



AUTHOR: PAUL COOK

USS LIONFISH Part 1

THIS IS THE FIRST PART OF A THREE-PART ARTICLE ON THE BUILDING OF A 9 FT 9" 32ND PARALLEL HULL GATO/BALAO CLASS FLEET SUBMARINE – USS LIONFISH – SS-298. THIS PART DEALS WITH THE CONSTRUCTION OF THE SEALED HULL

IN THE BEGINNING

Back in the mid 1970s, as a very young boy when I first knew about submarines, I had a book Called 'Underwater Exploration'. It was mostly about exploration craft, but there was a brief section about submarines of war. There was this striking shark-like shape of a submarine that has always stuck in my mind. This shape was not a Type 7 U-Boat as many of you would naturally think. It was an American Gato/Balao Class, with that Great White Shark-like shaped bow! For me, that has always been the iconic shape of a submarine!

Fast forward a few years to 1989 when I picked up a copy of a magazine called Marine Modelling. In this magazine was a feature called 'UP Scope' by Ron Perrott. This article featured a model of a Type 7 U-Boat in the shape of U-552. A fully operational radio controlled submarine kit? The fire had been re-lit! The kit was produced by an American company called 32nd Parallel. Somehow I found the address for this company and sent away a letter and a stamped addressed envelope for a copy of the catalogue – don't forget in those days there was no email or Internet!

A few weeks later the catalogue arrived, sadly the model at



The hull the day I got it home



The hull and my two oldest sons



The bare conning tower

almost 7 feet was too big, too expensive and too complicated for me as a first model. In this very same catalogue was a Gato/Balao class kit at 9 ft 9". This kit was way out of my league (at the time) – I was an 18-year-old catering student with no engineering knowledge. Later on that year I came across an advert for Darnell Models, I bought the smaller 5 ft 8" Darnell kit of the 'S' class, she was named HMS Satyr and still sails to this day.

The really ironic thing is this; I was at a show during the late '90s when a chap came along who was selling a 32nd Parallel Type 7 bare and un-started hull. He was very quickly parted from this model and I parted with cash – but my true burning desire was to have a Gato!

Fast forward to 2005, a good friend of mine, Geoff Johnson, who knew I'd always wanted a Gato called me and said, "Paul, do you still want a Gato?"

"Yes", I said, "Of course!"

At this point I was thinking maybe an Engel kit or ready built Engel boat. Geoff then said, "It's an un-built 32nd Parallel Gato hull and some made parts and it's only in Lincolnshire!"

He gave me the number of the gentleman selling it. The gent was only Ron Perrott! We had a chat over the phone – I was buying it! During the few days in between, I can remember staring at my 32nd Parallel catalogue that I purchased all those years ago. I still could not believe I was only a few days away from laying my hands not only on a Gato, but the biggest commercial kit made too!

At the time I only owned a Rover 400 saloon and, on taking some measurements, found this gave me a problem in getting it home, but I wouldn't let that stop me from having it! Geoff luckily owned



Overall shot of started tower and periscope shears



Close-up of periscope shears

a Ford Mondeo Estate. That weekend in April 2005, we drove to Lincolnshire to pick it up from Ron. Ron had started this model and had already made most of the conning tower parts including a 5" gun, which is an absolute gem of a model in its own right! Ron made me promise him that the model of the 5" deck gun would feature on the completed model. Ron gave me all the bits and I handed over the cash. To see a model submarine hull going into a Ford Mondeo estate from corner to corner with only a few inches to spare is a sight. Just before Geoff and I left, Ron gave me a brief but final treat – in his workshop sat the very same U-552 that I had

seen in Marine Modelling back in 1989. Geoff and I got the Gato safely back home to Norfolk. One of the first things I just had to do was to photograph it with my two young boys in the back garden. My youngest son at the time, Harry, could even sit in the hull itself!

PLANNING (((LF 4 TO LF 11)))

I spent many a day following the purchase just thinking and sketching about how I was going to build it, store it and finally transport it to the model boating pond at Eaton Park in Norwich.

For ease of storage at home, moving it around and getting it to the lake it would have to be cut either in half or thirds – a risky but practical idea in the long run. The other logical reason being I am no heavyweight lifter and am not getting any younger! I did not want to have such a superb model that in, say, 10 or 15 years' time I simply could not move, or indeed injure myself attempting to move it!



Conning tower floor planking



Above & Below: Close-up of general details



Close-up of the deck planking

I set about planning this idea of cutting it very carefully, with the various systems that I could employ to make it all work, along with ideas that would be needed when cutting the model into manageable parts. When I was not thinking about this I was researching the full size boats on the Internet and doing some scale detail work on the conning tower.

On many of these full size boats they had the forward main deck planked with wood to save on metal usage. The fibreglass forward deck of this model has these 'planks' moulded in, but to be honest it was only going to look good with the real thing. Looking at the plans I had along with photographs of the real thing, I worked out the scaled down planks to be 1/8th or 3 mm. To get it right, I also counted how many planks were on the real boat. Over the next few weeks I set about planking the forward deck with 1/8th spruce square section obtained from SLEC in Watton, Norfolk.

Over the course of the following months, I purchased drive motors, pumps, radio gear etc.

In 2008, my personal life changed and all my modelling was put on hold for about two years. Moving house in 2010, some form of normality returned and the model was retrieved from its storage, as was everything I had done for it. I got my new home sorted along with my workshop and got stuck in again. Everything I had planned and written down now came together just like a big kit. The plan not to rush it from the start was going to pay off in the end.

I had now decided for many practical reasons that the model was going to be cut into three sections. The main hull itself was to be used as the watertight sections and ballast tank rather than using a popular and more modern module system. I had used the full hull section as watertight areas on many of my other models, indeed I find the WWII type models tend to be more 'surface stable' with this type of hull.

The main ballast tank in the middle was calculated to be big enough to be able to take on waterline level ballast and actual diving ballast. The fore and aft watertight sections were to have all the required radio gear to run each section with one main difference – they would each have their own receiver and power supply. This meant that the model would effectively be two separate radio control models only linked physically so no need for watertight electrical joints between fore and aft sections. Within each watertight section would be an independently operated trim tank. I had played with this trim tank idea on my HMS Satyr over the last few years with great success.

THE HULL ITSELF ((LF 12 TO LF 18))

Before any cutting was done, however, the hull had to be plated (to simulate the welded hull) as per the real thing. Using research from photos and plans this was marked out. A Revell plastic 1/72 Gato hull was also used to get all the plate lines scaled up correctly. I used Lithoplate (un-bossed beer cans work well too!) to clad the entire hull in accurately sized and shaped plates of this material. Plating the hull took a good few months to get it right, patience was a virtue with this job. The intended and hoped for result was that, once done, the hull would then be cut into the three sections down the plate lines so when re-joined as the working model they are not instantly noticeable as a hull join.

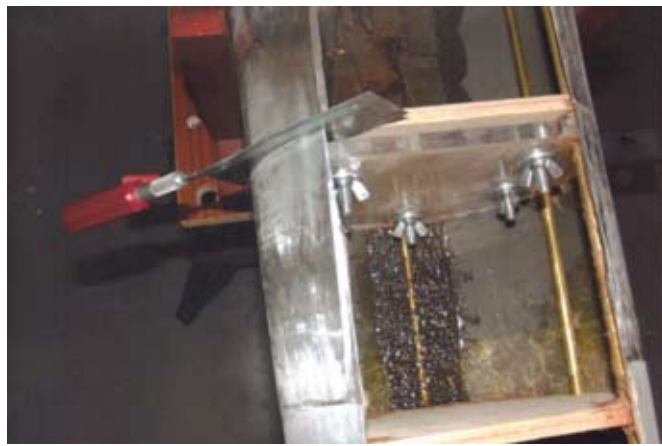
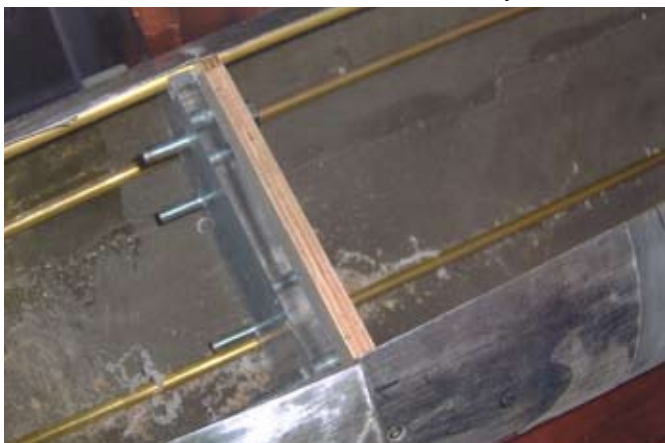
In between plating the hull, I broke up the monotony of this job by working on the main interior structure. Inside the hull 10 mm wooden (dry) and 10 mm thick Perspex (wet) bulkheads were fitted along with five 1 metre lengths of 11/32" brass tube guides. In order for the model to be perfectly aligned each time it is assembled, I fitted exact sized tightly fitting carbon rod, which also gives the entire model a 'backbone' across the middle. This was all fixed in with fibreglass matting. Ten 8 mm x 50 mm stainless steel bolts were fitted to the bulkheads to hold the model together when in use (five at each end of the tank). It was a cold November night in 2011, with the garage door shut down, when everything was



Lithopating on the hull



The internal bulkheads with the carbon and brass joiners



Cutting through the hull



The hull in separate parts

in place and checked, the carbon rods were withdrawn from the tubes, final checks done and the razor saw came out!

The razor saw was applied to the hull between the two facing bulkheads that were only the saw's width apart, so it could not really go wrong, but I was not being complacent! Sawing down through the hull and following the plate lines by hand through each of the five brass tubes was quite nerve racking but in less than half an hour the hull was in three sections. A very similar method was applied to the top deck section, but being only cut into two sections with two bulkheads and brass tube runners/carbon rod to create a backbone and joiner. As per the hull these were also fixed in with fibreglass matting.

THE INTERNAL STRUCTURE ((LF 19 TO LF 22))

The main ballast tank was to be completed first. During my initial planning I calculated a measured ballast tank area with hull cross-section and bulkheads in place to be 17 litres. A huge tank but there was a reason for this. The ballast tank could then hold three lead acid gel cells at the bottom (if needed) at a later date. 2 kg of lead shot was poured and sealed into the very bottom of the tank. Air cylinders in the top or sides near the top could be fitted at a later date. Although I had decided to use a sealed water tank method using water pumps, future changes to the system could take place easily. Brass fittings for air and water lines were fitted to the main tank. In each side of the ballast tank a 20 mm tube was fitted all the way through, this was to allow the passage of air/water lines or the need at a later date to pass power lines through from fore and aft (if needed). Clean power lines (servo cables) down one side, dirty (power cables) down the other, far better to fit it all now rather than to have to modify the boat once built in my view.

A Perspex rim and lid was made using 5 mm thick Perspex. 5 mm stainless steel bolts were fitted to the rim to hold the lid down

onto the, yet to be made gasket. The rim was dry fitted in place and all exits sealed. Fibreglass matting and resin was used on the inside of the tank to give it strength around the bulkheads, brass tube runners and to attach the rim to hull. After a few days curing in the warm garage, the ballast tank was then re poured with a litre of fibreglass resin to plug and fill every little pinprick hole, which it certainly did. The tank was left several weeks to fully cure.

Over this curing time the fore and aft sections were dealt with in exactly the same way, using 5 mm Perspex for rims and lids. Brass fittings once again for air and water were fitted in both sections. The fore and aft sections had all the power lines fitted both internally and externally using my tried and tested method of 4 mm electric flight gold connectors. These have worked very well for me in the past and I trust them completely. The internal rails to hold servos were fitted also at this time, so as to be able to get them in under the rims. It was far easier to do it this way that trying to get them in over the rims later.

GASKET SEAL

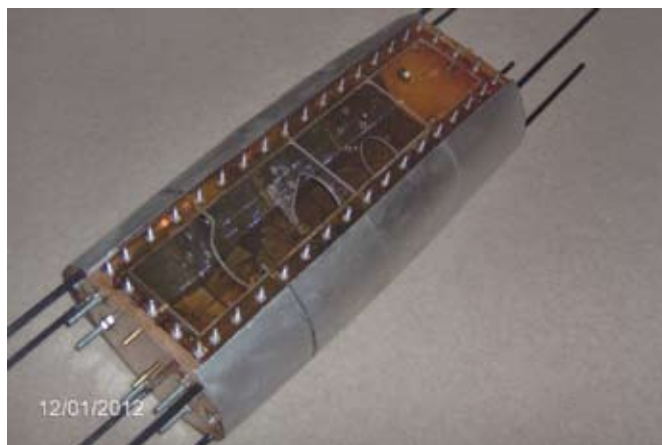
Water tightness is, of course, an important part of any submarine model. On this model I used my tried and tested method of a silicone sealant type gasket. I always use a black anti-fungal silicone seal available from any DIY store (colour is not important, but with black you can't see it through the flooding ports when the sub is surfaced). It's very, very important when doing this kind of seal that absolutely NO electronic item is in the hull, as the acid fumes given off during curing will attack the circuit boards.

I have used this method of gasket seal on many of my model submarines including way back on my HMS Satyr in 1989. That gasket seal has never leaked and is still there to this day, the method does work if done correctly!

The method is quite simple, you need some anti-fungal silicone sealant, one tube will do most submarine models – this boat needed two! A silicone gun is helpful, but not critical, some cling film (yes normal household cling film), grease of some kind (Vaseline, silicone, even butter will do). To start with grease the underside of your lid, and then lay cling film over this so that it is taut. Then punch through the pre-drilled bolt holes with a bradawl or similar. Do not get any grease on the rim at all! You need the gasket to stick to the rim.

Squeeze your silicone sealant over the rim, making sure you go round the bottom 6 mm or 1/4" of the bolts that are sticking up, when the entire rim is covered you want it at least 6 mm or 1/4" deep down the centre line of the rim. Place your lid cling film side down over the bolts onto the wet silicone sealant. When level, you can use the nuts to gently and evenly tighten (by hand only) the lid down. Continue to tighten up the bolts by hand until you see the silicone has evened out and the lid is level all round, using the tops of the bolts protruding through the lid as reference. Now, put that hull somewhere it can set. If done during winter in a cold garage or shed you are talking two to three, maybe four, weeks to fully cure properly, if you can get it indoors then all the better, but you may not be popular during winter (just ask my wife!). But it will cure in maybe one to two weeks. Yes this may be a long time, but remember this gasket is very important!

Once you are confident that it has cured, remove the nuts holding the lid down. Lift the lid with the cling film away from your cured gasket. The grease you applied to the lid will help the cling film stay attached to it as you lift it away. Now it may look a mess and will certainly stink inside that hull as the silicone smell has been trapped. With a very sharp scalpel or Stanley knife, trim away the excess from the outside of the rim, using the point of the blade to first find the edge. Before you go too mad, check the cut section of gasket for 'wetness' on the blade itself. If there is wet silicone, it's not cured! Place the lid back on and re-tighten the nuts down and leave longer. If cured then carry on cutting. Do the same on the inside to give you a perfectly formed gasket that will last years. Hopefully your gasket is at least 3 mm or 1/8" thick. **MMI**



The completed ballast tank



The completed ballast tank modelled by Harry



The basic hull section - fore



The basic hull section - aft