

Yak 50



Display pilot Nick Barnard caresses the sky in “one of the world’s great aeroplanes” – share the 365hp aerobatic fun and the Russian experience

I wanted one the moment I saw a Yak 50. As an enthusiastic newbie Yak 52 pilot, I knew that the Yak 50 offered more. And what every aerobatic pilot wants is more, more, more! More power, more agility, more sex appeal, more performance, more fun. Just give me more!

Now, 12 years later, after some 1,000 hours and more than 400 airshows on type, does the Yak 50 deliver? You bet it does, and more... It's one of those 'just right' aeroplanes – arguably one of the great aerobatic aeroplanes of all time – and would sit happily alongside a Bucker Jungmann and a Sukhoi 26 or 29 in my dream hangar. And I'm not the only one. Mark Hanna cherished the Yak 50 too, and there's many an experienced

warbird pilot who continues to be thrilled and challenged by the 50, as it offers traditional and classic handling characteristics, yet it's up for Unlimited aerobatics too, at a fraction of the cost of some of the other aircraft mentioned here.

The Yak 50 is not a single-seat version of the Yak 52. Rather, it's the original design from which the Yak 52 was derived. Unlike the 52, which were, and still are, made in Rumania, the 50 was assembled in Arseniev, Siberia. And unlike the 52, the 50 was not built in prodigious numbers – some 300 in all, of which about 49 are flying today. By contrast to the two-seater, the 50 is a lightweight design, a real thoroughbred. It's absolutely true that they also built spare sets of wings for the 50 – after all, they had to cope with considerable stresses and strains at the hands of

the extremely dynamic Soviet aerobatic teams. In the early years, structural failures claimed lives, but subsequent mods have ensured that the airworthy examples are safe and strong. Subject to how much fuel and smoke oil you carry, the type is limited to +9/-6g, which is more than most of us can handle.

Yet, it's no wonder the Soviet teams pushed the Yak 50 hard in the 1970s. The 50 was their adversary for the Pitts, and also for the Zlin. National pride and status on the world aerobatic stage was at stake, and the 50 did not fail the Soviet maestros. At the 1976 World Aerobatic Championships, Yak 50s took first, second and third in the men's championships, and first to fifth in the women's, as well as taking overall men's and women's team prizes.



In many ways the Yak 50 is a strange design for competition aerobatics. Since when does an Unlimited aerobatic aeroplane look and sound like a warbird? The Yak 50 has a retractable undercarriage – complicated and heavy – which seems to make it a bizarre choice for an aerobatic mount where performance is all. It's big too, especially by comparison with a Pitts, and in many ways this was, and is, one of its great strengths, as the Yak 50 is a graceful machine, loving majestic vertical rolls and lines, and all the while the low-revving radial engine creates a throbbing, deep-throated melody. This is an engine that sounds like a Russian chant emerging from deep within a monastery, by comparison with the high-pitched, chainsaw-like buzz from a high-revving American four-or-six cylinder, horizontally-opposed powerplant.

The Yak 50 is the last of the line of metal-and-fabric high-performance aerobatic machines, and it follows a classic Yak lineage from pre-war trainers to the famous Yak 3 and 9 warbirds and the Yak 18 series of single-, two- and four-seat aircraft. Yet within a decade of its arrival, the new, mostly smaller, composite aircraft of carbon fibre and plastic took aerobatics to a new level of rolling, tumbling and flicking. The Yak 50 was retired from one life, and began a new existence as a highly desirable aerobatic and fun machine for sport pilots, particularly in the UK and USA.

The first Yak 50s arrived in the UK in the 1980s and were, and are, used as either airshow display aircraft – with great success – or cherished by private owners as more of an everyday fun machine than a precious collectable. Owning a 50

ought not to be an eye-watering adventure in wallet emptying (any more than usual in sport aviation). A good example can be found for about £50k, maintenance costs are reasonable, they are not overly expensive to insure and you always know how much fuel and oil it uses – lots. About half-a-litre of oil an hour, minimum, and from 50 litres an hour in avgas. Go to full power and cavort in the sky and you'll burn over 80 litres an hour, and more oil too.

Caressing and slapping

The Yak 50 is a striking machine, much more elegant and purposeful than a Yak 52, and it's much lighter, in all about two-thirds the weight of the 52. But most importantly, it has a tailwheel and this looks right for the design.



It's a military cockpit, with an oversize stick, robust construction and plenty of room. The modern navigation equipment is essential for efficient and safe flying between airshows

Construction is all-metal, with fabric-covered control surfaces, including the classic Yak rudder with its curving trailing-edge and pointy mass balance. It's easy to access the cockpit with one step up from the wing, and you sit in line with the trailing-edge, making for a much better view of the world for aerobatics. And you know what? As you stand there, caressing the smooth flanks of the sleek fuselage, you suddenly realise that the 50 really is a wonderful and inexpensive introduction to the ultimate aviation experience – flying a classic single-seater.

For those happy in a Yak 52, the Yak 50 is familiar realm – there's lots of ways to cut fingers, scratch wrists and get covered in oil and grime – this is a real aeroplane you have to get close to, in order to appreciate, care for and savour, so wearing gloves and a flying suit near a Yak is sensible, not a pose. Open the cockpit, by sliding back the one-piece canopy and look in to see that the master switch is off, mags are set to 0, the throttle closed, gills and oil cooler door open, any control locks removed. Now you can look around.

It's clear that the wing is somewhat oversize for the weight of the machine, and creates a cushioning effect close to the ground when you land (so remember not to be too hot on final). Now check the aileron bearings – especially the outers, as they're prone to wear if there's a lot of aerobatics going on. Some of the 50s, albeit rarely, have aileron spades on the outside aileron edge (not underneath); these do increase roll rate a little, but this is not a modern composite, head-banging, turbo tumbler drier, and the maximum roll rate is a relatively sedate 140° a second.

The aerofoil section is pretty standard, with a flat underside, so inverted level flight is going to be very nose high, which is not a pretty sight and useless for mirror pair antics. Check the undercarriage for alignment and the pressure in the oleos. This design is extremely lightweight and its single strut design is not suited to lateral forces – the crosswind limitation is 12kph! Within the relatively large main wheels are drum brakes, not known for their effectiveness, and like the undercarriage, pneumatically-powered. Like the Yak 52, the brakes are controlled by a lever on the control column, but unlike the 52 there's no parking brake latch... you'll be busy wishing you have at least three pairs of hands at start-up.

The nine-cylinder 365hp Vedenyev M14P engine is a perfect match for the 50, and provides a thrillingly sporty performance in the aerobatic realm – but not for effortless cruising, where about 130kt is about the best IAS to settle for, as any faster is deeply uneconomic. Up front is a German-made MT three-blade prop, usually 260cm, providing efficient thrust at low speeds, but slightly more drag in the cruise by comparison with the standard Russian two-blade paddle. Of the nine or ten examples of the 50 I've flown, including one with a 400hp M14PF engine, on balance I prefer the original engine and paddle prop.

These engines are tough, light and powerful, but they do have one well-known Achilles heel, as with most radial engines, and that's a risk of hydraulic lock on start-up, which is why you must always pull the prop through (with mags and



How to blow the gear down in an emergency: main air valve off, select undercarriage down, and then open the red valve

switches off and throttle closed and when the CHT is < 90°C) on the walkround, and/or prior to start. Continue the walkround, and give the elevator and rudder a good waggle to check the bearings – these are hard-working control surfaces – and then slap the underside of the fuselage all the way from the cockpit to the tail. Like many lightweight aerobatic machines, the fuselage is open throughout, so any loose articles – commonly sunglasses, tools, pens, mobile phones and coins – make their way in a trice to the tail, where they can restrict or jam control movement. Listen carefully for anything bouncing about... OK? But before you get in, check to see there's nothing in the luggage box, which is usually fitted to 50s within the old battery access panel aft of the cockpit. And finally, I always like to lean in, open the air valve, and check the air system is sound and pressure holding. The air valve is low down on the left side, and it's all too easy to forget to turn on before start.

Big, simple and... Russian

Now, move the imposing control column to one side, and step inside. There's plenty of room, but the seating position is very upright, more like a church pew than a sports car. When you wear a parachute, it'll be a seat type, so the first two inexpensive comforts should be some energy-absorbing foam as a seat cushion and an orthopaedic back support. I don't know anyone who finds the seat comfortable without some customising. Sit as high up in the seat as you can, so that your helmet or cloth hat is one- to two-fingers-width within the canopy when closed, when you're securely strapped in. You'll soon see why – on the ground the forward view is all nose – so you'll need to do all you can to sit as high up as possible, and also be prepared to leave the canopy open when taxiing, so that with loose shoulder-straps you can also lean out as much as possible.

In the cockpit, it's reassuringly all Russian, unless you're not already a Yak 52 driver, in which case it's very alien at first. The style is 'big' and yet simple. Big instruments, big switches, big controls – very military. As with all aerobatic machines, I'm only interested in who's in my way or where I am in relation to my display, and whether I'm short of energy. So it's terrific that the view from the cockpit is panoramic and that the airspeed indicator, altimeter and engine instruments are easy to read at a glance. Airspeed in kph and rpm in percentages? Yes! You'll soon get used to it. And pretty quickly you'll love the size of the stick too. It's big! That's because you'll often need two hands to stroke this beauty around the sky – certainly the stick forces are much lighter than a 52, but this is a traditional aeroplane, with relatively small ailerons and elevator authority, by comparison with the modern Unlimited machines.

Although the seat is an old-fashioned shape, most 50s have now been fitted with modern Western-style harnesses, such as a five-point Hooker, complete with industrial-strength ratchet, and as I like to keep my hips buried to the seat, I make sure the lap straps are very tight. Sitting up so straight has one advantage – it's easy to reach all the controls, and you'll soon appreciate this at start-up. Without a parking brake you either need a ground crew and chocks (rare), quick hands and no chance of a surge of power at start-up (unlikely) or I suggest you buy a length of double-sided Velcro tape that you can wrap around the lever to hold the brake on (good idea).

Flip on the master, ignition and engine instruments switches, check all's well, turn the primer pump to cylinder (this serrated-edge knob, often stiff, makes you instantly realise why wearing flying gloves in a Yak is sensible), start pumping until you feel the pressure in the system and then pump five or six shots into the cylinders. Turn lever to pressure, pressurise three times, then back to cylinder, and pull the lever out so you're ready to push it home as soon as she starts to fire. Now, pause, open the canopy, look around and shout something like 'Ot buhta' or better still, unless you are in Russia, 'Clear Prop'. Lift the cover over the start button, crack open the throttle, keep the stick held back in the crook of your right arm, and press the start button...

With an explosive hiss of air, the prop turns, starts to fire on the shower of sparks, so you then flick the ignition switch to two (both), push home the primer, jockey the throttle if necessary to control the power, and yes, keep the stick back. Got it? With practice it looks easy. A lot of practice.

The engine throbs wonderfully and idles best at about 42%. Once the Ts and Ps are moving in the right direction, which in the winter can take 10 minutes or more, you're ready to taxi. Radial engines hate being over-rewired when cold, hate shock-cooling and have a tendency to cook with alarming ease when pilots forget to open the cylinder gills. All good training for when you move on to a warbird. In many ways the engine management on a 50 is more straightforward than on the 52, as the gills and oil-cooler controls are on the left side, forward of the throttle, so it's a more intuitive layout to monitor and use. ▶

When taxiing, there really is no view forward at all – none. Not any. So get used to sticking your head out the window, weaving, thinking ahead and generally never ever assume it's all clear ahead even if you looked there three seconds before. The oleos are forgiving as you taxi, but reckless throttle movements and hasty braking are not advised, as the tail is light, the nose heavy. The tailwheel is free-castering with the stick neutral, and locked straight with the stick back, so yes, be very, very careful with the power as you turn with the stick forward of neutral.

Power checks are straightforward, but require constant pressure on the brake lever, so you're swapping hands back and forth again, as you check mags, carb heat and prop functionality. Pre-take-off checks are simple, and you work from left to right around the cockpit. Check for the correct position of the oversize trim wheel, slide clear the u/c locking latch, make sure the gills are fully open and friction nuts adjusted or tight, all instruments set or within limits, primer pump locked vertically, and now, with the engine idling, make a final check of the flying controls.

Line up, run straight a little on the centreline with stick back and then open the throttle steadily, not rushing, and smoothly. The roar and the acceleration is fabulous, and with the tailwheel locked and tail down, for an instant you track straight, but a split second later you can raise the tail and touch out any swing, which is not at all dramatic, with rudder.

Trimmed correctly, the tail comes up with ease, and you can see forward! It's all go now as you check the engine performance, and make sure the throttle and propeller levers are fully forward giving you 100% power. She'll leap into the air at about 130kph, accelerating fast, and ready to climb at a precipitous angle at 150kph, at

over 3,000fpm – and of course at this attitude the long nose is obscuring all before you. Safely away, raise the undercarriage and check red lights showing both legs stowed – note there are no manual indicators in the wings. Soaring upwards, save the engine, and bring the power back to 70% and 7, and before you can catch up, you'll be at 2,000ft.

Level off and she'll settle at about 280kph. Now sort out the wellbeing of the engine, and then take in the view from the cockpit. It's sensational. You're sitting both in and on the aeroplane, and although the wing and nose blank the world forwards and downwards at an oblique angle, you've a totally panoramic outlook in all other respects. It's this sort of seating position, in line with the trailing edge of the wing, that makes aerobatics so much easier, and all-in-all encourages one to cavort around the sky – without even realising it.

First of all, let's see how she bites at the buffet, how gentle she is. Set power to 70/7 and start the turn, and enjoy the harmony, so smooth, so easy and flowing as you tighten, reverse and tighten again, at a ridiculously steep angle-of-bank. Pull harder and there's the buffet, but with no flick, no precipitous wing-drop, so ease off and away you go.

Stalling clean or with the gear down (there are no flaps of course), is another non-event, and she starts to cease flying at about 100kph, again without any unpleasant handling issues. Spinning is a laugh in a Yak 50, as the type has a forward C of G compared to the 52 and enters relatively readily, but has to be held in, and comes out in an instant when recovery is initiated. And the same for flat spins, inverted and erect – you have to really hold the stick in the full pro-spin position to maintain a stable rotation, and again, recovery is fast and reliable.

Aerobatic heaven

Aerobatics – well, this is, along with formation flying, the forte of this wonderful aeroplane. Power setting? It's so simple, as 70/7 will allow you to complete most beginner aeros without significant energy loss. Want more power? There's plenty more. Don't forget something like 25% of the power available is found between 82% and 100% – both at full throttle. Sadly, it's not recommended to roar along at 100% for more than five minutes, but in that time, when you really do need it – what a transformation! So set 82% and you can open the throttle all the way for as long as you like, as long as you have no regard for fuel consumption.

Barrel roll? Pull up from level, and caress the sky with your wingtips. Yes, it's that lyrical. Aileron roll? Pitch up a touch and just do it. No, it's not a blur, but it's fast enough for a traditional machine. Try a fast slow roll. Roll hard, ease forward a touch when inverted and apply some rudder to keep straight – beautiful, a clean, level roll. Inverted? What are you waiting for? Pitch up a little, half roll and push the nose up above the horizon to maintain level flight. It's all so easy and leisurely, and so peachy. Slow rolls are elegant, but not too slow, mind, as the rudder authority in the last quarter is not generous. For a loop, dive to 300 and ease up; you really don't pull, you eeeease back and up she goes. Want a bigger loop? Dive to 350 or even 400kph and make a loop as big as you like.

Verticals are the forte of the 50, as once in the groove, she seems to track upwards forever – and the size of the aeroplane helps reinforce this impression. Gain confidence by flying a succession of three positive and three negative humptys to explore the extreme slow-speed handling, and feel for the right speeds to ride the nose over the top in a straight line.



Responsive, good-looking, aerobatic, powerful, yet stable - what more could you want? It's an ideal aircraft for precision formation displays

Stall turns to the right are a delight to fly precisely, and as the view from the cockpit is so good, you can guide the up-going wing over and down through the horizon as if on rails, with a little practice. Just look out and fly the plane where you want it to go. For a complete vertical roll, take some energy, by diving to 400kph and then pull harder, applying 100% as you do so. Establish the precise vertical, pause, roll and enjoy. It's so lovely and leisurely... and refined.

Yes, of course she'll snap, tumble and cavort too. Such playfulness saps the energy of the 50 pretty quickly as she's big, and the aerofoil is very traditional. I like tumbling a 50 best, as the ride is entirely pleasant, and from the ground, looks spectacular. Lomcovaks and ruades are a swirl of action, and even if you end up with the nose hung in the vertical, closing the throttle and neutralising the controls soon has you falling gracefully earthwards again, completely in control. There are really no hidden vices to the 50.

Yak 50s have always been popular mounts for formation displays – and this is beautifully demonstrated by the three silver 50s in the Yakovlevs Aerobatic Display Team keeping tight formation around the leader's powerful Super Yak 52. Stable, predictable, possessing good visibility and sounding like a warbird – an ideal formation show machine – and the Yak 50's excellent power-to-weight ratio makes for quick formation

changes and rejoins. Loops, barrel rolls and wingovers – just take your place, please, on the wing or in trail to the 52, powering and controlling the 50 with ease. It just takes years of practice!

There's up to 120 litres of fuel available in a 50 (at 60/6 that's about two-hours flying from A to B) – but to preserve the airframe, it's best to fly with about 80-90 litres for most aeros and fun flying. So you'll have an hour in the air, easy, and that's more than enough for ordinary mortals to progress their aerobatic or formation techniques. And you can enjoy every minute, knowing that the landing ahead is not going to be a trauma. Unlike other aerobatic machines with higher wing-loading, the Yak 50 is not a hot ship on landing. In fact, too much energy and she'll float benignly, and float and float and float as the big wing, sitting close to the ground in the landing attitude, cushions you in ground effect.

Gear down at less than 200kph and by now you'll have about 4.5 on the manifold, and this will allow for a steady descent at about 160-170kph. Make rounded circuits, for obvious reasons, as the long nose and relatively high angle of attack does not favour long, straight-in approaches.

Flying a curving final, bring the speed back to 150kph, and as you make the final gentle part of the turn and straighten at the threshold, make sure you are no faster than 130kph. Close the

throttle and let her settle with the stick coming back. No, you can't see anything forward, but that's fine, as you have plenty of peripheral vision to judge your position and attitude.

Flown well, the 50 is a STOL machine, and can be flown from short farm strips with ease. With the stick back, the tailwheel is locked, and the 50 runs straight. Make judicious use of the rather tame brakes to contribute to your rapidly decreasing speed – and the windmilling prop is a great brake too, when fully fine. The crosswind limitation is 12kph (check) – which is very theoretical, as with practice 15-20kt of crosswind can be handled with relative ease. The lack of lateral strengthening to the spindly undercarriage is the clear weakness here, so in doubt, don't fly in strong crosswinds, especially from a hard surface.

So how was it for you? You've just flown one of the world's great aeroplanes, a true classic, and you haven't lost either your shirt or your mind from worry in the process. Shut down and sit quietly for a moment. Slide back the canopy and rest your arms on the canopy sides.

You're humbled, thankful to have experienced such a treat - and a rare treat too. And then, you know what? You've lost that moment of reverie and you yearn to fly the 50 again. Yes it's addictive, and yes it's not bad for you, and yes you can afford one. What more can you ask for? ■



Blue smoke and a rumbling roar
– the glorious cacophony of a
Russian radial engine at
start-up

TECH SPEC

Yak 50



■ DIMENSIONS

Wingspan 31ft 1in/9.5m
Length 25ft 1in/7.7m
Height 8ft 10in/2.7m

■ WEIGHTS & LOADINGS

Empty weight 1,687lb/765kg
mauw 2,951lb/900kg
Fuel capacity 120lt

■ PERFORMANCE

Maximum speed 300kmh/162kt
Vne 400kmh/216kt
Rate of climb 3,148fpm

■ COST

from £55,000 (example flown £70,000)

■ ENGINE

Vedeneyev M14P nine-cylinder 365hp

■ SEATING

1

■ CONTACT DETAILS

Richard Goode Aerobatics www.russianaeros.com
YakUK www.yakuk.com