

# ENDURING TURBULENCE







*Above: Just three MiG-29UB two-seat combat trainers remain available for converting pilots onto the 'Fulcrum'. While the surviving MiG-29s could soldier on until 2029, the BVVS plans to introduce a replacement fighter between 2018 and 2021.*

## Bulgaria's new fighter programme

**M**aj Gen Radev was being realistic in mid-2015 when he acknowledged publicly that the MiG-29 had become a hostage to domestic and foreign political interests. At the same time, the *Fulcrum* was the air arm's most important asset, used in the nation's most critical peacetime flying mission within the framework of NATINAMDS. Radev predicted the type's operation in Bulgaria would continue to be problematic and increasingly expensive in the near and mid-term. This was despite the fact that the MiG-29's service life could be extended, enabling it to remain in service, at least in theory, until 2029. Such an extended service would require the increasingly expensive deliveries of new and overhauled engines, accessory gearboxes and other important life-limited parts to keep the fighters airworthy.

Faced by this difficult situation, the only feasible solution in the mid-term – according to Radev – was to give the go-ahead to Bulgaria's long-delayed procurement of a new fighter. Since the early 2010s, the BVVS has been looking at acquiring an affordable Western-made type as a *Fulcrum* replacement, budget permitting. Radev pushed this issue as much as possible until his resignation in August 2016. Now, in his new position as the President of Bulgaria and supreme

commander of the country's armed forces, he has much more powerful tools to further the procurement process.

The MoD presented a request for proposals (RFP) on December 9, 2016 to a few selected potential suppliers of new multi-role fighter aircraft. It was revealed that the RFP was forwarded to four countries included in the so-called shortlist compiled by the MoD in 2012-13, based on responses to the request for information (RFI). These are Italy, Portugal, Sweden and the United States.

The four countries are now required to provide proposals by mid-March. Bulgaria aims to purchase its new-generation fighter via a government-to-government agreement with the country that submits the best offer.

Under an optimistic scenario, tender completion, purchase agreement signature and its ratification by the Bulgarian authorities could all be undertaken this year. More likely, the process will be delayed, with a final go-ahead for agreement implementation not being given before 2018.

The only new-build fighters in the Bulgarian tender are expected to be Sweden's Saab Gripen C/D, but the entire weapons package will likely be sourced from the US.

Italy's proposal will comprise used Tranche 1 Eurofighter Typhoons

taken from the existing Italian Air Force inventory.

Portugal and the US are expected to submit a combined proposal for used Lockheed Martin F-16A/B fighters upgraded to the mid-life upgrade (MLU) Block 15 standard. This offer will involve F-16s presently held in deep storage in the US, which will be upgraded and refurbished by Portugal's OGMA company. The entire logistic and weapons package will be supplied by the US through Foreign Military Sales (FMS) channels.

Bulgaria has allocated a budget of €767m for the procurement of a minimum of eight 'new' multi-role fighters, together with a combined logistics package – including ground support and test equipment, training, mission planning and debriefing systems – and weapons.

The MoD's overall procurement plan calls for as many as 16 fighters, but due to budget shortages the programme has been divided into two phases, the first of which is now being pursued. It covers eight to nine aircraft, slated to be taken on strength between 2018 and 2021. The Bulgarian Parliament approved the funding for this phase last June. The second phase, set to be undertaken between 2022 and 2023, will involve the procurement of eight more fighters. Its funding is expected to be approved after 2020.

## Fighter aviation in crisis

The BVVS operates a 15-strong MiG-29 fleet, including 12 single-seat and three two-seat aircraft. Four more are kept in reserve to be used as spare parts donors. A total of 22 aircraft was originally taken on strength between 1989 and 1990. Two were lost in accidents and another sold.

From 2006 to 2009, the *Fulcrum* fleet was partially refurbished and life-extended to 40 years of calendar service by its original equipment manufacturer (OEM), Russia's RSK MiG company, under a contract valued at around €31m (equating to \$48m at the time). No avionics upgrades have been undertaken.

After the withdrawal of the last MiG-21bis *Fishbed-Ns* in December 2015, the MiG-29 remains the only fighter type in BVVS service. The twin-engine jet is slated to remain in active BVVS use until the early or even mid-2020s, exclusively for the air policing mission. To make that possible, a framework maintenance agreement with RSK MiG, covering four years, was signed in September 2011. However, the Bulgarian Ministry of Defence (MoD) reportedly failed to fund the full scope of maintenance requirements for the *Fulcrum* fleet, on the year-by-year basis, as agreed with RSK MiG. The deal expired in



*After ambitious avionics upgrades were abandoned, the BVVS is making efforts to restore to service its previously grounded Mi-24V attack helicopters. As described elsewhere in this issue, the first of six aircraft was returned to service in November 2015 after overhaul.*



*Above: With guided munitions having been removed from the Su-25 inventory, the type's weapons options now include the R-60M air-to-air missile and 32-round UB-32 rocket packs for 57mm (2.24in) S-5 rockets, as seen here on '254 White'. Below: Despite availability of the more modern Cougar, the Mi-17 remains a popular platform, although only a handful are operational at any given time. This example is outfitted for close air support, carrying a full load of six UB-32 rocket packs.*



*Below: The Cold War-era Mi-17 cockpit remains little changed, although civilian-standard GPS receivers and VOR/ILS/DME equipment have been added.*



late 2015 and has not been renewed. The scant number of serviceable MiG-29s, combined with somewhat limited fuel supplies in recent years, has led to a significant reduction in pilot flying hours.

Natural attrition among aircrews has left an enormous workload on those qualified to stand on quick reaction alert (QRA) for the air policing mission within the NATO Integrated Air and Missile Defence System (NATIAMDS).

The former BVVS C-in-C, Maj Gen Radev – a distinguished graduate from the US Air Force's Air War College class of 2003 – was elected in November 2016 as the new President of the Republic of Bulgaria. His inauguration took place on January 22, 2017. Radev was a popular, well-respected commander and a talented fighter pilot. He is widely regarded as the driving force behind the BVVS transformation and the organisation of many

international air exercises in Bulgaria since 2005, which had a significant effect on the Westernisation of the air arm. Radev made great efforts to keep the MiG-29 fleet in the air. Between 2014 and 2016 there was an extension of the time between overhauls (TBO) for the aircraft's Klimov RD-33 engines, step-by-step in 50-hour increments depending on their condition, in a bid to use them for up to 500 flight hours. The same procedure was undertaken to extend the TBO of the KSA-2A accessory gearboxes, which represent another complex, time-limited and flight safety-critical assembly.

Despite opposition from Radev, in mid-2016 the MoD even approved an all-new air policing concept, inviting foreign fighter aircraft to undertake Bulgarian QRA duty. The incoming air arm would receive payment, including all accommodation and flight training costs, during

the period of deployment to Bulgaria. Poland was the first country to express interest in sending its MiG-29s to benefit from the paid air policing opportunity. The Polish Air Force even sent a site survey team to Graf Ignatievo in late July 2016 to prepare for deployment later in the year.

Maj Gen Radev never agreed to this new concept imposed by the MoD, stating publicly both before and after his resignation (which was highly publicised by local media) that such a decision was clearly against the interests of the BVVS. At the time, Radev added that his air arm was systematically underfunded, and that paying for allied fighters to carry out QRA duty would consume huge amounts of taxpayers' money. These funds would be better spent purchasing spare parts and fuel

to grant additional flight hours to

BVVS *Fulcrum* pilots, Radev contended. These arguments did not convince the MoD to reject its 'contractor' air policing concept and, consequently, Maj Gen Radev eventually submitted his resignation to the MoD on August 1, 2016. His election as President only four months later triggered a chain of abrupt political changes during November and December 2016, including the prompt resignation of the government.

The air policing concept promoted by the MoD earlier in 2016 has disappeared.

## Overdue investment in *Fulcrum* maintenance

In mid-2015, the Bulgarian Defence Minister, Nikolay Nenchev, claimed the MoD was committed to completely severing ties with RSK MiG and would not enter into a new long-term maintenance agreement after the existing contract expired late that year. The formal reason for this move, as given by Nenchev, referred to European Union sanctions imposed on Russia as a result of the Ukrainian crisis that began in 2014. These sanctions prohibit all exports and imports of arms and defence equipment to and from Russia, but there remains the possibility of continuing the maintenance of defence equipment that has already been fielded. European Council Decision 2014/872/CFSP dated December 4, 2014 allows the provision of Russian-sourced spare parts and services necessary

*Soldiers fast-rope from an AS532AL during an exercise. Eight tactical transport Cougars are complemented by four examples configured for CSAR, although availability across the fleet leaves much to be desired.*





for the maintenance and safety of existing capabilities within the EU.

The MoD refused to make use of this provision and instead opted to look for other countries to supply MiG-29 spares as well as maintenance, repair and overhaul (MRO) services. Finding reliable support from non-Russian sources proved almost impossible. Only one government-to-government agreement was eventually signed – with Poland in October 2015 – covering the overhaul of six RD-33 engines at a total cost of €6.138m. However, the Polish aircraft maintenance industry lacked the capacity to fulfil the entire range of Bulgarian maintenance needs for its *Fulcrum* fleet.

A long-delayed investment in the maintenance of the BVVS *Fulcrums* saw a series of spare parts contracts being signed in a rushed manner during November/December last year. The spending spree followed an 18-month search for new suppliers, two collapsed public procurement tenders and the failure to secure full support from Poland.

The urgent procurement procedures launched by the MoD have involved fast-track direct negotiations with a single candidate, in a desperate effort to place orders to purchase the vital engines and gearboxes before the end of 2016. This time, though, the MoD reneged on Defence Minister Nenchev's previous claims that Bulgaria had at last ended its dependence on Russian aircraft industry for the supply of spare parts and MRO services.

The contract awarded by the MoD to Sofia-based Aviostart, a company long-associated with RSK MiG, covered the delivery of

four newly manufactured and six second-hand, overhauled RD-33 Series 2 engines, priced at a total of €21.83m, and sourced from Russia. The same company received a contract to deliver seven brand-new KSA-2A accessory gearboxes priced at a total of €11.165m, also to be sourced from Russia.

### Frogfoot force soldiers on

Until early 2008, the BPR at Bezmer existed as a fully-fledged BVVS air base, designated as the 25th Attack Air Base (Shturmova Aviobaza – ShtAB). Its structure consisted of a headquarters, two flying squadrons, a flight line maintenance squadron (which formally 'owned' the 34 single-seaters and four two-seaters used by the two flying squadrons) and a maintenance/field repair squadron, as well as airfield/communications/landing aids and logistic support squadrons.

The BVVS restructuring plan of 2008 sharply reduced the size of the resident unit at Bezmer, as it received its new BPB designation, lost its 'numberplate' and retained only one Su-25-equipped flying squadron with a fleet of 14 *Frogfoots* (including four two-seaters) in active service. Aged between 28 and 30 years old, these aircraft remain in perfect technical condition. Their service life has been extended at virtually no extra cost by using internal BVVS engineering know-how and manpower, with only a limited supply of spare parts and consumables. A large fleet of grounded Su-25s is available for cannibalisation. This allows the *Frogfoot* fleet to remain in BVVS service until at least the end of the year. ◀

## Fixed-wing training fleet

The L-39ZA fleet was reduced from 35 to just 12 active service aircraft in the early 2000s. In 2005, four L-39ZAs were upgraded with Western-standard navigation aids. The 12 L-39ZAs remaining were grounded in 2010 due to the expiry of their service life, requiring the fleet to be cycled through a comprehensive life extension and overhaul programme. Bureaucracy and a lack of funding caused delays and the contract with the OEM, Aero Vodochody, covering six aircraft, was not signed until 2012. The first overhauled example was re-delivered in July 2013 while the general overhaul of the last L-39ZA was completed at the end of last year. The six-strong fleet is set to serve until the mid-2020s.

The Pilatus PC-9M turboprop is the workhorse for initial and basic flight training. Six were ordered in December 2003, in a contract valued at around \$33m (a figure that also included the PC-12/45). Delivery took place in November and December 2004.

The military and theoretical training of future BVVS officers is carried out by the 'Vasil Levski' National Military University (NMU) in Veliko Tarnovo. This is a four-year training course for officers who graduate with a university bachelor's degree. In the past, students destined for the BVVS spent their first academic school year in Veliko Tarnovo but since 2015 have begun studies at the NMU's Aviation Facility at Dolna Mitropolya. Co-located at Dolna Mitropolya is the BVVS' 'Georgy Benkovski' Training Air Group, which controls a single flying squadron equipped with the PC-9M and the L-39ZA. Students selected to undergo pilot training

start flying training on the PC-9M upon completion of their second academic year. By the time they graduate from the NMU they have 50 to 60 flight hours under their belts and are promoted to lieutenants. They continue flight training at Dolna Mitropolya for another two to three years.

The BVVS C-in-C in 2014, Maj Gen Radev, introduced an accelerated flight training programme for young and talented pilots, aimed at solving a growing problem. At the time, the existing system was judged inefficient as it took a very long time for trainees to be deemed suitably proficient to convert to frontline fighters. The new system, enforced by Radev, involves the intensive training of a small number of carefully selected young pilots for the fighter and attack branches, with a total of 190 to 200 flight hours on the PC-9M (including time logged by the young pilots while studying in the MNU). This covers the initial, basic and even a proportion of the advanced phase. The remainder of the advanced and all lead-in fighter training – some 130 to 150 more hours – are then flown on the L-39ZA. New graduate pilots are trained for air-to-air and air-to-ground combat employment with live weapons in addition to visual reconnaissance. Thanks to this 'downloading' of combat employment and bad-weather/night flying tasks, the new pilots go through fast-track conversion courses to attain combat-ready status. In the foreseeable future the BVVS plans to procure affordable piston-engined training aircraft for the screening and initial training phases, relieving the hard-working PC-9M fleet.



Above: As the backbone of the training fleet, Dolna Mitropolya's PC-9Ms are scheduled to be joined in service by a new, more economical piston-engined trainer that will be used for pilot screening and initial training.

In 2004-05, six *Frogfoots* (four single-seaters and a pair of two-seaters) underwent a small-scale upgrade of their navigation suites for NATO interoperability and ICAO compatibility, allowing participation in exercises and missions abroad. AN/ARN-154(V) L3 TACAN transceivers, Trimble AN/ASN-173 military-standard GPS receivers and VOR/ILS/DME units were integrated into the Su-25's existing analogue avionics suite. A mix of both upgraded and non-upgraded *Frogfoots* is today in active service at Bezmer.

Primary Su-25 roles include close air support (CAS) to the army and special forces, in addition to supporting naval operations in littoral zones. Visual reconnaissance is assigned to the *Frogfoot* force as another frontline mission. Although BVVS weapons stocks still include the Kh-29L (AS-14 *Kedge*) and Kh-25ML (AS-10 *Karen*) laser-guided missiles, Su-25 pilots no longer train to use these munitions. The only guided missile that remains in its arsenal is the R-60M (AA-8 *Aphid*) air-to-air missile. It is subjected to occasional experimental firings (used for extending the shelf life of the missiles produced in the late 1980s) against heat-emitting ground targets. The last firings took place in 2011, in an effort to verify the operability of R-60 missiles used by MiG-21 fighters on QRA duty.

Among the Su-25's wide variety of secondary roles, the most common calls for dropping radar-reflecting/heat-emitting bomb targets that descend under parachutes. This is conducted at the Shabla range on the Black Sea coast, where the parachute targets are used for practice firing by BVVS surface-to-air missile (SAM) systems and MiG-29s, and occasionally by foreign SAM and fighter crews involved in live-fire exercises.

## Struggling helicopter fleet

The BVVS operates an eclectic helicopter fleet comprising four types from three suppliers in France, Russia and the United States. This situation is set to remain unchanged until the early 2020s. Such fleet diversity is not conducive to smooth logistical support. The 24th AB at Krumovo, near Bulgaria's second-largest city Plovdiv, is busy training aircrews to support



*Above: The Bulgarian Air Force L-39ZA fleet has been given a new lease of life thanks to a life extension and overhaul programme for six aircraft conducted by manufacturer Aero Vodochody.*

*Below: A single An-30 is used for 'Open Skies' missions and other photo survey work, equipped with a camera suite and navigation aids. Life-extension efforts for the An-30 have included cannibalising the An-26 fleet to provide much-needed spares.*





Now used for the training of paratroopers and aircrew, the single An-2 is another type due to bow out of BVVS service in the near future.

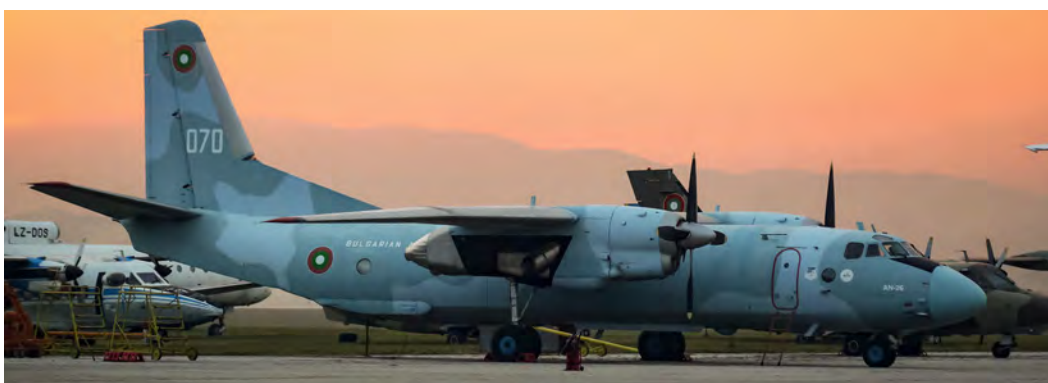
NATO and EU missions overseas, as well as for the ever-important homeland army support and humanitarian relief tasks. In 2016, the BVVS continued to maintain a combat-ready module for medical evacuation (medevac) and tactical transport in international environments, using two AS532AL Cougars.

The BVVS maintains a marginal rotary attack capability, with as many as six Mi-24V *Hind-E* helicopters assigned on paper to the 24th AB. Only one is

serviceable at present. It was reintroduced in November 2015 following a general overhaul. Later this year, or early next, it will be joined by another example currently undergoing general overhaul and life extension at the Sofia-based TEREM-Letets facility. No avionics upgrade is planned for the *Hind-E* force, after two unsuccessful attempts at an ambitious avionics upgrade in the mid- and late 2000s. The two examples will continue to serve in their original form,

outfitted only with civilian-standard Trimble 2021AP GPS receivers, until 2022 at the latest (see the accompanying *European Gunships* feature in this issue).

The BVVS rotary-wing fleet includes six Mi-17 *Hip-H* helicopters deployed for a variety of transport and special missions. Only two or three of these are serviceable, though three are more expected to be cycled through general overhaul and life extension between now and 2019, in order to be made good for an additional 2,000 flight hours and eight years of service. Again, no avionics upgrades are planned (the *Hip-Hs* are equipped with civilian-standard Trimble 2101AP GPS receivers and VOR/ILS/DME). Despite the presence of the much newer AS532AL Cougar, the rugged Mi-17 remains highly prized in BVVS service and is used for a range of so-called 'dirty and dangerous' missions for which the newer Cougar is less effective, potentially less safe or prohibitively expensive to use. An important frontline role performed by the *Hip-H* is CAS, armed with between two and six 32-round UB-32 rocket packs for 57mm (2.24in) S-5 rockets and side-firing 7.62mm (0.3in)-calibre PK machine guns. The *Hip-H* is also employed on combat search and rescue (CSAR) training missions and is held on QRA for use in peacetime rescue operations across Bulgaria on as-needed basis, alternating with the Cougar. Since 2011,



Above: Now in the twilight of its career with the Bulgarian Air Force, the final two examples of the An-26 will probably be disposed of before the end of the year.  
 Below: A single PC-12 executive transport was acquired together with the PC-9M trainers and delivered in 2003.





the Mi-17 fleet has been used for firefighting in Bulgaria, deploying the three-tonne Bambi Bucket on an external sling.

The AS532AL Cougar is the most modern tactical transport helicopter operated by the BVVS. Twelve were delivered between 2006 and 2009 – eight are in the standard transport variant, without any self-protection aids, while four are partially outfitted for the demanding CSAR role. The latter sub-variant features improved navigation and limited self-protection equipment, consisting of a radar warning receiver and chaff/flare dispensers, in addition to the FLIR Systems SeaFLIR optronic payload, searchlight, cabin lightning allowing the crew to use Generation III night-vision goggles (NVGs), NVG-compatible cockpit, partial armour protection for the crew, emergency flotation gear and an increased-capacity fuel system.

The eight tactical transport Cougars – also outfitted with NVG-compatible cockpit, cabin and exterior lighting – are used in a wide range of parapublic missions to assist the civil population. There were plans to install armour protection and defensive aids on the tactical transport-configured AS532ALs, to make them capable of operating on UN and NATO missions abroad. The existing defensive aids subsystem of the four CSAR Cougars was intended to be further enhanced through the integration of missile approach and laser warners.



*Representing the Bulgarian Air Force's initial Western equipment are the six Bell 206B-3 JetRangers delivered in 1999 and assigned to an independent training flight at Krumovo.*

This programme has been shelved, at least for the time being, due to a lack of funds. The BVVS is only able to arm the Cougars with door-mounted 7.62mm PK machine guns on locally designed pintle mounts.

The BVVS struggles to maintain a proportion of its AS532AL fleet in an airworthy condition. Once again, due to a shortage of funds combined with very high support costs, the air arm has only been able to keep two to four helicopters from a total of 12 in flyable status at any given time since the early 2010s.

Six Bell 206B-3 JetRangers were the first Western-made

aircraft acquired by Bulgaria. They were taken on strength in 1999 under a contract valued at \$8.8m. The batch of six JetRangers comprised four blue-painted examples in a training/liaison configuration (including two featuring NVG-compatible cockpits) while two more in a medevac/training configuration, outfitted with high skids and flotation gear, and capable of accommodating a stretcher.

The US-made helicopters equip an independent training flight at Krumovo. In addition to their primary training and liaison function, in which the type has proven very successful, the BVVS

Bell 206B-3s are occasionally utilised for visual reconnaissance and area observation.

## Transport capability

The BVVS maintains a modest fixed-wing transport component serving with the 16th Transport Air Group, stationed at Sofia-Vrazhdebna Airport. The Bulgarian tactical transport force today is deemed to be much more capable than that flown during the Warsaw Pact era, despite the small numbers of aircraft. It can perform a wide range of tactical



*Four Su-25UBKs remain in service with the single squadron at Bezmer.*



The BVVS fixed-wing transport fleet is a success story, and one of the areas in which capabilities have been dramatically improved since the days of the Warsaw Pact. Leading the line are the three C-27Js based at Sofia-Vrazhdebna Airport.

and peacetime operations thanks to the capable C-27J Spartan and its well-trained aircrews.

The original contract covering the delivery of five C-27Js plus three options was signed in February 2006, valued at around €92m. The contract was later amended due to limited funds and only three Spartans were taken on strength between 2007 and 2011. The aircraft feature survivability-enhancement features comprising defensive aids suites (with missile warning

sensors, radar warning sensors and chaff/flare dispensers), armour protection for the cockpit and the oxygen bottles in the cargo compartment, as well as fuel tanks filled with neutral gas to prevent explosion of vapours when hit by incendiary rounds or high-speed missile fragments. The aircraft are equipped for NVG operations, which is useful for low-level tactical missions, but BVVS aircrews have not yet undertaken this training in the Spartan.

The C-27J is regularly used for VIP transport and is equipped with three roll-on/roll-off modules, each featuring nine passenger seats offering increased comfort. This configuration is used to transport high-ranking members of the government and MoD during international visits.

Until 2011, the An-26 was the main workhorse of the

BVVS fleet. Three of the five aircraft were subsequently sold to civilian customers while the remaining two are still on strength, mainly as spare parts donors for the An-30. Both are expected to be sold this year.

The lone An-30 photo survey aircraft, familiar as Bulgaria's 'Open Skies' platform, is equipped with a sophisticated camera suite and navigation aids. However, due to a shortage of airworthy passenger transport aircraft, it is frequently utilised in this role. The An-30 has been the subject of multiple life-extension efforts in recent years, and the latest will ensure it remains in use at least until the end of this year.

One An-2 remains in BVVS service and has the distinction of being the oldest military aircraft still operated in Bulgaria. Manufactured in 1974, the biplane is utilised as a jump ship to train the Bulgarian Army's Special Operations Forces and parachutists from other armed

forces branches. In addition, it is regarded as an important aircrew training asset.

A newly built Pilatus PC-12/45 was delivered in December 2003, for VIP, liaison and passenger transport, as well as for medevac and aircrew training.

In the late 2000s, the eight-strong L-410 fleet was reduced to two aircraft in active operation, both L-410UVP-E versions. These were maintained in airworthy condition until 2010, while the remainder were offered for sale. No customers have yet been found. In addition, one of the two surviving L-410UVP-Es was upgraded in 2008 with the addition of a roll-on/roll-off system for airfield nav aids calibration. In the second half of 2016 the BVVS announced plans to return the two grounded machines to service this year and next, for use in the paratrooper training and light personnel/cargo transport roles until the late 2020s.



### Bulgarian Air Force air order of battle

Unit	Base	Aircraft	Primary roles
3rd AB - Main Component and HQ	Graf Ignatievo	MiG-29/UB	Air defence
3rd AB - 'Georgy Benkovski' Training Air Group	Dolna Mitropolya	L-39ZA, PC-9M	Training, ground attack, reconnaissance
24th AB - Main Component and HQ	Krumovo	AS532AL, Mi-17, Mi-24V, Bell 206B-3	Assault transport, SAR, CSAR, attack, liaison, training
24th AB - 16th Transport Air Group	Sofia-Vrazhdebna	C-27J, PC-12/45, An-30, L-410UVP-E, An-2	Transport, liaison, medevac, training
BPR	Bezmer	Su-25K/UBK	Ground attack