

# Tupolev TB3.

In 1934, the huge crowd that had gathered in Moscow's Red Square for the annual May Day military parade hushed, then gasped as three massive four engine monoplane bombers roared into view, each carrying FIVE fighter aircraft. (Two Polikarpov I15 Biplanes on top of the wings, two Polikarpov I16 monoplanes under the wings, and one IZ monoplane on a trapeze under the fuselage)

The sound of nine unsilenced engines PER PLANE, at an altitude of only 500 feet, must have been truly awe inspiring. The Aviamatka (mother ship) of each unit was the Tupolev T.B.3. 4M 17, and the composite was known as the ZVENO (link) 5. But although wonderful for propaganda, the world's first aerial aircraft carrier was not entirely practical for conflict.

Its successor, the ZVENO 6 certainly was... Milestones included.. 1st four engine cantilever monoplane bomber. 1st aeroplane to carry paratroops 1st aerial tanker 1st to carry parasite fighter/bombers in conflict. Etc. etc. etc Readers interested in aviation history would do well to further research this fascinating aircraft. In the early 1930's, the Polikilov I16 was rated as the best fighter aircraft in the world, a situa-



tion which continued until the advent of the Messerschmitt BF 109.

As the first cantilever monoplane fighter, and the first with a retractable undercarriage, the Rata (rat) holds a significant place in aviation history. Several are still flying today. This project was not a solo effort. To attempt to scratch build a model of this magnitude, one needs a lot of skills, money and time, and as I am definitely limited in the first two and have reached the age where one does not buy green bananas, help was needed – and found.

In looking for a successor to my Bloch, logic suggested that if a twin engine ugly

model was good, four engines and uglier had to be better, so suggestions were sought from fellow Keilor club members. Much to my surprise, three members came up with the same name – the Tupolev TB3.

Toolmaker/engineer extraordinaire Ivan Vidak immediately asked if he could be involved and long time modelling associate

Dave McKeon was given no choice. On his shoulders was placed the difficult task of searching for three views, drawings, photos, colour formulas etc. plus locating and purchasing all materials and parts.



The undercarriage is a visual feature but bungee chord as on the full sized wasn't practical so we simulated it. The 8oz fuel tanks wouldn't fit in the nacelles and are built inside. The four nacelles took longer to make than any other part of the project.



The simple and reliable OS 40 LA was the only engine considered. Only 30rpm difference between all four engines.



Dave sourced the wheels in the US and when fitted with larger tyres they provide almost exact scale dimensions. Below is the tail skid.



The wingspan is 3225mm which represents a 1.113.5 scale.



This allowed your humble scribe to do the job of designer/builder without having to leave the bench for weeks at a time.

### THE REAL T.B.3 (1932 – 1944)

Although now mostly forgotten, Tupolev's T.B.3 was one of the outstanding aircraft in aviation history with a list of "firsts" that challenge belief. 1st four engined cantilever monoplane bomber. 1st aeroplane to carry paratroops, 1st aerial tanker, 1st to carry parasite fighter/bombers in conflict Etc. etc. etc.

On receipt of three views, genuine Russian drawings, photos etc. from Dave, I quickly outlined a nice little 90" wingspan plan with a view to using 4 OS 15LA engines. Big enough – but cheap and manageable. "No way!" chorused the other two – "we want it bigger – much bigger."

Great, (I thought) they don't have to build the bloody thing. Back to the drawing board – and after carefully measuring the inside dimensions of my old Magna wagon, door openings etc. we settled on a scale of 1:13.5 giving a wingspan of 127 inches (3225mm) and an overall length of 77 inches (1955mm).



The slab sided fuselage was simple enough and although the strange glazing took a bit of working out everything else in cockpit was fun modelling.



Noted twin engine campaigner Rod Mitchell won (lost) the test pilot duties.



As a member of the V.F.S.A.A., I am expected to make my aeroplanes look like aeroplanes. (Though I have a few non scale models that they don't know about!) So the outlines were very carefully worked out and are as close to scale as is possible to produce with the data available. However, when working within the outlines, I rely more on illusion – it doesn't have to be exactly right as long as it looks right. It's called "stand off scale." That sickly squashed caterpillar green that nobody seems to be able to match or supply a formula did not deter Dave who tracked down the information from Sweden!

The five crew members were totally Dave's creations. He located the Fisher-Price toys in our scale size, moulded the helmets etc. in Blu-Tack, made the goggles from paper clips and celluloid and the vests and overcoats from millinery felt. A touch of paint here and there and they looked fabulous.

On the other hand, the guns were all Ivan's work. Working from photographs of the D.A machine guns used in most TB3s, Ivan made a tiny scale replica from plastic and aluminium from which resin moulds were taken. From these moulds it is (relatively) easy to produce the finished products as required. (They have a high mortality rate!) The scarf rings were turned from aluminium stock. Ivan also turned the (functional) antenna posts.

In detailing scale models, I have two "pet hates". The first is simulated rivets. At 1:13.5 scale, any simulated rivet large enough to be seen at the F.A.I. static judging distance would translate to the real rivet having been over 1 1/2 inches (40mm) in diameter. Where they that big? I think not.

My second dislike is the degree of "weathering" on many models, especially those depicting world war one fighters and military aircraft in general. In the first instant, the fighters on the front line had an average life of about three weeks – hardly enough time to get "weathered". Between wars, with most air forces severely cut back both in personnel and equipment, the remaining aircraft were usually very well looked after. Some Russian squadrons actually polished their bombers. There are no



Very light fibreglass fuselages for the fourth attempt at reducing weight in Pokilov fighters.



simulated rivets on "our" Tupolev, and any weathering is genuine wear and tear plus "hangar rash" which at times seems to reach epidemic proportions!

On the morning of Thursday August 11th 2005, Dave, myself and Keilor "top gun" pilot Norm Edmunds fronted at the Keilor flying field for engine run ups and taxiing trials. On filling the tanks a problem immediately became apparent. Each nacelle had a "Great Planes" fuelling valve for ease of filling but relied on fuel running out of the muffler to show that the tank was full.

With the engines canted clockwise, when the tank was full, so was the engine – and one can't easily flip a near eleven foot plane up onto a wingtip to clear the excess. This problem was completely cured later by fitting a second fuelling valve into the muffler pressure line. By placing the valve nozzle into the second unit whilst filling the tank, the overflow is directed out of the tube instead of into the muffler. It is a sobering indication of the cost of these large models to realise that we have \$175.00 worth of fuelling valves on the one plane.

Two days later, all was in readiness for the first flight. Dave, Ivan, Norm Edmunds and myself were joined by Rod Mitchell for the big moment. Rod and/or Norm had been asked to fly the "maiden".

Rod won (lost?) the toss and after all the usual checks, gently lifted the Tupolev into the sky. I would like to say that it

needed no trimming at all and that it flew perfectly from the start, but that only happens in some magazines! In fact it did require only a little trimming and flew well, but with a slightly awkward looking nose up stance – especially in banked aileron turns.

Rod changed to turning with the rudder only which improved things considerably. On final approach it became apparent that throttling off was the equivalent to putting brakes on (much like a biplane) and the model required some power right until touchdown. Norm took over on the second flight with similar results plus one of the best landings I have ever seen.

Consensus of opinion was that it flew well with no nasty habits but had to be flown all of the time, had more than adequate power, preferred rudder turns and that some power must be kept on when landing. I went home quite happy, I'd had models fly like that before. I knew what to do.

That night I added 3 1/2 lbs of ballast and moved the C of G forward 10mm. Ivan was nominated to be the pilot of the Tupolev, whilst David and I were to fly the Polikarpovs. Ivan was unable to try the TB3 on the test day because he flies "left hand drive" (mode 2) with J.R. Transmitters and the model had been set up to fly mode 1 on my Hitec tranny.

After the test day, we had a frustrating run of bad weather, Shepparton was looming close, and Ivan still had not flown the model. So at the first possible opportunity we headed for the field. With a gusty northerly wind worsening by the hour, the engines, which until this time had been the epitome of reliability, suddenly decided to give trouble. They would start easily enough then stop suddenly for no apparent reason, whether on idle or full throttle, then start again on the first flick.

Finally we got the four engines running together the plane roared down the runway and leapt into the air climbing like a glider on a bungee. Ivan quickly got things almost



under control when it flew into a gusty updraft from the gully to the north of our field, which flipped the model up and back, resulting in a massive stall. Ivan immediately headed south and turned around for a final approach.

Meanwhile, things were not going well with the Polikarpovs. Obviously the main attraction of modelling the Zveno instead of just a TB3 is to be able to release the Ratas in flight and fly each of the three models independently. The first prototype was a brick and rather than just binning it, I decided to fit an OS 15 I/C to see if we could learn anything from it before building two more lighter units. I didn't.

The model flew at Shepparton Mammoth Scale and generated a lot of interest. Rod flew the first flight without fighters and on Sunday Ivan flew with them on board. At my insistence he lifted off and held a few feet above the runway to determine if all was okay. Plenty of power he reported and climbed away and in fact there was not even a grass mark on the fighters at all. Now that is flying, given their bellies are only 40mm off the ground. The main objective is to get the Polikarpovs flying reliably, and to this end, Polly number four is being built as this is being written.



Four engines is four times the fun but four times the work and the cost.

I was recently questioned as to why we subject ourselves to such an emotional roller-coaster ride for so long and at such expense, when for less than half of the cost, we could buy a plane at the shop and be flying within a week. If I may presume to answer for most of the builders I know, it is the researching, designing, building, problem solving, innovating, as well as the flying that is our hobby. It sets goals, it keeps our brains working, it keeps us young, it gives us a satisfaction that you cannot get out of a box.

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Ken Thomas

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