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# The Yakovlevs

*The Yakovlevs have burst on the airshow scene with stunning formation aerobatics, in 'the ultimate sport aircraft'. By team manager and 'Yak 2', **Nick Barnard**. Photos by **Jamie Hunter**.*

## Yakovlev pilots

**T**HE SEVEN PILOTS come from civilian and military backgrounds, and all but three (Jez, Nick and Azat) have full-time working lives as well.

Azat Zaydullin is the latest addition to the team, arriving from the Ukraine in July 2002. Already well-known as an international competition pilot and coach, Azat's titles include: Aerobatic Champion of Ukraine 1994, 2001 and 2002 (Unlimited), member of Ukraine Aerobatic Team (Unlimited) 1994-2002, third in team competition and in World Air Games Turkey '97. As a display pilot, Azat flew with the well-known aerobatic formation team Northern Lights in 1999 and 2000, and flew in more than 100 displays around the USA, Canada, El Salvador and Germany. Azat was invited to join as coach and inspiration to the team—and he is highly respected for introducing new aerobatic and formation skills—watch out for Ukrainian inspired manoeuvres this coming season.

Jez Hopkinson leads, flying the Super 52, and 2003 will be his fourth season. Jez is also a CAA/JAR Examiner and in the recent past ran his own aerobatic flying school. He is now very involved with air displays on a formal basis, checking show pilots' competency as part of his role as a Display Authorisation Evaluator.

Nick Barnard, co-owner with Jez, was born into a total aviation family and has been enjoying flying since the age of five (in an Auster with his father at Hucknall). After three years with a University Air Squadron, Nick turned to writing and publishing before being

introduced to flying Yaks, by Jez of course! Nick is team manager and flies as Yak 2 in a single-seat Yak-50.

Peter Scandrett (Yak 3) is a litigation partner in City law firm Charles Russell. Inspired by his father, who flew Mosquitos and Meteor night-fighters, Peter started gliding in 1968, obtained his PPL in 1982 and has held a Display Authorisation since 1994.

Den Harkin also flies as Yak 3 and is an ex-RAF pilot and weapons instructor, flying Jaguars, and NATO Exchange Officer flying F16s with the Royal Netherlands Air Force. Den is now with British Airways having flown Lockheed Tristars, Boeing 747s, is currently an instructor on Boeing 777s and soon to be a captain on the Airbus.

Willy Hackett (Yak 3 or 4) is a very experienced formation pilot. Willy is an RAF fighter pilot, flying Tornado F3s in the Gulf War and Bosnian conflict. Seconded to the Fleet Air Arm, Willy flew and instructed on Sea Harriers and took part in the Sierra Leone operations. No stranger to airshows, Willy was the RAF's F3 display pilot in 1997 and 1998, and in 1999 was awarded an MBE for his services to aviation. Willy is now at Boscombe Down serving as a test pilot.

Lance Nicol (Yak 3 or 4), another experienced formation pilot, is a former RAF fast jet pilot amassing over 3000 hours flying Tornados and Harriers. Before leaving the Services, Lance developed operational tactics at the Harrier trials unit at Boscombe Down. Lance now flies 747s for Cathay Pacific Airways.

**F**OUR SILVER YAKS glint sharply in the late afternoon sunshine as they bank steeply and plummet towards the Old Warden runway, gathering energy and filling the sky with the deep, pleasing roar of Russian radials—all 36 cylinders!

"Running in, thirty seconds."

To the right of the leader, Yak 2 relaxes his grip on the stick, trims forward slightly to compensate for the burble of turbulence, checks temperatures and pressures and prepares for twelve minutes of pleasure and complete concentration.

Along the display line the team's theme music begins and the commentator consults the briefing documents. "Ladies and gentlemen, look to your left and welcome..."

"Smoke on... Go!"

Yak 2 flicks the switch on the throttle, looking through the leader some six feet away to see Yak 3 opposite, trailing a thick spiral of white smoke.

"Looping, pull up... Go!"

Easing back smoothly, Yak 2 teases the throttle forward and back, makes slight corrections with the stick and begins to apply left rudder as the speed falls away—as smoothly and harmoniously as possible to ensure the leader remains a stationary reference no matter which way up, and so that, from the ground, the show looks precise...

This was the Shuttleworth Military Pageant, August 2002, less than two years since the idea of a four-ship formation team took root. And this is the story of a formation display team, from start to first show, from dreams to accolade.

Formation is an essential part of military pilot training, allowing the efficient operation of multiple aircraft in a sortie. And although formation flying is very demanding, it is also very rewarding—some would say addictive—so that many ex-military pilots have sought their formation fix in warbirds or classic jets, or more affordable ex-military training aircraft such as the Chipmunk and Harvard.

The arrival of significant numbers of Yak-52s in the UK (there are now over 140 in the country) opened a whole new arena and opportunity for a wider enjoyment of formation flying. The well-known Yak formation training weeks at North Weald were a response. The syllabus is derived from the Harvard formation and display team practices. The week-long spring and autumn Yak-52 formation schools are a Mecca for rekindling dormant skills and acquiring wholly new formation flying techniques.

The North Weald school has trained a new generation of formation pilots who have learnt their art in the civilian rather than the military world. The majority of the instructors are military or ex-military—working for high standards in safety, skill levels, and enjoyment. The courses



create a wonderful enthusiasm for practising formation, and the Yak-52 is the ideal aircraft.

With 365 hp of radial-engined grunt and well-harmonised controls, the power of the 52 allows one to establish and perfect formation skills. Four of the Yakovlevs team have either taught or learnt their formation skills at North Weald.

The Yakovlevs also owes its inception to a more recent development in the Yak flying world—the establishment of the YakClub. Started in 1999 by three active Yak formation pilots, Phil (Pod) O'Dell, Lance Nicol and Jez Hopkinson, the YakClub was established to share knowledge and encourage the safe and fun (and less expensive) flying of Yaks, largely in Europe. Communicating via the website [www.yakclub.com](http://www.yakclub.com) and also a quarterly newsletter, the YakClub organized a formation weekend clinic every month at Compton Abbas. They were creating and encouraging a lively gathering of like-minded pilots, many of whom had airshow experience or wanted to display. From this core group came the volunteer pilots, with their own aircraft, for the first Yakovlevs team in 2000.

They mounted a four-aircraft display by a selection of Yak-52s and a single Yak-50. These events established Compton Abbas as the West Country centre for Yak flying, and it is still the home of the Yakovlevs. This picturesque airfield is set high above Dorset's Blackmoor Vale. From early spring to late autumn, its restaurant is thronged with visitors who enjoy watching their resident team practise for displays.

The first year, 2000, proved that a team of four Yaks worked. Why four? Four aircraft are a minimum for memorable impact at a big show, against which is the expense, the lack of manoeuvrability (you cannot turn a large formation on a sixpence) and the difficulties of rostering four current and available pilots.

Formation shapes and positions were refined, leading to the trademark box formation, with the more powerful Yak-50 flying at 4, line astern



behind the leader. Flying precise formation looks good, but just as important is the choreography of the show, and again this first season showed that mixing close formation box manoeuvres with splits, crosses and singleton Yak-50 aerobatics pleased the crowds.

After seventeen successful displays in 2000, some important lessons had been learnt.

First, the Yak-52 is excellent fun for solo aerobatics, formation training and continuity, but is underpowered for formation displays. If you want to perform formation aerobatics, you have to start very high above the crowd, as each manoeuvre bleeds energy, and you have to dive again for more. This handicap is not an issue for a part-time team, but is unacceptable for a more dynamic show alongside the military and professional civilian displays. We decided that we needed three Yak-50s and a very special Yak-52.

Second, the aircraft should all be painted in team colours and fitted with high output smoke systems.

Third, we wanted to complete two or three times as many shows as the first year. Taking the Yakovlevs to this next level would mean a great deal of time, money and determination.

With hindsight, we realised one should not start a business trying to do too many new things at once, especially when dealing with pilots, aircraft and weather—three fickle factors! When one works, the other is probably about to break.

By December 2000, pilot selection was in hand, aircraft were on order from Richard Goode Aerobatics and a marketing campaign launched.

By January 2001, the first team 50 was unavailable and the Super 52 was behind schedule, but good news followed when the first of the supportive aviation sponsors, Garmin, got together with Aerocom of Leicester and fitted GPS/COM systems in all four aircraft.

**After the first season showed up the Yak-52's inadequate power in formation displays, the team switched to three Yak-50s with this Super Yak-52—boosted with an extra 40 hp.**

During February, another Yak-50 was found and purchased in the UK, and a paint shop located—Edmondson Aviation of Thrupton. With their assistance, Jez and Nick developed the distinctive silver and red scheme.

More early support came from GQ parachutes, who developed a seat-type parachute for use in Yaks. Then there's Compton Abbas based Phil Moore of Air Defence—he maintains the the paintwork by cleaning the aircraft before every show and applying a Teflon coating for protection over time.

Positive meetings with Shell Aviation gave a much-needed boost of confidence—Yaks use a litre of oil per hour per aircraft!—but in March, yet another Yak-50 overhaul project was delayed. The inevitable stop-start-delay process continued throughout the spring and early summer until finally, in August 2001, the Yakovlevs at last flew with four aircraft in team colours.

Despite all the operational trials and setbacks, the first full season was a great success, with forty displays flown in front of over 6,000,000 spectators, taking the Yakovlevs back and forth across the country from Edinburgh to Plymouth, and Liverpool to Cromer. As you might imagine, there's a lot of fuel burnt. At the rate of 85 to 95 litres per hour per aircraft during a display, plus transit time for, say, two displays over one weekend, we can easily get through 960 litres.

Shows far away from Compton Abbas are a challenge—five-hour transit, twelve-minute show, and then it's time to go home. Invited to display at The Museum of Flight near Edinburgh, the Yakovlevs set off as two pairs—

one from a maintenance base in East Anglia, the other from Compton Abbas. Set fair as far as Newcastle, the pairs attempted to meet but weather across the Pennines drove a wedge between them. Result: Jez and Nick stuck behind the stationary front at Fishburn for 48 hours while Lance and Willy were ready to display at Edinburgh. Moral: never split the team on long transits!

In 2002, ground support was enhanced when Phil Moore painted and converted a Transit van to match the team colours—and then he followed the displays across the country, making sure that all the aircraft looked spotless, and the pilots were fortified. The website was upgraded too, and now includes a team merchandise shop, Young Yakovlevs club, video and wallpaper downloads, as well as a pictorial record of the year's events.

Formation excellence is like any specialist, high intensity and demanding skill—you need frequent practice. Without the support of Shell Aviation the team would not have been able to develop and perfect their routine each year. ►

## How the Yak Super 52 keeps up with the 50

**T**HE Super 52 is a unique evolution of a standard aircraft, and was overhauled in Lithuania specifically for the team. The brief was simple: create a 52 that can keep pace with—or rather, not hold back—the much lighter 50s.

First of all, anything unnecessary was removed from a standard Yak-52. Over 140 kg of equipment was stripped from the aircraft, the old engine and two-blade propeller removed, and the airframe stripped back to bare metal.

Reassembly centred around the new M14PF engine, delivering over 400 hp, coupled with a 250 cm three-blade MT propeller with spinner, and titanium, Sukhoi-designed iris engine cooling gills. This combination gives some 25 per cent more thrust (particularly important in the vertical) than the standard 365 hp M14P and two-blade propeller.

A self-contained smoke system was installed, aileron spades to improve effectiveness at low speeds, western attitude indicator, a Garmin 530 GPS/COM and 327 transponder with Mode C—mounted as if factory-installed on a bespoke central panel designed and fitted by Aerocom.

The result? The lightest, most powerful Yak-52 in the world. And how does *Natasha* fly? As sweetly as a standard 52 but with gusto.

The success of the project is clear. The Super 52 can happily fly the complete

sequence led by a 50, but is hampered by one crucial problem, and that is fuel burn. Any M14PF engine owner will agree... open the throttle at high rpm and the fuel is guzzled at a rate that will surprise even a classic jet pilot! The Yak-52 does weigh in at nearly 1.5 tonnes, against less than 900 kg for a 50, which partially explains why the Yak-50 is a respected and much loved thoroughbred.

And so the Super 52 became the lead aircraft, accompanied by three Yak-50s. All team Yak-50s are powered by standard M14P engines, and ready for 2003 all four aircraft are now fitted with three-blade MT propellers.

The Yak-50 is a classic design—with a similar power-to-weight ratio as a P51 Mustang in a highly manoeuvrable, Unlimited aerobatics package—arguably the ultimate single-seat sport aircraft.

Improvements to the Yak-50s include the fantastic 430 or 530 Garmin navigation and communications fit. Why fantastic? Ask any display pilot about airshow stress; they will tell you that most traumas are encountered getting to and from a venue, so you will see why the pilots are so appreciative of the equipment.

Like the Super 52, all the 50s have the superb seven-point Hooker harness with single ratchet, to keep us secure and rock steady in the seat. We all use a GQ parachute—with a special antidote for numb backsides on long transits—a comfortable Dynafoam seat pad from RD Aviation!



**The Yak-50 once brought the USSR to the top of international aerobatics, competing with Pitts Specials... but that was in the seventies. In the 'noughties', its classic lines and growling radial make it perfect for graceful formation shows.**

be operated at much lower cost—£195 per hour per aircraft.

Operating four aircraft is never going to be easy without a programme of preventative and regular maintenance and the Yaks are no exception, yet on the whole prove tough and reliable. To enhance operational flexibility all pilots have been trained to complete essential maintenance, and it is not unusual at airshows to see team pilots pulling on overalls, removing cowlings and not only checking the engine but also solving day-to-day problems as well. The M14 engines are famously robust, and to ensure longevity oil is changed every 25 hours, and a thorough maintenance schedule completed too.

Like all radial engines the M14 is prone to hydraulic lock caused by a surfeit of residual oil (or even petrol when over-primed at start-up) that settles with gravity to the lower cylinders—this is why you see Yak owners enthusiastically hand-swinging the prop to be sure there is no blockage. All team aircraft are fitted with a manifold drain system to reduce the risk of lock.



After the display season closes, the team gets together to analyse and criticise the past season and suggest new ideas.

A winter rest and period of calm follows, complete with aircraft maintenance and improvements, new routine planning, and flying when possible—as well as crucial sponsor chasing. Spring comes around all too quickly and the complete team gathers again at Compton Abbas for the annual training camp. Over ten days, the new ideas mix with old favourites to perfect the routine for the display season. Training continues throughout the year.

To maintain the highest standards in safety and entertainment, the team Standard Operating Procedures (SOPs) insist that every pilot has a ten-day currency span.

The driving force behind the Yakovlevs is the pursuit of formation entertainment, and the team believes that the finest piston-engined display aircraft to achieve this are the Yak Super 52 and Yak-50. Formation display is all about power, finesse and grace, and these aircraft possess all the throaty qualities of a big piston, the agility of an Advanced aerobatics machine and the physical presence of a warbird, yet can



## The 2003 Season

**B**OOKINGS HAVE BEEN confirmed for Middle Wallop, Woodspring Wings, Old Warden, Taunton, Wessex, Liverpool, Swindon, Shoreham, Caernarvon and also mainland Europe. This list was compiled before the season began; for more details and other displays, please see the website.

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The pneumatic system for engine start, brakes and undercarriage actuation (as well as flaps on the 52) is light and effective, but can spring leaks, so the team pilots are masters at locating and fixing air problems—and the ground crew are ready and able to respond with a portable air bottle if need be.

The 2002 season built on the lessons of the first full year, and despite the poor weather over the peak display period, 68 shows were completed throughout the UK. The display sequence was improved, with many more formation aerobatics, including the world's only barrel roll by a civilian team in four piston-engined aircraft.

Now Azat Zaydullin, the Ukrainian champion, is joining us again for a second year, as coach and inspiration to the team.

2003 shows every promise of being an even more exciting and demanding season for the Yakovlevs. ✚

## A day in the life of the Yakovlevs...

**T**HIS IS A log of the team's day when they displayed at the Shuttleworth Military Pageant in 2002.

**0845** Compton Abbas. Phil Moore and his team complete the final aircraft cleaning and polishing as the pilots arrive and fill each aircraft with 45 litres of red diesel for the smoke systems.

**0930** Compton Abbas. On the flight line, all oil and fuel checked, engines pulled through, walkrounds completed and ready for transit brief.

**0945** Compton Abbas. First brief, with obligatory bacon sandwiches. Weather and diversions noted, departure method and transit practice manoeuvres agreed. (The pilots have a well-thumbed set of memorised SOPs—all pilots know what to expect if any directive is 'SOP'.)

**1000** Compton Abbas. Start: with a chopping motion Jez signals and all four engines burst to life in a swirl of blue smoke. Warm-up takes about five minutes.

**1005** Compton Abbas. Taxi in a staggered line, the Super 52 leading the way to the threshold.

**1010** Compton Abbas. Take off: Yak lead, 2 and 3 line up in a close vic, and depart in formation, with Yak 4 following five seconds behind, one fly-by for the airfield and then direct to Shuttleworth across the eastern Salisbury Plain ranges... it's a Sunday. In transit the Yakovlevs fly in pairs or loose box, so that four pairs of eyes scan the air for traffic.

**1100** Thirty miles to run: time to practice rollbacks. Closing up quickly to display box, Yak 2 and 3 obey the command, pull up and roll back into tight formation, aiming to complete the manoeuvre in less than eight seconds.

**1112** Old Warden. Cleared to run and break, the Yakovlevs begin a shallow dive in box formation, and at the threshold each pull up with a three-second delay into a tight downwind pattern, landing in a stream.

**1120** Old Warden. Lined up facing the crowd, the team waits for another hand-chopping motion from Jez to execute the simultaneous shutdown.

**1200** Old Warden. Leaving Azat and Willy to

assist with fuelling, Jez and Nick attend the display briefing.

**1255** Old Warden. All aircraft display ready.

**1300** Old Warden. Display briefing: Jez leads the team through the special features of the site, paying particular attention to the blustery on-crowd wind—followed by two walk-throughs of the entire routine—then it is time for each pilot to recheck their aircraft and prepare themselves for the show to come.

**1330** Old Warden. Start: the engines are warm, and within minutes the Yaks are ready for taxi.

**1338** Old Warden. Take off in formation, and Azat signals he is aboard with a sharp double-click on the transmit button. Climbing for 2,000 feet, lead pushes the formation apart with a hand signal and each aircraft performs, in pairs, an inverted (checking for loose articles) followed by a smoke system check. Back in close formation, it's time for a warm-up: loop, quarter clover and barrel follow in a smooth flow of elegance and beauty. Thumbs up in turn and we are ready...

**1355** Old Warden. Show time.

**1412** Old Warden. Shutdown, a brief lull and then the applause fills the cockpit—a big smile and a wave before leaving the cockpit to congratulate each pilot in turn. We are all hot and tired, but elated. Along the barrier small boys call out for autographs and it's their time now.

**1600** Old Warden. Debrief over, tea and biscuits enjoyed, time to depart in a mid-show slot.

**1640** Near Andover. Formation practice, as briefed. New positions are tested, such as swan and line abreast, as well as perfecting tighter references for box.

**1705** Compton Abbas. Loop, break, land. Using the last of the smoke, the Yakovlevs make their trademark arrival at home base.

**1712** Compton Abbas. Shutdown, fuelling and a final wipe down of the oil before the aircraft are returned to the hangar. The day is not over—time for a debrief of the transit and the formation practice—on the whiteboard positions are noted and plans drawn up for the next sortie, a two-aircraft display for a private party the next day.