The aerial Land Rover

*It used to be possible to do a PPL(H) on a Westland Scout, until the CAA in its wisdom put a stop to it. AOPA member **John Beattie*** gives his own perspective on 'the perfect personal transport for the money'*

*Pictures by **Peter Marlow**, Magnum*

As a young Naval 'Jungly' Wessex pilot serving in the good ship *Albion* I was delighted to be told in 1972 that my next appointment would be to an exchange tour with the Army Air Corps (or 'hairy arm corps' as we liked to call them). This began with an excellent conversion course at Middle Wallop and introduction to a refreshingly different approach to helicopter aviation. The Army really did think they were just a different form of Land Rover. Ground school was helped enormously by bits of sectioned or disassembled helicopter or parts thereof, in true service style, and the instructors were absolutely excellent so we got a very good grounding in how it all worked and why. The flying was easy at first as it is a delight to fly once you get used to the lightness of the controls and quite crisp response. The servo-assisted flying controls can be taken out, though, by a 'manual' changeover switch, for training purposes, and that is a bit tricky to get used to. As with all things in aviation, there is a trick to it… keep the b****y thing in trim and it's easy! The collective lever is balanced by two bob weights to offset blade loading and give a neutral feel at about the mid-power point, so it is heavy to either increase power or decrease it from that position. Landings in manual do take a bit of getting used to, but after a while a bold instructor will tell his student to land in dispersal in manual control. Very good for the confidence if you make a good job of it and no-one else notices. Autorotations were fed in very early, to get used to the rate of descent, which is a little higher than most. It really isn't a problem after you've done a few but does look daunting when observing from the ground. It is actually about 2,000 ft per minute, but there is plenty of flare effect at the bottom, and a smooth touchdown isn't too difficult to judge. The flare is commenced at about 125 ft and used progressively, utilising a 'check' with the lever at about 15 ft just before levelling, and then pulling the lever in gently from about 5 ft in the 'landing' attitude. Misjudging the height was common and many an instructor perfected the art of unfolding the arms and re-gaining control of the helicopter in about 3 milliseconds, and the good ones didn't appear to panic at all! Engine-off landings, with the throttle wound back to ground idle, were essential and most students approached this exercise with fear and trepidation. I remember passing, so I must have done OK, but it wasn't until some time well into the course that I felt comfortable doing this exercise. I went back to Middle Wallop in a Wasp on a visit some years later and on final approach discovered the wreckage of two helicopters on the landing area. It appears a Sioux had been making a 'normal' fairly flat approach and a Scout came in high and descended steeply for an engine-off landing, during which he could see nothing much directly beneath, i.e. where the Sioux was. The mid-air collision happened very low to the ground and everyone walked away, and indeed were busy telling the tale in the bar seconds after opening time that evening! Both helicopters were totally written off.

Early exercises were designed to teach you to fly the machine academically, but things soon hotted up to rushing around navigating at low level, the Army helicopter's only safe environment, and trying to get it into impossibly small spaces. I seem to recall my instructor, Fred Small, getting me to find the point of balance on the skids, which is well behind you, by landing on a wall! Must say I subsequently used that a few times myself when I became an instructor. They also fed in quite a bit of tactical employment and use of the Army radio 'voice procedure', which was very different from Air Traffic radio work. It is designed to pass messages between various troop units using very few words and be employed in a battlefield environment, which is likely to be noisy and where perhaps radio reception is poor. It wasn't in use in the Navy as we didn't have the luxury of tactical radios. A steep learning curve. Fred also had the habit of 'chopping' the throttle when over open country and immediately asking where I was going to land. If I indicated a site he didn't want he'd open the throttle before we got to the ground, but if I got the right site he'd sit back and I'd do an engine off landing to a track or field. Needless to say he knew exactly what he was doing and it improved my confidence in the machine no end.

Left: some Scouts retain their Army colour schemes, others have been given a complete makeover

Licensed hooliganism

My tour was in BAOR, based at Bunde in the northern part of Germany and our role was both anti-tank and utility. In the anti-tank mode we carried four SS11 wire guided missiles and the mission demanded ultra low level flying, which of course we revelled in. Only 3,000 ft of wire on the missile meant getting as close as you could to enemy tanks whilst using what cover was available. There is nothing quite like sitting in the hover in someone's garden and just popping up over the roof to fire a simulated missile. Licensed hooliganism! The tour was quite excellent and included a four-month deployment to Northern Ireland, in which theatre the Scout gave sterling but to some extent unsung service until its retirement. Not allowed to use our missiles there of course, we tended to operate with four troops, sometimes with, sometimes without doors. The tasking was varied, often carrying bomb disposal technicians, war dogs, carrying mobile vehicle checkpoints, the mail or supplies or changing over personnel at remote outposts, inserting or extracting observation posts by day or night and often without any lights at night, to pre-recce'd sites (well before the days of NVG), and so on. The type, of course, went on to much greater fame in the Falklands conflict where the Army Air Corps made the very best use of its versatility, in the roughest of field conditions.

During my tour the Scout soon became like a well-worn wellington and we all got to know it very well indeed. The comradeship between aircrew and engineers was tremendous and we spent many a rainy day hiding in the same tent or barn, or out at first light flying low level and searching for mushrooms to supplement the breakfast rations. On return to the Navy my 'appointer' thought that as I could now fly the Scout, I ought to go and teach the Wasp. There starts another story and one that includes yet another steep learning curve!

The aeroplane is tough… built on a couple of strong girders under the floor, with a utility look and feel and which proved to be rugged and reliable in service. In Ireland I remember doors being left open in the heat of the moment whilst dropping troops, and the need to take off and go somewhere 'safe' before being able to land and get out and shut them. None ever broke on me. The Navy used a developed version, the Wasp, designed as the first dedicated ship-borne helicopter with a

high energy absorption undercarriage in lieu of the skids, and a folding tail boom. It could also carry SS11 but alternatively the bigger AS12 (6,000 yards of wire and bigger warhead), or Mk 44 or 46 homing torpedoes. Its role was quite different from the Scout, being a frigate's main armament, able to engage a surface target 100 miles away from 'mother', or drop an anti-submarine torpedo on a contact discovered by a ship or helicopter-mounted sonar. Needless to say it also carried out many utility tasks from collecting the mail to ferrying medical cases ashore, delivering supplies or people between ships, or sometimes even getting the pilot ashore to the party well before the ship made it alongside the jetty.

Spinning uncontrollably

The Scout is powered by the Rolls Royce Nimbus 105 engine (Wasp had the 103 engine, essentially similar but incorporating corrosion resistant materials or finishes) of 710 SHP, which has a two-row axial compressor feeding a centrifugal compressor, an annular combustion chamber and three-row turbine. The first two turbine rows drive the compressor and the last is a 'free' power turbine driving the rotors through a reduction gearbox and main rotor gearbox. An old-technology mechanical but nonetheless automatic fuel governor keeps the rotor rpm constant, but can be overridden by a manual throttle. The starter becomes a

Top left: Scouts tended to stay low to the ground, the only safe place for Army pilots Far left: original instruments and kit on an ex-Army Scout, with a modern GPS added Above: Scout hid behind hedges to deliver wire-guided missiles over 3000 metres Left: Wasp was identical to the Scout apart from undercarriage and folding tail

generator above a certain compressor speed (to save weight), and the main rotor gearbox drives a hydraulic pump which feeds the powered controls.

Early aircraft suffered from a 'resonant frequency' in the reduction gearbox which led to the destruction of the turbine. Not good. Mod 664 changed the gear ratio, strengthened the turbine and fitted a damper to it, resolving the problem. I do remember the Wasp around 1970 being very limited in what it could carry and over what terrain it could fly because of this problem. The tail rotor also gave rise to some concern, in that the original wooden one could 'ripple' if subjected to a sudden and large power increase. It had the effect of losing all lift, or stalling, at a most inopportune moment, which meant you then ended up spinning uncontrollably. An American Navy Wasp student of mine did just this whilst

practising solo deck landings to a frigate and only got out of the situation when his wheels entered the water and slowed down the spin. I learned about instructing from that! A mod provided a metal tail rotor blade which solved that problem.

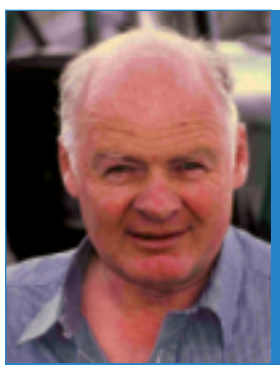
The type left service in the late '80's and quite a few found their way onto the civil market. I got involved with the Scout again after a lay off of 23 years, with Kennet Aviation at Cranfield in May of 1997. Initially I was simply going to display the type, but Kennet's owner, Tim Manna, needed to learn to fly it so I was soon renewing my instructor rating and designing probably the first and only PPL(H) course for the Scout. Close work with the CAA followed and we designed a compromise between the Robinson PPL course and the Military Scout conversion syllabus. Tim was a very good student and things went fairly well, though my day job with Debonair did get in the way a little. The 45-hour course we designed took a little longer because of continuity problems. The helicopter has a single engine, so following normal philosophy he had to practice and be 'safe' at engine off landings. I cannot tell you how much 'pucker' factor was involved in the early exercises, closing that throttle and trying desperately to keep off the controls and let him do it all himself. Naturally he would have to for real if the worst happened during a solo sortie, so he had to prove he could cope whilst dual. Tim actually flew very well indeed and I ended up debriefing more on radio inadequacies than handling skills. In service no-one actually started helicopter flying on the Scout/Wasp – these types were converted to after training on the Bell 47 or Gazelle (Army) or Hiller/Whirlwind or after 1974 Gazelle (Navy). It wasn't particularly difficult, just that no-one ever did it.

Private flying

So what about private ownership? The helicopter is operated under the restrictions of a 'permit to fly', which means you can only carry 'essential' crew, not use it for hire or reward, can't use the hoist or underslung hook and can't instrument or night fly. The 'essential crew' has many interpretations and usually the wife is given a brief on how to do the refuelling and is the other pair of hands needed to push it under the lean-to after flight! It uses about 400 lbs avtur per hour, moves around at about 100 knots and lasts about two hours on a tankful. However, if you are not helicopter qualified you can no longer take a PPL on type (which might mean Tim is the only person ever to have done his PPL on the Scout/Wasp in the UK). So you either have a licence already or get one on a Robbo or w.h.y., and then have to do a 10-hour type conversion course. Once qualified it can go places the Robinson might not have the power to, is better in turbulence than either a Robbo or JetRanger and is for the money the perfect personal transport. There is enough room in the back to chuck loads of kit and you can land on quite a slope compared to some types. Cost of maintenance varies, but can be extremely competitive. The cost per hour with a maintenance all-in deal compares extremely favourably with a R22 and is dramatically cheaper than a JetRanger or Hughes 500. Some are retained in their old Army schemes and others given a modern 'make-over' outside and in, sporting such luxuries as fitted carpets, leather seats and metallic paint jobs. I don't think I've seen any without the obligatory GPS... though when I started flying them we had to find the correct eight figure grid reference from a 50,000 map anywhere in the world!

Above: Rolls Royce Nimbus 105 engine produces 710 shaft horsepower

I still thoroughly enjoy displaying the Scout and Wasp. The actual routine depends on the venue and wind. Cloudbase is not usually an issue – if it's enough to display at all you can probably do a full routine. I sometimes enter flying backwards… well, everyone else came on going forwards! If you keep going backwards gently turning so the crowd are head on about the 45 degree line, gently increase to full power and start a climb. You have to be a bit careful – the rearwards limiting speed is only 20 knots, so doing this facing into the wind but *travelling* downwind makes good use of the environment. At about 500 ft, ease the stick forward about an inch and the a/c tips its nose down beautifully, the rotor disc 'flapping forward' automatically, to about 70 degrees nose down, and lower the lever, but not fully (with no coning angle the blades can get very close indeed to the tailcone). It looks for all the world like a vertical dive to the crowd. In order to keep the attitude, as speed increases you have to increasingly push the stick forward. At around 90 knots ease the power back in and pull out of the dive before getting to 110 knots. Turn through 90 deg, so you are now tail to the crowd and pull the nose up about 70 deg. As the speed comes off, keep straight with rudder and ease the power to about halfway. At exactly the right moment (which is an old family secret), ease the power back in, holding the rudder pedal position, and allow the fuselage to turn through 180 deg. Control the rate of turn with the collective lever, lowering it to stop the rotation when you are pointing 70 nose down. A torque turn. I then come back to the hover at the upwind end and complete a 'twizzle', which is a continuous spot turn, whilst travelling along the crowd line. It utilises all of the controls at once, and again you have to be travelling downwind to make it work. At Yeovilton I have used the Harrier Ramp once or twice, landing on it either nose up or sideways, it being great to show what helicopters can do, and they are very good at landing on slopes. Trying to compete with Extras or warbirds or jets is crazy. I hope you all had the opportunity to watch Dennis Kenyon before his retirement to see what a helicopter can do that is different… but don't try and copy him! ■



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Wasp, in Navy camouflage, had a high energy absorbing wheeled undercarriage