11	4+
2017	FTR: 24 MiG-29S /UB FGA: (21 Su-27 /UB <i>non-operational/stored</i>) ATK: 12 Su-25K/UBK	ATK: 4 Mi-24	5 Mi-26 8 Mi-8 6 Mi-8MTV-5	2 Il-76 (+9 Il-76 (civil available for mil use) 3 An-12 1 An-24 4 An-26 1 Tu-134	Some L-39 <i>Albatros</i> 8 <i>Yak-130</i>
Total	36	4	19	11	8+

Year	Combat (cbt)	Helicopters (attack)	Combat support (CBT SPT)	Transport (TPT)	Training (trg)
2018	FTR: 28 MiG-29 /MiG-29S; 6 MiG 29 UB FGA: (21 Su-27 /UB non-operational/stored) ATK: 22 Su-25K/UBK	ATK: 12 Mi-24	6 Mi-26 8 Mi-8 12 Mi-8MTV-5	2 Il-76 (+9 Il-76 (civil available for mil use) 1 An-24 4 An-26 1 Tu-134	Some L-39 Albatros 8 Yak-130
Total	56	12	26	8	8+
2019	FTR: 28 MiG-29 /MiG-29S; 6 MiG 29 UB Fulcrum FGA: (21 Su-27 /UB non-operational/stored) ATK: 22 Su-25K/UBK	ATK: 12 Mi-24	6 Mi-26; 8 Mi-8 12 Mi-8MTV-5	2 Il-76 (+9 Il-76 (civil available for mil use) 1 An-24 4 An-26 1 Tu-134	Some L-39 Albatros 8 Yak-130
Total	56	12	26	8	8+

Abbreviations: ATK-attack; FGA-fighter ground attack; FTR-fighter; ISR-intelligence, surveillance and reconnaissance; RECCE-reconnaissance; trg-training

Source: *The Military Balance* 2002, Vol. 102, Issue 1, p. 66; *The Military Balance* 2003, Vol. 103, Issue 1, p. 66; *The Military Balance* 2004, Vol. 104, Issue 1, p. 83; *The Military Balance* 2005, Vol. 105, Issue 1, p. 112; *The Military Balance* 2006, Vol. 106, Issue 1, p. 118; *The Military Balance* 2007, Vol. 107, Issue 1, p. 118; *The Military Balance* 2008, Vol. 108, Issue 1, p. 169; *The Military Balance* 2009, Vol. 109, Issue 1, p. 169; *The Military Balance* 2010, Vol. 110, Issue 1, p. 178; *The Military Balance* 2011, Vol. 111, Issue 1, p. 90; *The Military Balance* 2012, Vol. 112, Issue 1, p. 94; *The Military Balance* 2013, Vol. 113, Issue 1, p. 219; *The Military Balance* 2014, Vol. 114, Issue 1, p. 174; *The Military Balance* 2015, Vol. 115, Issue 1, p. 178; *The Military Balance* 2016, Vol. 116, Issue 1, p. 182; *The Military Balance* 2017, Vol. 117, Issue 1, p. 204; *The Military Balance* 2018, Vol. 118, Issue 1, p. 185; *The Military Balance* 2019, Vol. 119, Issue 1, p. 83.

3. Modernization of the air force

Belarus is one of the few countries in the post-Soviet area that has attempted to modernize at least some of the Soviet military aircraft left on its territory. The majority of older types of aircraft owned by Belarusian air force were built before 1990, so Belarus has been facing a dilemma whether to withdraw them from service, partially modernize them or purchase new aircraft. In recent years Belarus has partially implemented all three of these scenarios. The oldest military aircraft were removed from the air force records, and a small part of them was renovated and modernized. Attempts were also made to buy new military aircraft from Russia. The domestic arms industry does not produce its own military aircraft; hence Belarus is forced to look outside the country.

Although President Alexander Lukashenko has repeatedly declared his intention to produce the country's own combat aircraft and attack helicopters, these plans have never been implemented, mainly due to limited financial resources. After the dissolution of the USSR, Belarus inherited, apart from a large number of combat aircraft, also a substantial logistics and repair base. The most important role is served by 558 Aircraft Repair Plant in Baranovichi and by Orsha Aircraft Repair Plant, where military aircraft are inspected, repaired and modernized. 558 Aircraft Repair Plant in Baranovichi specializes in repairing and modernizing the following types of military aircraft: Su-22, Su-25, Su-27 (Su-30), MiG-29, An-2, Mi-8 (Mi-17), and Mi-24 (Mi-35), while Orsha Aircraft Repair Plant deals with Mi-2, Mi-8 (Mi-17), Mi-24 (Mi-35), Mi-26 and Il-76. In 2016, 558 Aircraft Repair Plant in Baranovichi stopped doing repairs to attack helicopters so as not to compete with Orsha Aircraft Repair Plant. At the beginning of the 21st century, Belarusian air force owned over 40 MiG-29s. The necessity to withdraw older aircraft as well as the planes approaching the end of their service life brought forward the decision of the Belarusian authorities to modernize at least some of the military aircraft. Initially, due to limited funds, it was planned to modernize MiG-29 fighters in Russia, but the Russian side asked too high price for their modernization. Thus Belarus decided to modernize them on its own, using some of the solutions developed by the Russian arms industry. In 2003, 558 Aircraft Repair Plant in Baranovichi finished modernizing first MiG-29BM fighters destined for the national air forces. The modernization included partial replacement of the electronics, expanding the capacity for carrying weapons, and installation of a probe for in-flight refuelling. The first four MiG-29BMs were presented in 2004 at the Victory Parade to celebrate the liberation of the SSRB from the German occupation. In recent years probably at least a dozen or so MiG-29 fighters have been modernized. In 2014 it was decided to modernize ten such aircrafts, and in December 2015 the first upgraded fighters went to the 61st Fighter Air Base. Initially, the Belarusian authorities planned to modernize all the remaining MiG-29 fighters, but probably at least some of them will be replaced with new Russian Su-30SM aircraft. In its 558 Aircraft Repair Plant in Baranovichi, Belarus has also upgraded several Su-27UB interceptors to the UBM1 standard. As in the case of MiG-29BM, the modernization of Su-27 was carried out in cooperation with Russia. The first information about modernized Belarusian Su-27 aircraft was released at the MILEX 2015 exhibition. In 2009 one of them crashed in an aviation accident, and in December 2012 Belarus withdrew all Su-27 aircraft from service. It is also worth mentioning the little-known Belarusian upgrade of Su-25UB to the Su-25UTB standard. At

least one such aircraft was modernized for Belarusian air force, and in 2007 eight Peruvian Su-25UB aircraft were upgraded to this standard. In recent years, some Mi-24 helicopters have also been modernized at Orsha Aircraft Repair Plant. In 2004 Belarus signed an agreement with Ukraine to provide ten modernized L-39 Albatros trainers, which supplemented its air force. Military transport aviation has also been slightly modernized, including one of the An-26 and IL-76 aircraft (Alesin, 2013; Cool, 2009; Furtak, 2016, pp. 48–61; Soyuz.by, 2015; Tut.by, 2015).

As mentioned before, Belarus is trying to modernize its military aviation in cooperation with the Russian Federation. In the signed agreement on military and technical cooperation for 2016–2020, Russia has committed to sell new types of military equipment for Belarus: it declared it would deliver Yak-130 trainer and fighter aircraft, MiG 29M / M2 fighters as well as combat support helicopters. In 2015 Russia delivered the first four Yak-130 trainer and fighter aircraft, which replaced the outdated L-39 Albatros. In 2015 Russian Helicopters Company signed a contract with the Ministry of Defense of Belarus for the supply of 12 Mi-8-MTV-5 transport and attack helicopters in 2016–2017. Although it is an outdated model from the Soviet era, its modernized variant is still used by many armed forces. In 2016–2017 Russia delivered all the helicopters of this type ordered by Belarus.

At the beginning of 2016, the Belarusian Ministry of Defense signed a preliminary agreement with the Russian company Irkut on purchasing SU-30SM multi-role combat aircraft, which were to replace some of the end-of-life and obsolete MiG-29 fighters. There was also information about the possibility of modernizing half of the MiG-29 fighters owned by Belarus to extend their service life beyond 2020. Due to limited financial resources, Belarus intended to purchase SU-30SM only after 2020. Eventually, Belarusian air forces ordered 12 such machines, and the Irkut plant committed to deliver the first aircraft in 2018. However, Western sanctions on Russia caused delays in the implementation of the contract. The twelve ordered Su-30SM multirole fighters are to come to Belarus in batches of four in 2019, 2020 and 2021. Their cost will probably be around 600 million dollars, and will be financed by Russian loans (Alesin, 2017; Alesin, 2019; Naviny.by, 2019).

4. Export of military aircraft

After the dissolution of the USSR, Belarus began selling the excess amount of Soviet military aircraft and those withdrawn from service. According to the information which Belarus gave to the United Nations Register of Conventional

Arms (UNROCA), in 1996–2012 the country sold about 150 military aircraft to other countries. Thanks to research done by the Stockholm International Peace Research Institute (SIPRI), it is possible to include supplementary data, which slightly differ from the reports sent by Belarus to UNROCA. It is difficult to determine the actual scale of Belarusian trade with withdrawn Soviet military aircraft. Belarus sells its planes and helicopters mostly to African countries and the Middle East, where they are still used in the air force, even in military conflicts. Belarus also sells its military aircraft to countries subject to international sanctions. Belarusian arms factories often modernize them before delivery to the country of destination. Their major advantage is a competitive price and the fact that their importers already have similar models of aircraft in the air forces. Occasionally, Belarus sells its end-of-life aircraft and helicopters to other countries (China, Serbia, Peru). The most important transactions in 2000–2019 are e.g. the 2008 sale of 11 Su-25s to Sudan and 33 MiG-23MS fighters to Syria. According to SIPRI, Belarus delivered 25 MiG-29 fighters (UNROCA-31) to Algeria in 1999–2002. In 2010 Russia signed a contract with China for the supply of 10 IL-76 transport aircraft, and five of them came from Belarus. In 2014 Belarus sold four Mi-24 helicopters to the United Arab Emirates, which in 2015 delivered them to Libya. In 2015–2016 as many as nine Belarusian Su-25s went to Iraq. In 2018, India agreed to pay for four Mi-24 helicopters modernized by Belarus, and handed them over to Afghanistan. According to the available data, the number of military aircraft exported by Belarus in 1996–2019 can be estimated at about 170–180 combat aircraft, 60 attack and combat support helicopters, and 6 military transport aircraft (Diplomat.com, 2019; Livejournal, 2012; Naviny.by, 2014; Udf.by, 2013).

Table 3. Export of Belarusian military aircraft in 1995–2019

Year	State	Source	Aircraft		Helicopters		Transporters	
1995	Sierra Leone	SIPRI			2	Mi-24/ Mi-35		
1996	Peru	UNROCA	8/0 (SIPRI 18)	MiG-29				
1996	Sudan	UNROCA			6/0	Mi-24B		
1997	Algeria	UNROCA	2/0	SU-24MPK				
1997	Peru	UNROCA	28/18 (SIPRI 18)	SU-25 UB				
1997	Papua New Guinea	UNROCA			2/0	Mi-24P		

Year	State	Source	Aircraft		Helicopters		Transporters	
1997	Sierra Leone	UNROCA/ SIPRI			2/0	Mi-24B		
1998	Ethiopia	UNROCA			4/0	Mi-24V		
1998	Rwanda	SIPRI			2	Mi-24/ Mi-35		
1998	Uganda	UNROCA			4/0 (SIPRI-2)	Mi-24V (SIPRI Mi- 24P/Mi-35)		
1999	Algeria	UNROCA	16/0	MiG-29				
1999	Angola	UNROCA	14/0	MiG 23 MLD, MiG 23 UB, Su-22 M, Su-22 UK				
2000	Algeria	UNROCA	11/0	MiG-29 UB				
2000	Angola	UNROCA	1/0	Su-24MK				
2000	Angola	SIPRI	2	Su-27S (supplier could have been Ukraine)				
2001	Ethiopia	UNROCA/ SIPRI (2000)			2/0	Mi-24P/Mi- 35P		
2001	Algeria	UNROCA	2/0	MiG-29				
2001	Ukraine	UNROCA	4/0	Su-25 UB				
2002	Algeria	UNROCA	2/0	MiG-29				
2002	Côte d'Ivoire	SIPRI					1	An-12
2002	Côte d'Ivoire	UNROCA/ SIPRI			2/0	Mi-24V/ Mi-35		
2003	Côte d'Ivoire	SIPRI			1	Mi-8T		
2003	Côte d'Ivoire	UNROCA	2/0	Su-25 UB				
2003	Nepal	SIPRI (financed by UK for police use against Maoist rebels on condition not to be used in offensive or armed role)			2	Mi-24P/ Mi-17		

Year	State	Source	Aircraft		Helicopters		Transporters	
2004	Uganda	SIPRI			3	Mi-24P/ Mi35P		
2004	Côte d'Ivoire	UNROCA	2/0	Su-25				
2005	Djibouti	UNROCA/ SIPRI			2/0	Mi-24P/ MI-35P		
2005	Slovakia	UNROCA			2/0	Mi-8		
2008	Sudan	UNROCA	11/0	Su-25				
2008	Syria	UNROCA/ SIPRI	33/0	MiG-23MS				
2009	Azerbaijan	UNROCA	5/5	Su-25				
2009	Sudan	UNROCA	3/0	Su-25				
2010	Azerbaijan	UNROCA	1/1	Su-25				
2010	Sudan	UNROCA	1/0	Su-25				
2010	Nigeria	UNROCA/ SIPRI			2/0	Mi-24/Mi- 35P		
2010	Uganda	UNROCA/ SIPRI			1/0	Mi-24 (SIPRI Mi-24V/ Mi-35)		
2011	Azerbaijan	UNROCA	0/4	Su-25				
2012	Azerbaijan	UNROCA (SIPRI 2009- 2012 11 Su-25)	1/1	Su-25				
2012	Great Britain	UNROCA	0/1	Su-27 (Su- 30 Mk2b)				
2013– 2014	Sudan	SIPRI			4	Mi-24P/Mi- 35P		
2013	China	SIPRI					5	2 Il- 76MD, 3 Il-76TD; ordered via Russia
2014	Sudan	SIPRI			2	Mi-8T		
2015	Libya HoR				4	Mi-24P/Mi- 35P		
2015– 2016	Iraq	SIPRI	9	Su-25				

Year	State	Source	Aircraft		Helicopters		Transporters	
2015–2016	Sudan	SIPRI			3	Mi-24P/Mi-35P		
2016	Sudan	SIPRI			1	Mi-8T		
2018	Afghanistan	SIPRI			4	Mi-24P/Mi-35P		
2018	Serbia	SIPRI	4	MiG- 29S				

Source: *Belarus*, <https://www.unroca.org/>, accessed on 6.10.2019; *Transfers of major weapons: Deals with deliveries or orders made for 1990 to 2018 (SIPRI)*, http://armstrade.sipri.org/armstrade/page/trade_register.php, accessed on 6.10.2019; the *United Nations Register of Conventional Arms* provides the numbers of aircraft based on the reports of the exporting country and importing country. In the table, the first number represents the number of aircraft provided by reports sent by Belarus, and the second number – by the purchasing country. In many cases, the countries importing Belarusian military aircraft did not report that to UNROCA (Algeria, Sudan, Syria, Ivory Coast, the People’s Republic of Korea, Papua New Guinea, Sierra Leone, Ethiopia, Uganda, Nigeria). There are also differences in the reports of exporting and importing countries (Belarus/Peru). In 2012 Great Britain sent a report but did not provide information about the purchase of aircraft. *Stockholm International Peace Research Institute (SIPRI)* provides dates of aircraft delivery.

Belarus has also become specialized in the renovation of Soviet military aircraft, which is often a part of a tying agreement. Belarus sells older types of military aircraft to other countries after their modernization. Their repairs are done mainly by 558 Aircraft Repair Plant in Baranovichi and Orsha Aircraft Repair Plant. In 2012 the Ukrainian company Motor Sich became the main shareholder of Orsha Aircraft Repair Plant and went to sell modernized Mi-8 MSB helicopters to foreign markets. Both factories have become specialized in repairing and modernizing Soviet military aircraft for the countries that already own such aircraft (post-Soviet states, Middle East countries, and Central and Eastern Europe states). In 2018, the 558 Aircraft Repair Plant won the tender for renovating and modernizing 8 Bulgarian Su-25s. At that time, the company was also modernizing Su-25 attack aircraft of the Democratic Republic of Congo. Earlier, Belarusian renovation plants modernized the Kazakh Su-25 and Su-27. In 2019 Belarus delivered to Serbia four MiG-29 fighters modernized by 558 Aircraft Repair Plant in Baranovichi. Older types of Russian military aircraft are also being renovated in Belarus, and later sold by the Russian Federation to other countries. Not always are they included in the Belarusian export statistics. In 2011, 558 Aircraft Repair Plant in Baranovichi received 18 Su-30K fighters, traded in by India. In 2013 Russia sold 12 of them to Angola, after upgrading them to the Su-30KN standard. Belarus also renovated Russian Su-25s and

Mi-24Ps which were delivered to Sudan afterwards. The Belarusian armaments plants also modernized the Chinese Su-27 and Mi-8. In addition, pilots from countries equipped with Soviet combat aircraft (including Iranians) were trained in Belarus. There is also information about negotiations conducted by Belarus on selling its end-of-life military aircraft to other countries. For instance, the Islamic Republic of Iran has entered talks on purchasing Belarusian Su-25 attack aircraft (Bsblog.info, 2013; Bsblog.info, 2018; Czulda, 2015, pp. 76–77; Trendafilovski, 2017, pp. 68–69; Tut.b, 2017; UNROCA, 2017).

Conclusions

After the dissolution of the Soviet Union, Belarus inherited a substantial fleet of warplanes. Under the Treaty on Conventional Armed Forces in Europe (CFE), effective since 1992, the state covenanted to reduce its air force to 260 combat aircraft and 80 attack helicopters. The rest of combat aircraft were put in storage or dismantled for spare parts. In 1996–2010 Belarusian air force underwent the majority of organizational changes. At the end of the 1990s, Belarusian air force had 349 combat aircraft, 74 attack helicopters, 167 combat support helicopters and 84 transport aircraft. Belarus did not have adequate financial resources to maintain such extensive military aircraft fleet. The result of the above was the gradual deterioration of Belarusian air force, which accelerated after 2006 – a process which the Belarusian authorities did not manage to stop. When compared to the first half of the 1990s, today Belarusian air force have only 15% of their aircraft. Attempts at comprehensive modernization of Belarusian military aviation were unsuccessful: Belarusian arms factories do not have adequate technological and financial resources to start producing new types of combat aircraft, while limited financial possibilities prevent Belarus from buying more modern military aircraft from its closest ally. Moreover, Russia is not particularly interested in modernizing Belarusian air force. In consequence, Belarus sells older types of military aircraft and does not replace them with newer ones. In the future, further reduction of Belarusian air force potential and an increase in dependence on the Russian Federation regarding the modernization of its own military aviation fleet should be expected. An additional problem is the decreasing operational readiness of Belarusian military aviation and the successively decreasing number of flying hours.

REFERENCES

- Alesin, A. (2013). Poetomu prichodit'sia wozwraszczat'siak modiernizacyi MiG -29... Retrieved from https://naviny.by/rubrics /society/2013/09/22/ic_articles_116_183090
- Alesin, A. (2017). Istriebiteli Su-30SM: nakoniec, nam prodali czto-to stojaszczeje. Retrieved from <https://www.belvpo.com/83984.html/>
- Alesin, A. (2019). Mnogofunkcionalnyje bojewyje samolety: oborotnaja storona medali. Retrieved from <https://www.belrynok.by/2019/08/23/mnogofunksionalnye-boevye-samolety-oborotnaya-storona-medali>
- Belarus. (2019). Retrieved from <https://www.unroca.org/>
- Belta. (2014). V Belarusi likvidirovano Zapadnoe i Severo-zapadnoe operativno-takticzeskoekomandovanie VVS i vojsk PVO. Retrieved from <https://www.belta.by/society/view/v-belarusi-likvidirovano-zapadnoe-i-severo-zapadnoe-operativno-takticzeskoe-komandovanie-vvs-i-vojsk-pvo-60334-2014>
- Bsblog.info. (2013). Wojenno-tiechniczeskoje sotrudnicestwo Bielarusi i Kitaja: awtotiechnika i drugoje. Retrieved from <https://bsblog.info/voenno-texnicheskoe-sotrudnichestvo-belarusi-i-kitaya-avtotexnika-i-drugoe/>
- Bsblog.info. (2018). 558 ARZ provodit modiernizaciju Su-25 WWS DRK. Retrieved from <https://bsblog.info/558-arz-provodit-modernizaciju-su-25-vvs-drk/>
- By24.org. (2017). W Bobrujskie razbiłsia Mig-29 WWS Bielarusi. Retrieved from http://by24.org/2017/02/23/belrusian_mig_29_fighter_crashed_in_bobruysk/
- Cool, J. (2009). Samolot szturmowy Su-25UTB Sił Powietrznych Białorusi. Retrieved from <http://www.konflikty.pl/technika-wojskowa/w-powietrzu/samolot-szturmowy-su-25utb-sil-powietrznych-bialorusi/>
- Czulda, R. (2015). Samoloty Sił Powietrznych Islamskiej Republiki Iranu. *Lotnictwo*, 1, 70–81.
- Czwofek, A. (2019). Determinaty współpracy wojskowej Białorusi i Rosji po 2014 r. *Kwartalnik Bellona*, 3, 17–38.
- Diplomat.com. (2019). India to Deliver 4 More Helicopter Gunships to Afghanistan. Retrieved from <https://thediplomat.com/2018/04/india-to-deliver-4-more-helicopter-gunships-to-afghanistan/>
- Furtak, M. (2016). MiG-29 BM- myśliwiec wielozadaniowy Sił Powietrznych Białorusi. *Lotnictwo*, 1, 48–61.
- Grenda, B. (2014). *System walki sił powietrznych Rzeczpospolitej Polski*. Warszawa: EMENTON Monika Niewirowska.
- Górski, K. (1996). *Polityka bezpieczeństwa i siły zbrojne Białorusi*. Warszawa: Ministerstwo Obrony Narodowej.
- Istorija. (2019). Istorija VVS i vojsk PVO. Retrieved from <https://www.mil.by/ru/forces/vvspvo/history>
- Livejournal. (2012). Nowyje Il-76 WWS NOAK. Retrieved from <https://bmpd.livejournal.com/386043.html>

- Main, S. J. (April 2002). Belarus' & Russia Military Cooperation 1991–2002. *Conflict Studies Research Centre*, 1–12.
- Ministerstwo Obrony RB. (2013). Godowej prazdnik 927 centra podgotowki iprimienienija biespiłotnych awiacyonnych kompleksow WWS i wojsk PVO. Retrieved from <https://www.mil.by/ru/news/17324/>
- Mróz, M. (Maj 1995). Traktat o konwencjonalnych siłach zbrojnych w Europie (CFE). Kancelaria Sejmu. Biuro Studiów i Ekspertyz. Wydział Analiz Ekonomicznych i Społecznych, Raport, 74.
- Mykhailyshyn, Vasył. (2017). The influence of the conflict in Ukraine on the modernization of the Russian armed forces. *Torun International Studies*, 1, 39–59.
- Naviny.by. (2014). Irak intieriesujetsia spisannymi w Biełarusi bombardirowszczikami? Retrieved from https://naviny.by/rubrics/society/2014/07/10/ic_articles_116_185987
- Naviny.by. (2019). Diużyna Su-30SM smożet zamienit' poczti wsiu biełoruskiju bojewuju awiacyju. Retrieved from <https://naviny.by/article/20190405/1554479807-dyuzhina-su-30sm-smozhet-zamenit-pochti-vsyu-beloruskuyu-boevuyu>
- Reform.by. (2019). Minoborony Biełarusi zakupiło rossijskije biespiłotniki Supercam S100. Retrieved from <https://reform.by/minoborony-belarusi-zakupilo-rossijskie-bespiłotniki-supercam-s100/>
- Siły zbrojne Białorusi w 2016 r. (2016). Retrieved from <https://militarium.net/sily-zbrojne-bialorusi-w-2016-r/>
- Soyuz.by. (2015). Baza w Baranawiczach popoñilas' 10 samoletami MiG-29. Retrieved from <http://www.soyuz.by/news/security/22917.html>.
- Spatkaj, L. (2016a). Wojennaja i spieczalnaja Awiacyja Biełarusi: sostojanije i pierspiektiwu razwitija. Czast'1. Retrieved from <https://bsblog.info/voennaya-i-specialnaya-aviaciya-belarusi-sostoyanie-i-perspektivy-razvitiya/>
- Spatkaj, L. (2016b). Wojennaja i spieczalnaja Awiacyja Biełarusi: sostojanije i pierspiektiwu razwitija. Czast'2. Retrieved from <https://bsblog.info/voennaya-i-specialnaya-aviaciya-belarusi-sostoyanie-i-perspektivy-razvitiya-chast-2/>
- The Military Balance*. (1993). Vol. 93, Issue 1.
- The Military Balance*. (1994). Vol. 94, Issue 1.
- The Military Balance*. (1995). Vol. 95, Issue 1.
- The Military Balance*. (1996). Vol. 96, Issue 1.
- The Military Balance*. (1997). Vol. 97, Issue 1.
- The Military Balance*. (1998). Vol. 98, Issue 1.
- The Military Balance*. (1999). Vol. 99, Issue 1.
- The Military Balance*. (2000). Vol. 100, Issue 1.
- The Military Balance*. (2001). Vol. 101, Issue 1.
- The Military Balance*. (2002). Vol. 102, Issue 1.
- The Military Balance*. (2003). Vol. 103, Issue 1.
- The Military Balance*. (2004). Vol. 104, Issue 1.
- The Military Balance*. (2005). Vol. 105, Issue 1.

- The Military Balance*. (2006). Vol. 106, Issue 1.
- The Military Balance*. (2007). Vol. 107, Issue 1.
- The Military Balance*. (2008). Vol. 108, Issue 1.
- The Military Balance*. (2009). Vol. 109, Issue 1.
- The Military Balance*. (2010). Vol. 110, Issue 1.
- The Military Balance*. (2011). Vol. 111, Issue 1.
- The Military Balance*. (2012). Vol. 112, Issue 1.
- The Military Balance*. (2013). Vol. 113, Issue 1.
- The Military Balance*. (2014). Vol. 114, Issue 1.
- The Military Balance*. (2015). Vol. 115, Issue 1.
- The Military Balance*. (2016). Vol. 116, Issue 1.
- The Military Balance*. (2017). Vol. 117, Issue 1.
- The Military Balance*. (2018). Vol. 118, Issue 1.
- The Military Balance*. (2019). Vol. 119, Issue 1.
- Trendafilovski, V. (2017). Nowe „wierzchowce” serbskich rycerzy. *Lotnictwo. Aviation International*, 4–5, 61–69.
- Topwar. (2019). Białaruś sprzedała Sudanu bombardirowszcziki Su-24. Retrieved from <https://topwar.ru/32144-belarus-prodala-sudanu-bombardirovschiki-su-24.html>
- Tut.by. (2011). Poczi wsie „Su-24” Woorużennych sił Białaruśi nachodiatsia na riemontie. Retrieved from <https://news.tut.by/society/232506.html>, <https://news.tut.by/society/232506.html>
- Tut.by. (2013). Istriebitiel „Su-27” sniats eksploatacyi w Białaruśi. Retrieved from <https://news.tut.by/society/374817.html>
- Tut.by. (2015). Ministierstwo oborony Białaruśi możet zamienit’ istriebitieli „MiG-29” na „Su-30”. Retrieved from <https://news.tut.by/society/469288.html>, <https://news.tut.by/society/469288.html>
- Tut.by. (2017). Angoła połuczila dwa Su-30K iz Białaruśi. Retrieved from <https://42.tut.by/561111>
- Udf. (2013). UN: Belarus exports to Sudan Su-25 and S-8. Retrieved from <https://udf.by/english/economy/75798-un-belarus-exports-to-sudan-su-25-and-s-8.html>
- UNROCA. (2016). United Nations Register of Conventional Arms Report of the Secretary-General. Retrieved from <https://undocs.org/en/A/71/138>
- Zbytniewski, M. (2009). Rozwój systemu obrony powietrznej Białaruśi. *Przegląd Sił Powietrznych*, 2, 33–40.