



Neil Hintz and Ron in the sky above Dannevirke at the 2019 NZ Autogyro Association fly-in.

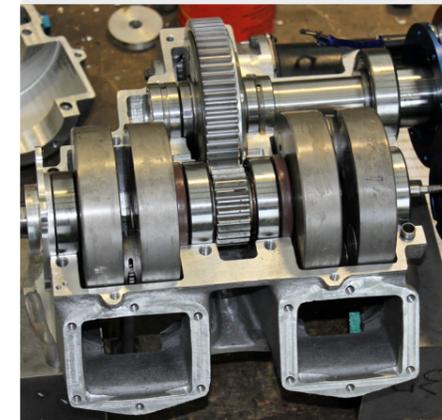
“ I’m not a fan of Rotax.
I thought I would build
my own engine.
How hard could it be? ”



Parallel Twin - exhaust side



Parallel Twin - inlet side



Partially assembled Parallel Twin



Version One - the Tandem Twin

The story of RON

Star of show at this year’s NZ Autogyro Association AGM and fly-in at Dannevirke wasn’t one of the shiny new European gyros (of which there were many), it was ZK-RON, a humble single-seat Dominator with a great story to tell. RON earned builder Neil Hintz the association’s prestigious ‘Man and Machine’ trophy this year. It was a well-deserved honour, particularly as Neil flew solo for the first time only recently in this very machine. Of even more significance however, is the innovative engine. Neil built it too (that’s designed, cast and machined, not just assembled). Here, in Neil’s own words, is the story of RON:

Back around 1995, the Dominator single seat gyro was a new design. A promotional video and plans were available from the Designer Ernie Boyette and his company Rotor Flight Dynamics in the United States, and how exciting they looked!

Plans were ordered and promptly arrived. Four of us in the NZ Rotorcraft Association were to use them. Ken Middleton was first to complete his craft, then Jim McEwen, and then Graeme Jury.

ZK-RON’s frame was largely also completed around the same time but ‘real’ work and a lack of finance stunted its growth. It got placed in my shed roof for storage; actually there were several rooves over the years.

A decade or more later, another gyro friend, Grant Simpson was

ratting around in my shed roof looking for something else when he noticed the almost finished Dominator frame. With my permission he took it to his workshop and in an unbelievably short time he finished it off, complete with a Rotax 503 engine. Grant proceeded to fly RON and show it off, forty odd hours in fact, with someone else’s engine. The Rotax did not actually belong to either Grant or myself, being an engine Grant had reconditioned for its owner. He had convinced the owner it needed to be run in, on RON.

RON soon became known as the people’s gyro, being essentially syndicate owned and largely available for others to try if they were keen/brave enough.

As you would expect the time came for

the engine to go to its real home. Grant brought RON back to me and handed over ownership; "Just get another Rotax and go flying," he said.

I'm not a fan of Rotax and having built many two-stroke dirt bike engines and parts of the years, I thought I would build my own engine. How hard could it be? As it turned out, quite difficult.

RON's Engine

RON's engine started off as what is termed a Tandem Twin with two single cylinders mounted on separate cranks arranged back to back using twin rotary valve induction. This is a favourite layout for many road race engines. I wanted a short engine and this setup was short, being the length of only one crankshaft. Both cranks were connected with a single larger diameter gear between them, this also serving as the reduction to the propeller. All seemed well for the first few ground runs then disaster struck; broken crank gears. Six different styles of gearbox all had the same outcome so I reluctantly shelved that design.

Not to give up so easily, I decided to build a Parallel Twin two-stroke (like a Rotax) but with crankcase reed induction instead of rotary valve this time - reeds being most commonly used in almost all modern two-stroke dirt bike engines. This engine used the same cylinders (recycled from the previous engine), same pistons, rods, carburettors and starter. A new crank was built but in an effort to keep the engine short I again ran the output drive off the middle of the engine, putting the propeller flange just past the rear cylinder.

This engine suffered typical parallel twin type vibration, i.e. quite bad. I tried to fix it with changing the crankshaft balance factor but all that did was to relocate the bad vibration elsewhere within the operating rpm range. I knew this might happen, and in fact it only took 15 minutes of run time to start cracking the exhausts. I pushed RON back into the corner of the workshop and that was that for about a year.

I had been considering using a counter-rotating balance shaft but I didn't want the extra weight. What to do however?, as without this shaft the vibration was a show stopper. One Sunday afternoon (several actually) I built a balance shaft and bolted it up externally to the engine as a test - with counter rotating bob weights flying around in mid-air. The difference was like night and day! I could

not believe how smooth this new addition made the engine feel. I shortly came to the conclusion that the balance shaft would double very nicely as the pre-rotator drive output, and suddenly the balance shaft was not such a bad thing to have after all.

Now we were ready to fly, but not with my home made ignition. I didn't trust it so I bought and fitted a rather nice programmable 12V CDI system. What I didn't know was that it had a fault with one channel being prone to randomly advance on its own. That meant detonation (incorrectly timed combustion in a cylinder) which rapidly punching a hole in a piston; good times, not.

I consumed a few pistons before the fault was found and finally rectified, with another new ignition becoming the fix, bummer it. I'm not ashamed to say that toward the end of this ignition fault problem I was starting to weld the holed pistons up and re-use them. In fact one of these pistons that underwent 'surgery' ran for quite some time in the engine, even getting to fly for a while. The new ignition has been faultless along with new (second-hand off Yamaha AG100) Nippon Denso coils as now I didn't trust the Chinese units that I'd previously fitted.

Flying

So there you go: just like that, build and fly your own engine. There are 15 trouble free hours on this second engine (with the balance shaft integral now). It has new cylinders with power valves fitted, all of which were cast (including the cylinders) and machined in my Autoflight workshop behind our house near Hamilton.

With RON flying and myself signed off for solo (there have been various blocks of instruction over the years but I've never had my own aircraft to complete the licence process with), I flew the initial few hours at Matamata airfield.

As an interesting note, while driving to the airfield I would look at the paddocks around the airfield thinking, 'no problem I sure I could land there if the engine stopped' but at 500 feet that confidence soon disappeared. Suddenly those paddocks looked real small. So I've relocated to Galatea, a long strip with plenty of long flat surrounding paddocks, no power lines, and best of all no traffic. I'm under no illusion that this new engine will stop at some point so I'm trying to stack everything in my favour. We are off to a good start though as a recent



Caption 1



Caption 2



Caption 3



Cast engine casings ready for machining



Freshly cast cylinders

complete strip and inspection showed no signs of trouble at all.

How does she perform? RON will maintain altitude at 4700 rpm and fly nicely between 5000 and 6000 with a further 1000 rpm of spare power up your sleeve. She goes well. (Ed. That's quite an understatement.)

About Ron

For those that might wonder, ZK-RON was named after my father Ron Hintz who was a rotorcraft enthusiast when I was a lad, and was one of the original Benson gyro builders back in the day.

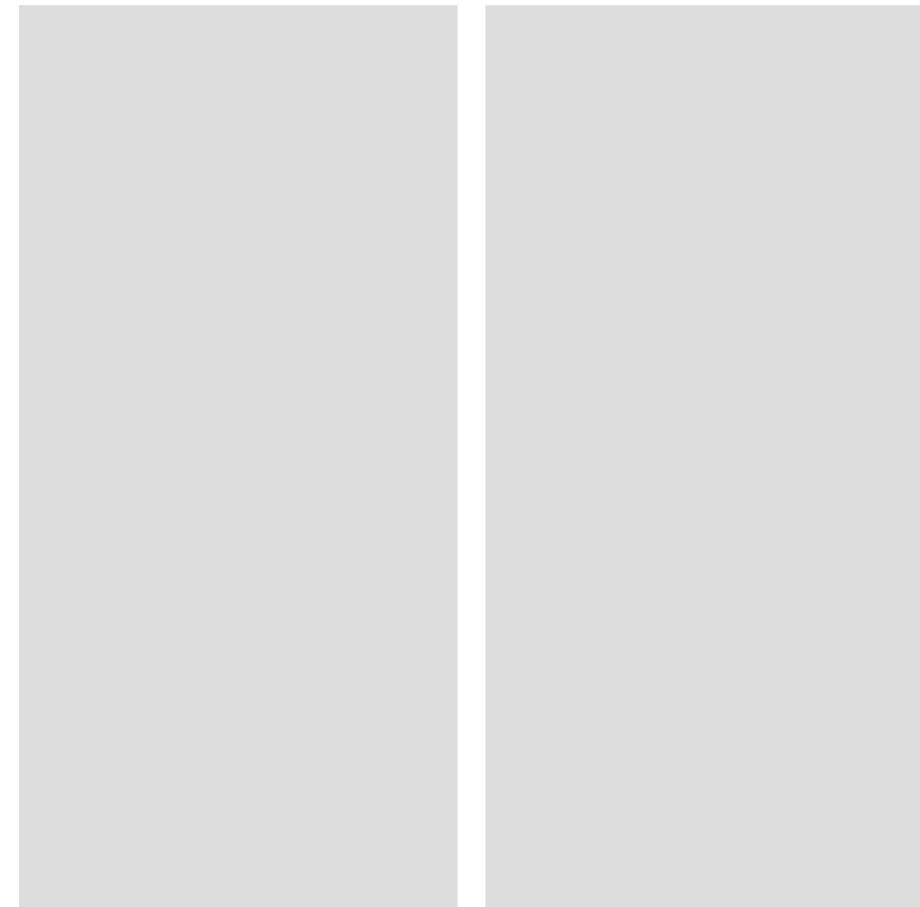
As an aside to finish this tale, Ron Hintz was testing his Benson gyro glider one day at the top of Powderals hill near Te Puke. (Ed. A gyro glider is a small gyro with rotors but no engine, capable of flight when towed behind a car on a beach for example - and back in the day how you learned to fly 'safely' before bolting on an engine.) It was a windy day, good enough for Ron to tie the gyro down with a metre of rope off each wheel.

My brother and I sat in the truck watching as we were told to do. Ron would hand start the rotors (Ed. Until the wind could catch them and accelerate them to flight speed) then proceed to fly the machine like a kite, up until that metre of rope got tight. It was an awesome sight for an impressionable young lad watching from the safety of the truck. But the excitement didn't stop there. After a few 'flights' Ron stopped the rotors and came over to my brother and I. We were now to learn the real reason we had been invited to watch. Ron wanted to know if his craft would lift the weight of an engine and had figured Ian and I were about that weight. Instructions were issued, Ian and I were to approach the craft from the front once the rotors were spun up, then attach ourselves to the mast standing on the keel just behind the seat.

We were allowed one practice run with rotors stopped. I guess that was for 'health and safety' reasons. WOW, exciting and frightening all at once and yes his Benson would lift an engine, or two small children as the case may be.

Excitement over, we packed the machine up on the back of the Thames Trader and set off home but with a caution: we were NOT to tell our mother. To this day Mum's the word and yes that episode certainly made an impression on this lad.

Neil Hintz 







Manufacturers of Fun

Dominator gyros are made here in New Zealand by Autoflight and provide the most cost-effective rotorcraft flight available. Choose Subaru or Rotax power. We produce parts, airframes, partial or fully completed single and tandem seat aircraft. We also manufacture Gear Reduction Drives to suit all Subaru engines and many other well-proven car engine aviation conversions.

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