

# Ag Air *update*

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## AG AVIATION'S NEWSPAPER



# R44 - the next ag chopper

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Realizing my R22 had reached its productivity limits, I decided it was time to upgrade. My question was, which helicopter would best suit my needs, increase my workload per hour while still making a good profit with cheap operating costs?

I began looking into available ag spray kits for helicopters. I had an Enstrom F28C with an ag kit. It was a great helicopter, but it was too slow. With its side tank, I could rarely fly faster than 60 mph. I needed to be able to fly at least 80 mph. Also, the Enstrom was expensive to maintain. So, apart from speed, an Enstrom was an option.

I looked into the Hughes 300/269. This helicopter was not as strong as the Enstrom, meaning it would not lift the same loads. But, the biggest problem with the Hughes was its speed. It is no faster than an Enstrom.

Next, I turned my attention to the Bell 47. It is a beast! It can carry a massive load and looked to be a very strong machine. The problem, again, was that it was too slow. Plus, there are very few Bell 47s in South

Africa. I could not afford to have a helicopter spares problem.

Another option was the Hiller UH-12 E. This ship, too, is a beast. Like the Bell 47, but there is no backup service in South Africa. I



The 80% boom length installed with six Micronairs and TeeJet nozzles. Note the streamline Helipod unit mounted to the belly of the R44.

was able to find one here, but it was in need of component changes. Why purchase a helicopter with major overhauls due soon? It too, was slow moving for my needs.

I had examined all the heli possibilities available to me in South Africa with the exception of the R44. I was operating an R22 and knew the quality of the aircraft. However, the spray systems I'd seen on them were designed for the landowner, not for commercial operations like mine. If I could find a suitable spray system, then the R44 would surely be the way to go with its speed and lift abilities.

I discovered Helipod International ([www.helipod-international.com](http://www.helipod-international.com)), a New Zealand company that manufactured a commercial-grade spray system for the R44. I checked out their belly tank construction and determined it would work nicely. I contacted Peter Maloney of Helipod and explained what I was looking for specifically. I asked him if he could make alterations to his product to suit my particular needs. He seemed happy for my input and requested details.

My first area of concern was the high volume Honda engine with its aluminum

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The Micronair rotary atomizers and the TeeJet hydraulic nozzles mounted on the same boom.



The 5.5 hp Honda/Pacer transfer pump mounting on right side of R44 with the Helipod unit. Note wheels on tank for easy of removal.



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A close-up of the Micronairs installed on the dual boom. This photo also shows the 1/4" cutoff taps on each nozzle outlet.

pump. It would have to be changed. The sugarcane chemicals I use for ripening will eat through it in no time. A high volume plastic Pacer pump would have to be put in front of the 5.5 hp Honda engine. This would give me flow rates over a thousand liters per minute. This easily could take care of my

sugarcane ripening, forestry, herbicide and insecticide work.

My next concern was the booms. I wanted a dual setup on one boom using Micronairs for ULV work, as well as normal hydraulic nozzles (TeeJets) for hollow cone, flat fans, etc. work. I needed three Micronairs

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per side. Peter increased the size of the top support brace to accommodate the Micronair brackets. This set-up allowed me to switch between atomizers and nozzles. In the past, I used 1/4-inch shut-off valves to turnoff either the Micronair or the nozzles while on the same boom. Often when I spray sugarcane ripener, the farmer will want Roundup work afterwards. With this new set-up, I can accommodate the farmer and be more efficient in a game where every minute counts.

The booms come with either a 100% or 80% rotor diameter length. They are attached with camlocs to a center section that is attached to the tank. You can remove each side boom, install it onto a bracket assembly on the skid and ferry to the job site with little loss of speed due to drag. I use 80% of the rotor diameter boom length for herbicide work. Adding an extension, I have 100% rotor diameter boom length for orchid and insecticide jobs.

It is a huge advantage to be able to change from one spray system to another. But, the question of the correct flow rate arises? To insure this, I installed a TeeJet Series 70 Flow Meter inside the cockpit of the R44.

Peter installed a switch on the cyclic control unit that operated an electronic flow regulator valve installed on the delivery side of the pump to the boom. The valve directs the flow through the flow regulator sensor, then to the booms giving a read out on the console in liters per minute. With this information, I can calibrate flow based on speed, swath and rate while in flight.

The last item of approval for my spray system was the incorporation of a tank jetti-

son door. I consider this mandatory; it may save my skin someday.

With the details on a suitable spray system for the R44 resolved, I turned my attention to the choice of which model R44. Peter kindly directed me to two Downunder ag operators using R44s. I gave each one a call and was keen to hear what they said. It was clear the R44 was the best option, but should I get the new Raven II or the older Astro?

The long waiting list here in South Africa was a problem with the Raven II. Any used ones to be found were too expensive. One of the Downunder operators told me he uses both models and the one for bottom-line profit was the Astro. It didn't have hydraulics, the purchase and insurance costs were less. With the Raven II certified to carry only 45 liters more, I settled on the Astro.

My search for an R44 Astro found one being rebuilt and zero-timed. I would have basically a new helicopter, as far as hours were concerned. I knew the Astro wasn't built as strong for ag work like a Bell 47 or Hiller. But with the Helipod system, I was sure it was going to be a force to be reckoned with.

The quick removal time of the Helipod unit meant I could fly charter outside the spray season, 12 months out of the year utilization. R44s are very popular helicopters in South Africa. They are always in demand. It is the most sold piston helicopter here, so spares are readily available and maintenance will not be a problem either.

I settled on ZS-RKY and requested for it to be painted orange to make advertising



This photo demonstrates that no chemical is being deposited on the tail and rear section of the R44. This helps prevent corrosion, sugarcane in the background.

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it easy. There was only one other like it in the country. While waiting for the R44 to be completed, my Helipod system arrived from New Zealand. I opened it up and what a surprise! It was better than I had ever imagined. The Kevlar/fiberglass belly tank was superb. The booms were a work of art and all the wiring and such were clearly marked, which insured an easy installation.

The day finally came when I received my new, shiny, orange R44. Now, it was time to install the Helipod rig. I found the instruction booklet to be very straightforward. Within a couple of hours all the big stuff was done.

The rig uses four support brackets that are attached to the skids' cross tube bolts. Inserting the four pins with their safety clips and the tank was on. The wiring took the most time, as it needed to be fitted meticulously along the boom. The connections fit together nicely. The wiring ended with a cannon plug that simplifies disconnecting of the spray gear from the helicopter.

The complete installation was done in a day. The next day saw me filling the Helipod with water for the first time and checking out

how it worked. All was working great and I was ecstatic.

Now came the true test, a perfect opportunity to see how it all worked together. I used the Micronair setup for a sugarcane ripening application. The flow rate was set to match a speed of 80 mph with a swath of 16 meters. I sprayed at 75 mph and used a 12-meter swath. With the R22, I could only spray 10 hectares at a time, as this is all it will carry.

I loaded 200 liters to get a feel for the machine. For the second load, I upped it to 240 liters and it still performed well. The next load was its maximum certification of 285 liters. The helicopter handled the load with no problems.

The first job saw fantastic figures of hectares per hour. I sprayed ripener at seven liters per ha. With the R22, I averaged 25 hectares per hour. The first job with the R44 resulted in 52 hectares per hour. A few more hours at the stick saw me increase my work rate to 60 hectares per hour. With the R44, I can spray 50 hectares before returning to refill and fuel. With the R22, I was spraying only 10 hectares per load.

The Astro flies effortlessly at 80 mph with a large load. The cyclic feedback is minimal. You set the trim with the first run and it is set for the remainder of the loads. The R44 has a decent turn rate at the end of a run, certainly not as quick as the R22, as the side area of the R44 with its large stabilizers causes more drag. The turns can be tricky. Lower the airspeed, leaving alone the trim, the aircraft will momentarily be a little heavy but will get back into trim the moment the speed builds up again. This saves the pilot from constantly chasing the trim.

The R44 has excellent pilot view. The booms are called TV booms, mounted forward of the skids. The pilot has clear sight of the pressure gauge and both booms. The pump and motor are on the pilot's side. There is a little left cyclic input to counter this, but as the R44 hovers with the left skid low, this makes for an easy, level landing. The pump motor is out of the pilot's way. There is no need to maneuver around it every time you enter the cabin.

The power used for 80 mph runs is the cruise setting of 21" MP. This will insure a good engine life. Its fuel burn is 16 gallons

per hour, better than my Enstrom. It was burning around 18.5 gph and carrying a smaller load with a spray speed of 60 mph. As can be expected, there is drag on the system with the booms installed, but you can ferry at 100 mph with a load on board. For me, the main issue was no longer having the large pump on the side, which was like a brick. With that and the booms removed, leaving only the tank in tact, it will indicate 115 mph.

Some people may cringe at the thought of an R44 flying ag work. It's not built like a Bell 47, or a Hiller. However, it does the job just as well. The R44 burns less fuel and in South Africa, it is much less expensive to maintain than other helicopters. It doesn't have bearings to constantly grease. The spray rig can be easily removed. It can be used for charter work. It will cruise at 130 mph burning 15 gph. It will make you money for twelve months a year. Its speed and passenger placement outperforms other three-seaters in the piston class of helicopters. As they say, "When in Rome do as the Romans do." When in Africa, make do with what Africa has.

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