Scale by Scale

Taking a close look at an excellent Vario Bell 230.

Flying the Bell 230.

Continuing my series of scale 'juice' gathered this year I am going to turn my attention to the Bell 200 series of helicopters. The Bell 222 and the Bell 230 are very popular machines to model, primarily because they are readily available in model kit form and when completed look very nice indeed.

The model I would like to focus on is an excellent Bell 230 by Gonzalo Martinez. I met Gonzalo at a competition in America and had the pleasure of examining his model closely and watching him fly the model very well indeed. Unfortunately in the competition scene if you have no documentation then your model will not get the marks it deserves and Gonzalo's model suffered from just such a handicap. When Gonzalo chose his subject he was building it for himself and not for competition purposes. As a personal model goes it is excellent and I hope you enjoy reading how he built the model.

Vario Bell 230

I wanted to build a scale model big enough to allow me to put as much detail as a scale heli should have, including several electronic components such as rotary lights, flashers, redundant battery systems, sirens and all I could ever dream of. I also had been flying gassers for some time with extraordinary results and my scale project needed to be a gasser. They have a lot of power, no smoke, no mess, their fuel tank lasts forever (28-35 minutes) and you can start them by just pulling the starting cord... as simple as that! And, I almost forgot to mention the low price of gas compared with glow fuel.

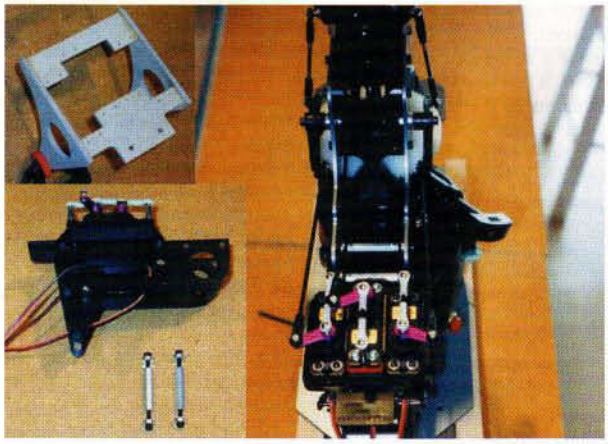
After doing some research and reading all the Vario catalogues in detail many, many times and familiarising myself with all the options, my decision was made for a Vario Bell 230 with the Vario Petrol mechanics. I ordered all the components: the fuselage, the petrol mechanics, the Zenoah engine and all the scale options at once from Vario USA. My idea was to have all the pieces of the puzzle before I started my project so I can make all the right engineering decisions ahead of time.

Let's Put It Together

I started with my first instinct as an engineer by assembling the mechanics first. What a beautiful set up with clear instructions in many languages. I found out that the Petrol mechanics are extremely robust, well designed and very flexible, allowing you to fit them in many of the Vario scale fuselages. One of the problems that I ran into was that the mechanics are designed for a 90° eCCPM system using 4 servos set up. I have tons of JR gear on a 10 SX II that would only support an eCCPM 120° for 3 servos. I also found out in the Petrol mechanics that Vario is using a wooden tray for placing the servos. This is the only area that I thought I could improve, so I proceeded to redesign the servo tray to allow me to use a 3 servos configuration for a CCPM. But, I decided instead of using a wooden tray set-up, to use a mix of aluminium frames and a plastic tray. I decided to adapt the servo tray plus the frames set up from my JR Ergo Z230 that I was already familiar with. I ordered the tray and the metal frames from Horizon Hobbies, did some cuts on the frames, machined some very simple spacers and proceeded to install my new set up. The results were perfect. I didn't need to drill any holes in the original Vario Petrol frames and everything fitted perfectly within the tolerance of my design. You would not believe how precise this system worked with my new servo frame structure. I also decided to use a hi-torque JR Digital servos (DS 8411) 155 oz/in - tough enough to handle all the loads of such big blades. I sent some images to Vario in Germany, they were impressed and gave me lots of compliments (great people by the way!) and I hope they will soon remove the wooden servo tray from the Petrol mechanics and add a system similar to mine and flexible enough to accept 3 to 4 servos depending upon your radio set up.

Building the Fuselage

As all Vario scale fuselages, the quality is superb! Also, the



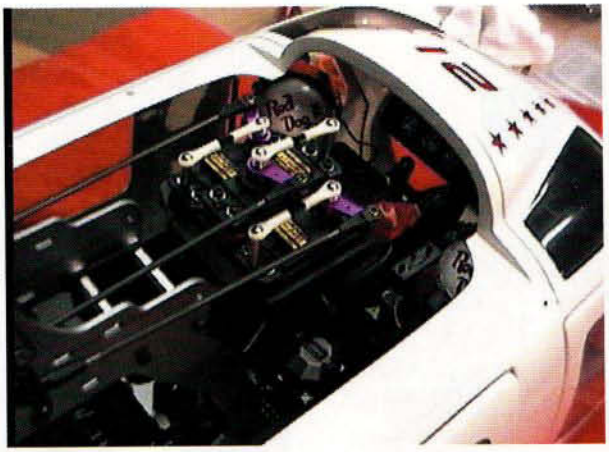
Original wooden servo tray and the redesigned servo tray.

QUICK SPEC

AUTHOR: Sean Brown and Gonzalo Martinez
PHOTOGRAPHER: Gonzalo Martinez and Jon Tanner

instructions are quite clear, but I have to say nothing is more clear and more helpful than to stop by Sandy's web site at V-East (www.varioeast.com). He has hundreds of pictures and descriptions at every stage of building scale fuselages. Sandy's site and service is FANTASTIC!

It is important to rehearse all the steps before cutting and gluing many of the components. If you decided to include the retract system on the Vario Bell 230, it will require careful planning and you should always think 1 or 2 steps ahead before you glue. I had excellent results by using Hobbico 45 minutes epoxy to glue all wood components. I did some stress tests and quite frankly the results were impressive. It is important to install the new fan under the fuselage although the Vario Zenoah G-23 has incorporated its own fan system. This second fan system is made to pull out all the hot air made by the gasser tuned pipe inside the fuselage.



New tray set up on fuselage.

Electronics

The electronics required special attention due to the many components that I planned to run. For the scale effects we added the following items: search lamp on the front left side of the fuselage, 2 rotary lights top and bottom of the fuselage, 2 flashing lights on tail fin and bottom of the fuselage and a siren that moulds to the fuselage. For this last one, I carefully used my heat gun to mould the base to the curvature of the fuselage. I also added a set of 9 LED's with their own circuits on the cockpit of the heli that indicates the status of the fuel tank via a Vario fuel indicator. On the Bell 230 it is hard to see the fuel tank but you can easily see the cockpit LED's... The cockpit is fully modular and is plugged to the electronic fuel sensor using 2 phone plug type systems that I adapted. I also have another led on the cockpit that indicates when the battery pack is switched to the second redundant battery system. On the battery systems I have 4 battery packs completely independent as follows: 2 main battery systems for the receiver, gyro and servos. These 2 battery systems of 1400 mAh are plugged to a battery 'switcher' created by EMS (www.emsjomar.com) that work smartly. When one battery system is completely out of charge it will switch to the second battery and indicate via a bright LED that the second battery is activated..... way cool!!! The third battery system is for the rotary lights and flashers provided by a Vario flasher unit. The fourth pack is on a 9 volts square battery (very light) that provides power to the siren and searchlight. This will keep all the electronics on the Bell 230 live and independent.

Theme

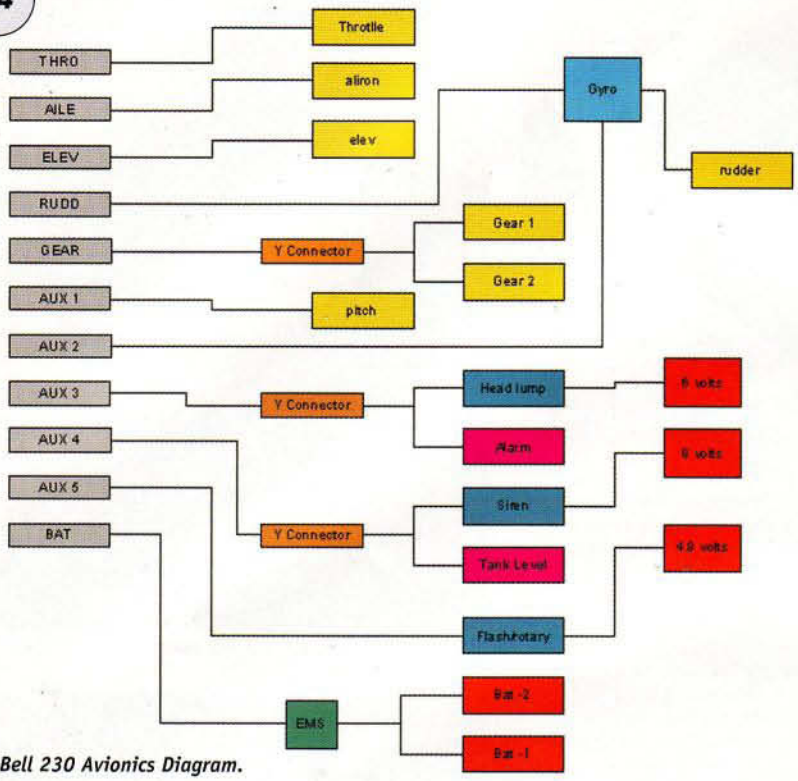
This area required, as always, special attention. The theme of the helicopter is the soul and purpose of a heli. So, I

An ideal scale feature, a scale undercarriage that is rugged enough to allow safe flying.

All cables, receiver and battery packs are under the floor for scale effect.

The main feature of this model is the excellent build quality and the result is a very sharp machine as if it had just rolled out from the factory.

Another picture to highlight the excellent build quality of this model. Precise cutting has ensured tight fitting exhaust stacks and clean vent grills. A faultless paint job and sharp decals transform a stock kit into an excellent model. Add some rivets and some scale documentation and this machine would be a scale winner.



Bell 230 Avionics Diagram.

Full use of standard fittings add a nice touch of scale and a functional refuelling valve is always a good idea.

decided to choose a noble cause - air medic/rescue helicopter is what this Bell 230 was made for. I dreamed many times about how cool it would be to hover and simulate rescue missions. To see it passing by at full speed with retracts up and transition to an impressive hover with a siren on. I got some of the colour ideas from an Italian rescue helicopter found on Helispot (www.helispot.com) and I adapted it to an American version. I used for the paint a single stage acrylic urethane made by Dupont. All decals were made in Vinyl by (www.motorsportsgraphics.com). These guys are great.

Flying

The moment of truth... after checking all systems and checking the final weight of 21 lb. Wow!!!! I was quite nervous about whether this Bell 230 would ever lift off..... I talked with Vario and they said that I was within tolerance. By turning those huge 810 mm blades at 1250 rpm, the Bell lifted off unbelievably smoothly and hovered rock solid at half stick. A few clicks up and it was climbing quite impressively. I put up the retracts, turned on the flashers and searchlight and I was ready for a rescue mission in Northern California where I live... I almost forgot to tell you. I toggled the siren a few times, put the Bell back into the ground and proceeded to taxi on the runway.... Yes, it taxied like an airplane... What can I say? "Too cool to be true!"

The Bell 230 is so unbelievably stable, it hovered rock solid, I've never seen anything like that on a R/C heli... I already have 11 flights on the Bell, but I'm still breaking-in the engine. By the time you read this article, the Bell will have several full speed flights and some nice stall turns. Every flight is more and more fun. Vario did an outstanding job in this kit and you can bet all my upcoming projects are for scale heli's.

Gonzalo Martinez

The detail on the pilot's helmet is excellent and well worth the effort.

Again standard instruments augmented with the fuel level lights combine to give a realistic instrument panel.

Gonzalo with his excellent model.

Thank you Gonzalo for a very detailed build of an excellent model. For those of you who like to get deep into the scale information, here are some other technical details of the model;
Engine: Zenoah G 23
Flying weight: 21 lb
Fuselage length: 1.78 m
Main Rotor diameter: 1.79 m

During my examination of the model there were quite a few features that caught my eye so I have added some extra photographs to Gonzalo's. As you can see from this article if you don't want to get too bogged down in 'scaling up' detail then there are a lot of proprietary fittings available to add that touch of realism to your model. However, the main feature of this model is that although very little of the model is scratch built and by no means is the kit unique, it has been built to a very high standard and consequently flies as well as it looks. So take some inspiration from Gonzalo's building quality and add that extra effort to finish your model to an equally high standard. MHW