

Radio Controlled (R/C) Model Hydrofoils, Power & Sail

Discussion, Advice, Information Sharing, Lessons Learned, and Networking

(Last Update 2 Jun 03)

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Correspondence

Buyer (and Seller) Beware!

[17 Feb 03] Some of the commercially produced hydrofoil RC model kits have been long discontinued. Recently, several people who posted messages here were contacted directly by email with an offer to sell a rare such model at a price in the hundreds of dollars. The individual making this offer was not a member of IHS and is not known to us. The offer may be perfectly legitimate. The price may be perfectly fair... IHS has no way of knowing, and we do not recommend or endorse products and services. This seems a good opportunity to remind our valued members and correspondents to be wary of responding to any unsolicited offer to sell valuable merchandise by e-mail. If, due to distance or other reason, you have no way to meet the seller under safe circumstances and see the merchandise before you buy, then you would be ill advised to provide personal information, give out your credit card number, or mail a payment in the hundreds of dollars in such a situation. For the legitimate seller with a valuable model or other item to sell who does not have an established internet business, I would recommend that you sell the item locally where people can view the item before buying in a safe public location. Or you can list your item for sale on eBay or other web-based auction site and earn the confidence of your potential buyers by offering to deal through the payment escrow feature offered on such sites. As the saying goes, "Let the Buyer Beware!" The legitimate seller should heed this warning also, and sell by a safe means... you do not want to get a bad check or a stolen credit card number in return for your valuable model! -- Barney C. Black (Please use the [BBS](#) to reply)

New Sailing Hydrofoil RC Model From MicroSAIL

[14 Apr 02] microSAIL! is about to introduce a new radio controlled model, the aeroSKIFF. The boat has a very fast canting keel (52 degrees/one second) for stability and a dagger board just forward of the keel strut for lateral resistance. This boat is significant because it is the first KEELBOAT, to the best of our knowledge, either full size or models to sail on hydrofoils--and only two foils at that! There is a main hydrofoil on the daggerboard and one on the rudder; altitude is controlled by a slightly modified version of Dr. Sam Bradfield's wand system. We are patenting a version of the aeroSKIFF concept for use on large monohulls such as Open 60's and feel that our system can revolutionize monohull sailing. This type of boat, a MONOFOILER(tm) will never be as fast as a multihull foiler but it can create a unique niche for itself as a very fast single hull sailboat. We would be interested if anyone has heard of or seen -- and can document - - another ballasted keelboat (full size or model) having sailed on foils. -- Doug Lord (lorsail@webtv.net)

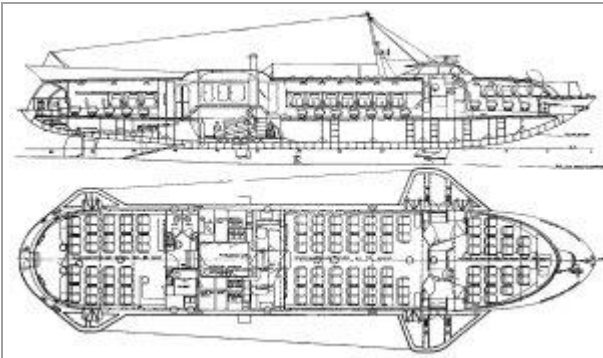
Kometa R/C Model - Help Needed

[24 Mar 02] I inherited an antique fiberglass model of the Kometa Hydrofoil (It was sold by Mantua Model, Italy, made by a small company Siderea in Rome). The model is almost 5 feet long, and seems to be built for R/C, it also has scale features (white metal window frames, lifesavers, fittings) as it has comes with a sturdy gearbox to drive 2 contra rotating props (Engine size is supposed to be a .60 - .90 glow). It comes with all the foils (extruded aluminum and curved), and foil legs (cast metal). The kit has features to be totally scale (white metal window frames, lifesavers, radar, etc). One part of the planning is my primary concern about the total weight, and CG, other details include: size of rudder, rudder placement, cooling, etc. Alas, no instructions! The picture of the bare hull is attached. I was wondering if anyone had come across this, and what were their experiences building and running this kit? -- Ho Sing, Singapore (hos888@pop.singnet.com.sg)



Responses...

[29 Jun 02] May be these pictures will help you! Can you send the foil's drawings? -- Michael Moizhes (muphaz_a@messilot.org.il)



[Click Here](#) for Larger Version

[29 Jun 02] [Click Here](#) for a scan of instructions for the Mantua Model Kometa-M kit. [Click Here](#) for a photo of the piece parts. -- Martin Grimm (seaflyte@alphalink.com.au)

[15 May 03] Just for your information a hydrofoil like your model is sailing between Dar Es Salaam and Zanzibar Tanzania transporting passengers-it was imported from Russia -- Johannes Pedersen (jhp@nccaarsleff.com)

PT-50 Model Wanted

[15 Mar 02] I have been looking for the PT 50 model for a long time. I would like to know if you can tell me where I could get the PT50 kit? or maybe you know someone that would like to sell me one. -- Felix (felix9@harborside.com)

Response...

[15 Mar 02] The problem is that the model is not being made any more since 1984 (I guess). A while ago I saw one on [eBay](#) being sold for US\$295. The best way is to find drawings of the PT-50, and build it yourself. -- Mark van Rijzen (info@dutchhydrofoils.com) website: www.dutchhydrofoils.com

[17 Feb 03] One note of caution: If you get an offer to sell you a model in response to this posting, be wary about giving out credit card numbers or sending off a lot of money in response to email offers from individuals who do not operate an established internet business and are not located where you can physically see the model in a public place. In such a circumstance you could suggest to the seller that he list the item on eBay, and then use the payment escrow service offered on the eBay site to be sure you get your merchandise before the funds are released. -- Barney C. Black (Please use the [BBS](#) to reply)

Hydrofoil Model Experiments

[3 Feb 02, updated 4 Mar 02] I conducted some experiments in 1978 that I am now getting back into after a lapse of 24 years. I even have [some fuzzy video](#) (*.avi file - 400K) showing my early craft becoming foilborne and operating. The original film was taken as 8mm, and it was later copied to VHS. This version was only recently converted to digital format. So, the quality has suffered a bit in the translation. I am looking for the original film, and if I can find it, will see if it is possible to get a better, enhanced copy made of it. There were problems of course, but after reading many of the messages here over the past couple of years since discovering this forum, I think I can address many of them now. As my time permits, I will try to bring the information I have discovered before this group for their use and entertainment. Now, some details of what I did way back when. I used a Dumas Swamp Buggy as the basic platform for my craft. Its hull is 28" in length and has a 10" beam. It proved to be a nice, stable platform to work with. I built it with only a couple of modifications to the original design. Mostly for my convenience to be honest. The first modification was to turn the engine pylon 180 degrees so that the engine faced in a more standard prop forward position. This allowed for easier starting of the engine, and use of a standard propeller rather than a more difficult to find pusher prop. The second modification was to build the boat with two rudders rather than the single shown on the drawings. This allowed for more control at lower speeds, and I felt more control to help counteract the foils tracking tendencies. It proved to be a good choice. This kit is still available from Dumas and various hobby supply shops for a price in the range of \$50.00 or so. My engine selection was to use a Veco .19 r/c engine as it had very high power available for its size (approximately 1 BHP). As for my choice in foil design, I chose to build a single surface-piercing front foil, and what I termed a "W" foil for the rear. This, I felt would give me the stability of a three-point stance once foilborne. There were many variables that I played with as I remember. Mostly dealing with the angle to set the engine at (I chose to keep the original 5 degrees suggested by Dumas), as well as the angle of incidence of the foils (both front and rear). I originally selected a 0 degree setting for both foils in relation to the hull itself. The rear foil was set as close a possible to the same incidence as the front foil to help cut down on the initial complications of their interaction with each other. The front foil did have a deeper draft than the rear, and was set 10" aft of the bow. The rear foil was mounted directly below the stern, and was even with its aft bulkhead. Front foil was created from balsa aileron stock (1" wide) and shaped into a "water foil" cross section. The front foil was built with a 45 degree angle built into the foils. The rear foil was a bit more complicated, and that will have to remain for a future post. The engine thrust setting had MUCH less effect on the overall performance of the foils than I had expected. In parting, this craft did have some great potential, did work in the foilborne mode, and was a rather inexpensive way of doing some good experiments in hydrofoils. I am currently working on preliminary tests of a new boat that I hope will eventually end up as a hydrofoil. Again, it is based on a Dumas Swamp Buggy (I can't seem to get away from this hull). I am still using a Veco .19, but have drifted away from the air-screw driven design. I am using a Graupner Water Jet, and once I am satisfied that I will be able to force enough water through the system, I will begin working on the foils. So far, all looks good. More details and photos will follow as the experiments progress. I will be happy to answer any questions. -- Joe Bennett (thedarkoverlord@earthlink.net)

VS-8 R/C Model Owner

[3 Feb 02] I have a VS-8 that I run on a regular basis. 32nd Parallel Corp is out of business, I had a hard time with them myself. -- Leonard (lenny1324@aol.com)



DISCO VOLANTE

[23 Jan 02] I am trying to build a model of the *DISCO VOLANTE*. Unfortunately, I have yet to find a marine engineering firm that still carries them. Also, if you look at the Rodriguez Canterei navale website they also have some information on the *FLYING FISH* (i.e., before conversion). It appears the *FLYING FISH* underwent extensive conversion at Miami Shipbuilding Co. before her movie role, including possible alteration of the forward section up to and including the foils, so I'm not certain if the plans would be complete as to new underwater lines and the integration to the "cocoon." Information is also extremely sparse as to possible plans of the same "cocoon." -
- Doug Binish (email address withheld)

Response...

[23 Jan 02] Your information about conversion of *FLYING FISH* into *DISCO VOLANTE* for the James Bond movie *Thunderball* is partially correct. Miami Shipbuilding Corp (MSC) took care of drydocking *FLYING FISH*, but Allied Marine, here in Miami, fabricated the false after-part of the hull that broke away when the surprise get away was made. [Click Here](#) to see a newspaper ad dated 18 Feb 1966 offering the vessel for sale. -- Jean E. Buhler

[3 Feb 02] Information such as this is a valuable aid in tracking and finding reliable plans for the *DISCO VOLANTE*. I understand that the cocoon section ended up as a houseboat somewhere in West Miami. True facts? Also, Is the German firm offering the PT-20 plans reliable as far as delivery and pricing(I believe it is on the models page?) -- D. Binish (email address withheld)

Modeler Needs DISCO VOLANTE Details

[13 Jan 02] I have only two photos of the *DISCO VOLANTE*. The conclusion based on these photos is that it was built from a Supramar PT-20. Have you more information about this topic ? I am very interested in this because I plan to build a PT-20 model with the option to alter it into a *DISCO VOLANTE*. I have the drawings for the PT-20 but they are not very detailed, so I am trying complete them. -- Michael Thies (michael_thies@web.de)

Responses...

[26 Mar 02] There is a bit of information and three small black and white photos of the *DISCO VOLANTE* in the January 1966 issue of Popular Science. The article is titled "James Bond's Weird World of Inventions. -- Barney C. Black (Please use the [BBS](#) to reply)

[14 Sep 02] I'm wondering if your intention to build a PT-20 is still on...I have two 1:24 scale plans of her [1. plans of an R/C PT-20 Hydrofoil...German I think! 2. Original Supramar PT -20 plans] Let me know. I built a 1:24 scale static model of a PT-20...see below. -- Alex (lord_barrington@smartchat.net.au)



CURL CURL Model Kit Wanted

[30 Dec 01] I am very interested in the *CURL CURL* boat that you have on the website. Would you be able to tell me where I could get a kit (or completed boat)? Also, how does it run? -- Chris Kozlik (ckozlik@newarchery.com)

Model VS-8 Schnellboote Wanted

[2 Sep 01] I'm finally at a point in my life where I can get back to enjoying modeling and model boating. Specifically, I need some info on 32nd Parallel's Schnellboote model. I just finished reading [the thread you have posted on the VS-8 Hydrofoil](#). What a great job that was, and the fun the owner is having with it now! Sadly, as you pointed out in the thread, it appears 32nd Parallel Corp. is in hiding. So if anyone out there has this boote (boat) in kit form or already built and wants to sell it, please drop me a line, so we can commence to dicker the price. -- O.E. "Spotter" Dillon, Woodbridge, VA, USA (dillonoe@earthlink.net).

Response...

[2 Sep 01] It looks like Antoine Lenourmand, the author of the thread you mention, has just sold his model on [eBay at www.ebay.de, item # 1614864145](http://www.ebay.de, item # 1614864145). One note of caution: If you get an offer to sell you a model in response to this posting, be wary about giving out credit card numbers or sending off a lot of money in response to email offers from individuals who do not operate an established internet business and are not located where you can physically see the model in a public place. In such a circumstance you could suggest to the seller that he list the item on eBay, and then use the payment escrow service offered on the eBay site to be sure you get your merchandise before the funds are released. - Barney C. Black (Please use the [BBS](#) to reply)

PT 50 Model in Holland

[14 Jun 01] Just want to let you know that the PT-50 kit is really fast. Faster than my I think cause my engine stopped working (after 12! years), it was still the original Mabuchi RS-540SD black motor. Condor Ferries indeed ran five PT-50a ,but none of them as Condor 5 because that was a [RHS-160](#) delivered in 1976 (you can see it on <http://www.rodriquez.it/crafts/crafts.html>). -- Mark van Rijzen (dutchhydrofoils@wanadoo.nl)



PHM Model Planning Update

[31 May 01] We have a pretty good set of plans from "[Floating Drydock](#)" now. [Floating Drydock](#) is a Plan service company. They now have a couple different scale plan drawings and sets of PHMs: Hull, faired lines and stations *USS PEGASUS* Builders plans outboard profile and plan view, and deckhouse details, model builders set showing main deck, outboard profile bridge superstructure deck, platforms, some hull sections, general arrangements, and longitudinal cross section. Cliff Shaw is currently designing the jet pump. I gave him three or four size and scale options, and it looks as if we will be building at 1/48 scale. My job challenge looks as if it will be to keep the model weight below five pounds or 2.26kg. I don't think that should be too hard, but I doubt we will have scale foil retracts on this model. lol! Wish us luck, I'm sure we will need it, and any advice you guys have to give. -- Aimee Eng, Portland, Oregon USA (umi_ryuzuki@hotmail.com)

Response...

[15 Mar 02] Can I ask you how the building of the 1/48 scale *USS PEGASUS* R/C model is coming? I have seen one of these boats and have dreamed of making a R/C model of it, so "Please"!!!! let me know. -- Felix (felix9@harborside.com)

[27 Apr 02] Note the following references:

- "The Mariners' Museum's Scale Ship Model Competition and Exhibition 2000," *Scale Ship Modeler* (ISSN 1066-0275), Nov/Dec 2000 (Vol. 23, No. 5), pp. 36-37, 62. Features a 1:48 scale model of PHM-1 *USS PEGASUS*. Modeler Dean Leary of Statesville NC was awarded the Gold Medal under the Division I (Scratchbuilt) Class B (Powered Ships) category. "The Scale Ship Model Competition and Exhibition 2000 ran from June 17 until October 28, 2000. During these dates, visitors were able to see the top ship models in the world and participate in various activities associated with the exhibition on the opening weekend. For more information about the competition and exhibition, call The Mariners' Museum at (757) 596-222 or (800) 596-2222, or write to: The Mariners' Museum, 100 Museum Drive, Newport, VA 23606, or visit their Web site: www.mariner.org"
- *Marine Modeling Monthly*, March 1991, contains photos and drawings of the PHM Class; purpose of the article is to provide details to modellers of the PHM Class.

-- Barney C. Black (Please use the [BBS](#) to reply)

Modeling the Boeing Jetfoil

[20 May 01] I have had an interest in modeling the Boeing Hydrofoil for many years, but due to the pressure of work it has not been possible to pursue the interest with vigour. I am now close to retirement and feel that I can resume my interest. I have given some thought to the problem of inherent instability of the Boeing's foil configuration. I wondered if model radio control aircraft type "flaperons" could be used? I have happened upon some old papers referring to "The Hydroflight Society", in England linking with a 'Peter Cahill'. Have you heard of him? If so, do you know if he is still active? Do you have any members in the UK, in the society? -- Alan Barwick (ElaineBarwick@cs.com)

Responses...

[20 May 01] I once saw an advertisement for "Hydroflight Models - Model Hydrofoil and Hovercraft Specialists - Incorporating the Hydroflight Society (the Society for Model Hydrofoil and Hovercraft Enthusiasts)". This was in the April 1991 issue (volume 41 Number 482) of *Model Boats* magazine published by Argus Special Publications in the UK. At the time, a 48" kit for a model of *HMS SPEEDY*, a Boeing Jetfoil variant was due to be available soon. I had advised [Chris Morgan](#) in the UK, another person who had made enquiries via the IHS, of the details above and the address of Hydroflight Models which appeared in the advertisement. Chris was subsequently able to make contact with Peter Cahill and sent me the following update via e-mail on 1 Feb 2000: "I have tracked down the owner of Hydroflight Models... one P. Cahill. His

mobile is 0403 245280 and his home number is 01797 229120. The model company is now defunct, but he still makes the hulls and fins for *SPEEDY*. He is also developing a propulsion system for the model based on the original *SPEEDY* concept. He can do this as he has all of the technical manuals, log books, engineering drawings etc etc from the design, development, test, commissioning, service, de-commissioning and eventual sale. I will give you any more information when I receive it. Chris." I have included Chris Morgan as an information addressee to this reply in case you don't have any success contacting Peter Cahill yourself. If you manage to get an update on how Peter Cahill is going with the *SPEEDY* model, please let me know and post the information on the IHS [BBS](#) . -- Martin Grimm, IHS member and RC hydrofoil modeler (seafite@alphalink.com.au)

[7 Apr 02] Note the following reference: *Radio Control Boat Modeller*, Vol.1, No.4, May/June 1986. ISSN 0268-5248. Published monthly by Argus Specialist Publications Limited, UK. Features a short one page articles on the first successful model Jetfoil marketed in the UK, this being developed by Aries Hydrافibre of Portsmouth. The model designed by Martin Seymour is to 1:32 scale and was to be on sale from 1 May 1986 for a price of about 195 UK Pounds. The model is depicted in the article. -- Barney C. Black (Please use the [BBS](#) to reply)

[28 May 03] An article on the Boeing Jetfoil appeared in the International Plastic Modeler's Society Quarterly magazine, Vol. 17, No. 4, Summer 1982. No further info is available. -- Barney C. Black (Please use the [BBS](#) to reply)

How to Build an R/C Model Sailing Hydrofoil?

[19 May 01] I have recently decided I'd like to build a radio controlled model sailing hydrofoil (about 1m, 3'4"ish, high) from scratch. I hadn't seen any sailing hydrofoils before so was glad to see that it is going to be possible (in some form at least). I intend to sail it in the stretch of the River Thames near home, so the model will have to cope with varied wind conditions and must cope with high waves/chop (up to 1 foot high) - ie waterproofing for radio and servos is probably required. Since I have not yet started, and am keen to learn new skills, I was wondering if you could give some suggestions on how to build this model and from what materials etc. Budget will be rather limited so if you could give some alternatives it would be much appreciated. Thank you all for your help (anybody wishing to mail me is very welcome) -- Jez McKean (jez@jazzle.co.uk); Ashdown House, Basmore Lane; Shiplake on Thames; Oxon RG9 3NU UK

Response...

[19 May 01] Some possible sources of info taken from the links section of our web page include The 750mm R/C Yacht Association at <http://www.home.aone.net.au/cybernautics//750.html> and Victor Model Products at <http://www.victor-model.com/> and MicroSAIL at <http://www.micosail.com/f3.html>. Please feel free to browse through the posted messages we have received over the years on this subject and to contact any of the correspondents directly that you think might have good info for you. Good luck with your project. When finished please send photo and summary of "lessons learned" for possible publication on the website and in the newsletter. -- Barney C. Black (Please use the [BBS](#) to reply)

[22 May 01] It's great that you have this interest in modeling an RC foiler. The conditions you refer to: 1' waves/chop with a 39" model are extreme to the point of being impractical. Think about it: that would be like 12 foot waves on a 39' boat!; this becomes doubly difficult in short period choppy conditions. The main problem is that to get the hull clear of the wave tops while foiling you will have to have an extraordinarily deep foil and that's OK but the crux is that when you're not foiling that vertical foil will be very deep and cause a lot of drag which will make it difficult to get up on foils in the first place. The other main consideration, in those conditions, is getting the center of effort of the sails too far away from the center of lateral resistance so that you may be forced to carry too little sail area to avoid excessive heeling moment. This can all be calculated relatively simply and should be foremost on your agenda as you get started. I would suggest designing a foiler a little longer and sailing in smoother conditions until you understand more about the boat you come up with.

I will try to give you some basic parameters that may help you. You have to decide on the hull configuration and it basically comes down to a catamaran or trimaran; I would suggest a tri about 1.2 times wider than it is long with amas (outside hulls) having a 16 to 18/1 beam to length ratio and a total buoyancy of about 75% of the all up weight of the boat. The main hull should, of course, support the whole boat without either ama in the water and have a beam to length ratio of about 12/1. Next you need to decide on foil type and configuration. The two main types of foil used on sailing hydrofoils are : 1)_"Bruce" (surface piercing) foils and, 2)-"T" foils. Bruce foils are generally used in a configuration of two forward on each side with a t-foil aft on the rudder or rudders. Bruce foils do not need an altitude control system since they are at an angle of approximately 45 degrees and are designed to rise up out of the water as the boat gains speed thereby reducing their wetted surface to a minimum and providing just the lift they need to. The problem is that they tend to ventilate (suck air and lose lift) easily, especially in waves. I would suggest using "t"-foils with a flap even though they are a little more complicated; they can be set up to provide a foil set that develops its own righting moment as it goes faster and they work real well on a model. The best way to learn about them is to go see a full-size RAVE hydrofoil and study how it is set up, especially the altitude control system.

Here are some facts based on our F3 that may help you: Configuration: two T-foils forward, one T-foil on the rudder. The forward foils are set up with approximately 2.5 degrees angle of incidence and are supported by vertical foils that develop lateral resistance; the vertical foils are located just forward of the center of buoyancy of the main hull such that the main foils support approx. 80% of the boat weight with the tail foil taking about 20 % (actually much less in practice since the rudder foil counteracts the pitching moment of the boat). The span of all three foils can be about 22.6% of the length of the boat, each. Flap area should be about 33% of foil area. We used a total foil area of 2.7% of sail area divided equally between all three foils. The rudder t-foil should be set at about 0 degrees angle of incidence. Weight should be referenced to sail area and you should have at least 196sq. inches of sail area per pound of displacement for winds between 0 and 7 mph with the ability to reduce sail as the wind picks up. The figures given here could produce a boat capable of taking off in a 5-6mph wind.

You might want to [contact Dr. Sam Bradfield](#) to ask permission to use brilliant and simple altitude control system for a one-off model; again the best way to learn about it is to see a full-size RAVE. Hope this gives you enough to start doing some serious planning: but remember the

more you learn the better off you'll be. Feel free to contact me by email, and and take a look at our foiler on our site at: www.micosail.com. -- Doug Lord (lorsail@webtv.net)

Need Source of R/C Receiver Plans

[1 Apr 01] Do you have or know where I can get hold of any RC receiver plans or circuits for my GCSE project? I have to build one rather than buy it. -- Chris Hawkins (chris@hawkinsbm.freemove.co.uk)

VS-8 Radio Controlled Model

[21 Feb 01] My name is Antoine Lenormand, I live in France. I will receive a VS-8 ready to run from 32nd Parallel that I bought to a person in USA. It will be the first time I get into this hobby... I have no idea of the sailing characteristics of hydrofoil boats. I contact you to ask some advice about it. -- Antoine Lenormand (hublen@club-internet.fr)

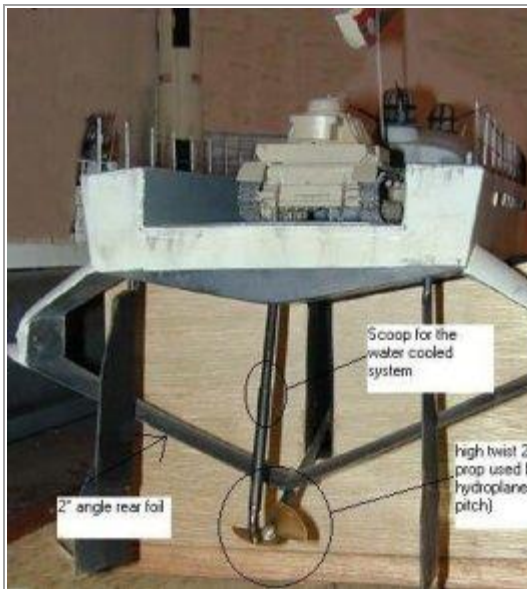
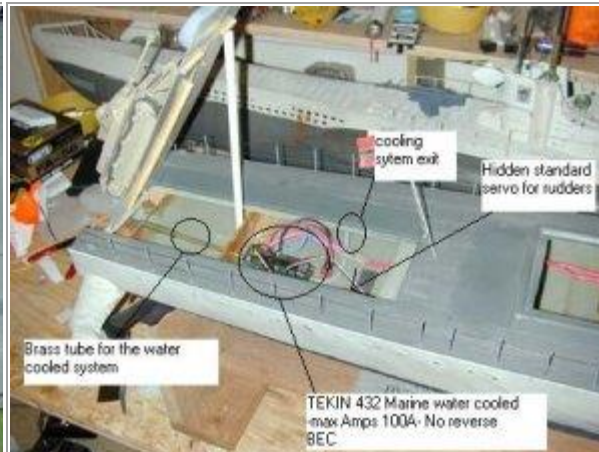
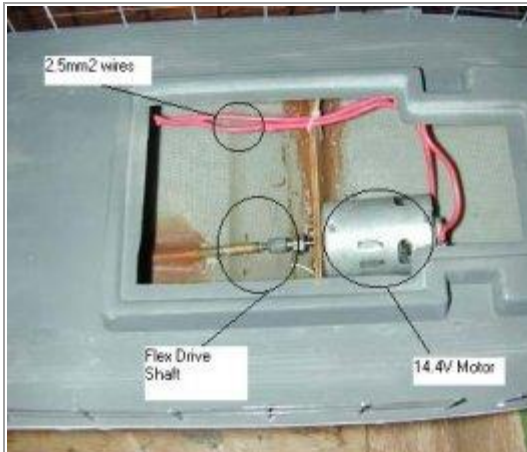
Response...

[21 Feb 01] Hello Antoine, and congratulations on your VS-8 purchase. Unfortunately I have had no previous correspondence on this model, except brief correspondence with the 32nd Parallel company itself. They may be your best source of information and advice. They had a webpage for this model at <http://www.32ndparallel.com/vs8.htm>, though it seems to have dropped off the web. We would like to receive your impressions and opinions on the VS-8 model in the future after you have had a chance to operate and become expert with this model... and don't forget to send a photo or two! -- Barney C. Black (Please use the [BBS](#) to reply)

Follow up...

[23 Feb 01, updated 11 Mar 01] I think 32nd Parallel Corp. will not answer any more.... This company had huge problems... the website is closed, maybe forever Below are two photos of the model... "at sea" and "in drydock!" The photos are not mine, they are by Mr. Anderson (the past owner of the model). Also there are 2 pics of the internal arrangement. Notice that it is a single prop model (the real VS-8 had 2 props.) The boat needs a lot of power to lift off. You must reduce the throttle to prevent the prop from coming out of the water and losing thrust. The motor draws 50A to get on the foils! The most important thing to get a model that can run a long time is to choose the right batteries... I decided to try 2 types of Ni Cad, 2000 and 2400 mAh. After an overnight charging, I plugged the 2400 mAh 8 cells in the ESC. The TEKIN 432 Marine is a speed boats "dedicated" ESC : no reverse, 100 A max Amps... I will change it to a Robbe Rokraft... After SC adjustment, I applied full throttle. Noisy boat! The prop shaft was vibrating and heating a lot, something was not normal... I dropped off the shaft and noticed that it was bent. No problem, I changed it and tried again. This time no vibrations, but the shaft was as hot as ever. But in the water the shaft will automatically be cooled... I calculated the maximum run time with this kind of batteries: no more than 10 minutes! I will try something else to improve that. To be continued... -- Antoine Lenormand (hublen@club-internet.fr)

VS-8 Radio Controlled Model



More on the Above VS-8 R/C Model

[30 Mar 01] Here is the next chapter of the hydrofoil review: First lake trials : First of all, woohhhh !!! Impressive boat ! It is amazing to see this gray boat flying above the surface, everyone at the lake was impressed. But there are some technical problems...the run time, very short, no more than 5 minutes with a full charged 8 cells 2400 mAh NiCad... I noticed 2 major

hydrodynamics problems : a loss of lift and "ventilation". Let me explain: It is a V shape hydrofoil so it is not the most stable configuration. I must immediately reduce the throttle when the boat is lifting on its foils, otherwise it will lose lift and fall brutally. The ventilation is a strange phenomena due to the cavitation under the rear foil : a bubble of "vacuum" is forming under it and the boat, again, stalls brutally! I really don't know, for the moment, how to do to fix these problems, but I keep looking for solutions. I will change the ESC and the motor, for a 2 motors and 2 screws configuration (it will improve the longitudinal stability). During the tests, its speed was impressive when the VS-8 was on its foils (2 times its speed when the hydro doesn't fly !!!) but because of the instability I only could manage to run it during periods of few seconds above the water (the longest period was 10 sec.) -- Antoine Lenormand (hublen@club-internet.fr)

Responses...

[30 Mar 01] Three possible solutions: (1) move the center of gravity forward, possibly by moving the battery pack, etc.; (2) do not try to operate the model at too high a flying height by limiting the speed; (3) add a servo-operated flap for adjusting the trim attitude. With a V foil, as the boat rises higher in the water, the foils become ever more heavily loaded as the same weight is supported by less area, and eventually they ventilate or stall. If the boat is allowed to pitch over to a smaller angle of attack at higher speeds, the flying height is lower and the foils are less heavily loaded. Also, as the boat rises, the submerged span of the V-foils reduces, which greatly increases the drag due to lift. The boat may actually go faster with more foil in the water because of this. -- Tom Speer (tspeer@tspeer.com) website: <http://www.tspeer.com>

[1 Apr 01] From my experience with the 1:20 scale RHS 140 model I fully agree with Tom Speer that you should try to experiment with shifting the centre of gravity of the boat forward if the bow foils rise too rapidly and flies too high after power is applied. Indeed, I also moved my battery pack forward as Tom suggested to you. On my model it is possible to adjust the angle of attack of the complete bow foil assembly and to a lesser extent the aft foil. This gives further options to experiment and find the best set-up for good foildborne running. From the photos of your model, I don't know if that is so easy for you to do. Although I found the inclusion of flaps as Tom suggested too complicated for my model, you could still achieve the same result by incorporating thin alloy trim tabs on the aft end of the bow foils which can then be bent up or down slightly by hand between trial runs of your model.

The ventilation on the aft foil of your model which you have described could be due to any number of reasons. My model was also prone to such problems. If the aft foil rises too high and near to the surface, the propellers would then suck in air and this would be immediately apparent with the motors racing and the water behind the model being churned up. I suspect the foils of my model have also ventilated from time to time as the low pressure on the top of the foil causes air to be sucked down from the water surface, particularly as these foils are surface piercing anyway. This in turn causes a sudden loss in lift and the model can plunge unexpectedly. My model is fitted with what are called 'fences' on the foils and rudders. These are also fitted to full size hydrofoils to avoid ventilation of the foils by blocking the path for air to be sucked down. I didn't think the model would require them but added them all the same so that they would look more realistic (the fences are also fitted to the full size RHS 140). You can see the series of

fences fitted to the twin rudders on my model if you look at the aft foil photo in the [Photo Gallery \(under model hydrofoils\)](#) on the IHS website. The fences are also fitted to the upper sides of the bow and stern foils though they are not clearly visible and some were missing when the photos were taken. The fences may help avoid ventilation but two fellow hydrofoil modelers and IHS members in Denmark, Soren Struntze and Hans Jorgen Hansen, have had perfectly running surface piercing hydrofoil models without requiring fences to be fitted.

My model also does not run for very long on its pair of 1700 - 1800 mAh NiCad batteries, unlike those of Soren and Hans which run faultlessly for a considerable length of time. My suggestion is that you experiment with different centre of gravity positions, foil set-ups and propellers types (try changes in pitch and diameter) until you achieve the best performance. You need to be patient with this and visit your local pond many times!

-- Martin Grimm (seaflite@alphalink.com.au)

PT-50 Model

[04 Mar 01] Just to let you know I have found a PT50 built and painted as per the box on the IHS website. I have not flown it yet but the chap who built it says, it is very fast - it has done a Barrel Roll due to having a new motor fitted. I have also found a German hydrofoil kit of a river police launch a little larger than the PT50 which I may build later. I will keep in touch after my first flight. In interest, the chap on your web with a PT50 states he has never heard of one called Condor. Actually, Condor Ferries ran no less than five of them! I have asked for some pictures for your files. -- John Leaver (leaverjohn@talk21.com)

Responses...

[4 Mar 01] I am curious about the German hydrofoil kit of a river police launch a little larger than the PT50. I wonder if it is just the size of the model which is larger (due to its scale) or whether it is a model of an actual hydrofoil larger than the PT50? I recall the Hessian Water Police in Germany operated three of the small Supramar PT3 hydrofoil launches on the Rhine. Details were provided in an article in *Hovering Craft and Hydrofoil*, Vol.2, No.4, January 1963, pp22-23. -- Martin Grimm (seaflite@alphalink.com.au)

[31 May 01] Hans Jorgen Hansen from Denmark was kind enough to provide a copy of "Hydrofoil PT-50" by Colin Gross, *Model Boats* magazine, Model & Allied Publications LTD, PO Box 35 Bridge ST, Hemel Hempstead, Herts, HP1 1EE, February 1981, Volume 31 No. 360, pp. 80-82. IHS has forwarded this to John Leaver. The article is informative about the experience of assembling the model, and it contains several suggestions for modifications, for example, "The most useful modification to improve the performance of the model is to replace the stiff spring coupling between the motor and the prop shaft.. Unfortunately, the usual Ripmax/Huco universal joints do not come in the correct size. However, if two type KC42 couplings are purchased, one may be opened out to fit the prop shaft, and the other to fit the motor. When joined by the couple converter, the new coupling can still be fitted to the model by pushing the motor forwards in its clamping brackets." According to the article, the manufacturer of the kit is

Sanko Seimitsu Co. Ltd, Japan. It was imported into England by Richard Kohnstam Ltd. The kit price in 1981 was £59.99 -- Barney C. Black (Please use the [BBS](#) to reply)

CURL CURL Model

[25 Feb 01, updated 27 Sep 02] Attached are some images of my 1:20 scale RHS 140 *CURL CURL* model. I have particularly included some photos of the foils looking from the underside of the model to give a better idea of the layout of typical surface piercing hydrofoils. Also, I have included a view inside the hull of the model showing the arrangement of the RC gear and pair of electric motors directly driving the propeller shafts. [Click Here](#) for more descriptive details and "Lessons Learned" from trials (99kb Adobe Acrobat file). The speed controllers are fairly simple two-stage forward and reverse units which are those used for cheap RC cars and buggies. Perhaps I will get this model finished one day!



The model is in fact scratch built based on a small general arrangement drawing that was published for the RHS 140 series as well as a variety of photographs I took of *CURL CURL* while that hydrofoil was still operational in Sydney in the late 1980s. Consequently, the model is not available in kit form. I had started to prepare a plan to 1:20 scale to work from but never finished that to the point that all the construction details were shown, rather, I just started to build the model from a number of separate part templates I prepared. It has always been my intention to finalize those plans so that others could also build a model from them. I also wrote up some notes on the construction and testing of the model. Unfortunately the notes were on a computer that is no longer running so may have to be re-written. The model is largely built of plywood and the foils are also wood with metal rods at the leading and trailing edges to reduce impact

damage. Other parts are fabricated from plastic or metal. The choice of materials for my model was mainly due to my lack of access to metalworking machinery. It operates on a 3-channel radio control set-up. One servo to control power to each motor / propeller and one servo for rudder control. It could be run on 2 channels without problems (no independent control of port and starboard shafts). I enjoy running the model but unfortunately that is fairly infrequent. It is somewhat of a crowd pleaser as hydrofoil models are fairly rare just as their full scale counterparts are in Australia. I last took my model out in August 2000 and unfortunately ran it aground. The damage was not major but I have been slow to repair the model. The model runs on two electric motors driven by a pair of 7.2V 1800mAh NiCad batteries. On a good day it runs foilborne very well but on other days it is stubborn! The main limitation is that I would probably not achieve much more than about 10 minutes of foilborne operation before the pair of batteries are running low. I have three sets of batteries to change over for that reason. The choice of electric or internal combustion motor for hydrofoil models is a hard one. Electric models are easy to start and run but have relatively limited endurance. IC engines solve the endurance problem and have plenty of power available but then you have to deal with issues such as engine cooling, oil, exhaust, noise, vibrations and difficult starting the engine(s). If you download the Dec 01 issue of the free on-line magazine 'Classic Fast Ferries' at <http://www.classicfastferries.com> you will be able to read about a nice, but also unfinished, scratch built scale model of a PT 50 powered by a chainsaw motor. That model is owned by Garry Fry in Sydney, Australia. There have been some hydrofoils manufactured as Radio Control model kits but I am unsure whether any of them are still in production. On the IHS website you can find examples such as a PT 50 kit manufactured in Japan many years ago and a German VS-8 military hydrofoil of WW2 released as a kit some years back but now no longer in production. It may be possible to obtain such a model by keeping an eye out for them on internet auction sites such as EBay. A final suggestion is that there was a German company that distributed plans to build a semi-scale model of the Supramar PT.20 hydrofoil that is similar but smaller than the RHS 140. That model is intended to be operated with a small IC engine similar to those used on RC model aircraft but water-cooled. The company is: Verlag fur Technik und Handwerk GmbH, and the model plans are: Bauplan MT-160.-- Martin Grimm (seaflyte@alphalink.com.au)

Jetfoil Model

[15 Feb 01] Back about 1980 I built a Boeing Jetfoil to a scale of 3/8 I think, any way it turned out about 35 inches long by about 12 inches wide. This was powered by a 61 glow plug motor and water jet, as per full size craft. The jet unit took some years to perfect in itself as there was none on the market at that time. I also played with gyros and various servos in an attempt to keep it upright, but with no luck, even using the direct control from the Tx to stabilize it, the whole thing was a bit too quick in its movements to control. However after various attempts at foil control stability (or not) the project was shelved after some 5 years. I still have 002 in its box. Your site has inspired me to have another go. If any one cares to contact me discuss it feel free. - Martin Seymour (qwerty74@netscapeonline.co.uk)

Response...

[15 Feb 01] IHS member Harry Larsen, who knows a lot more about the math of control systems than I, reckoned that his 4000lb *TALARIA III* would double its angle of roll in about 1/2 second.

If it got to 10 degrees of roll, the flaps couldn't hold it. Even though he was riding it and could feel its lean, he only once drove it without automatic roll control, and after 2 minutes he was exhausted. A 35 inch model will be impossible to control by hand. You will need a fast servo controlling the flaps. You can buy a solid state helicopter gyroscope and a tilt sensor from Analog devices, available from Maplins. I can program a microcontroller to join them together if you want. How were you controlling the ride height? -- Malin Dixon (gallery@foils.org)

[16 Feb 01] I was wondering if you have scaled your designs up to about a 15 to 16 passenger size. This would likely be 35 ft boat or so. I am considering building or buying such a boat for use on the US west coast. I would love to see a photo of your smaller one if you can. -- Robin (robin.christine@netzero.net)

PT-50 Model Kit Wanted

[13 Feb 01, updated 17 Feb 03] I am looking for a model PT50 hydrofoil. Can you tell me if you know of any for sale in any condition? - John Leaver (trev.32@bushinternet.com) [*This email address for John Leaver is no longer functional - Editor*]

Response...

[13 Feb 01, updated 17 Feb 03] I don't know of any model PT50 kits being sold today. We have two photos of such models in our Photo Gallery. One came from the Ebay auction site (www.ebay.com) when a person sold one of these kits. The other was sent in by an adult in the Netherlands who got his kit as a child, and does not remember the source. I expect that another of these kits will go up for sale on eBay, but it may be a long time. I have only seen one in nearly two years of watching this site. The only thing I can suggest is to find a store that sells models and ask if there is any kind of national database of discontinued kits that are available for sale. There may be some kind of a search service available similar to the one for old books. If there is such a service or database, I would like to know about it for the information of our members and visitors. One note of caution: If you get an offer to sell you a model in response to this posting, be wary about giving out credit card numbers or sending off a lot of money in response to email offers from individuals who do not operate an established internet business and are not located where you can physically see the model in a public place. In such a circumstance you could suggest to the seller that he list the item on eBay, and then use the payment escrow service offered on the eBay site to be sure you get your merchandise before the funds are released. - Barney C. Black (Please use the [BBS](#) to reply)

Modeling the DOLPHIN

[18 Jan 01] Did the *DOLPHIN* MK 11 hydrofoil ever go into commercial production. I started building a model in 1977 and have just pulled it out for completion/refurbishment. Do you have any source of information relating to any of these in service or was it just a prototype? -- Tony Morling (amorling@supanet.com)

Response...

[18 Jan 01] I am not familiar with the MK 11 designation, but if you are talking about the Grumman *DOLPHIN*, then here is a quick overview: The prototype was completed in 1966 and subsequently saw service in the Canary Islands off the coast of West Africa. After eleven months of troublesome operation due to design "bugs" and interruption of schedules due to difficult sea states, the operator Maritima Antares returned the vessel to Grumman. A second vessel of the class was consequently abandoned in the construction phase. *DOLPHIN* was then named *GULF STREAK* and operated by Bahamas Hydro Lines on a run between Miami FL in the USA and Freeport in the Bahama Islands. Again, frequent turbulent sea states made it difficult to keep a regular ferry service schedule. In 1969, *DOLPHIN* moved to the Virgin Islands, where it operated a seasonal ferry service between St. Thomas and St. Croix. In December 1970, the vessel was sold to the US Navy, which moved it to San Diego where it was partially cannibalized for equipment needed in other Navy hydrofoil development efforts. There is a good B&W photo of *GULF STREAK* in the 1969-70 edition of Jane's Surface Skimmer Systems, and there are line drawings of the vessel in the 1968-69 edition of the same. Another photo and the above text is [posted on our website](#). -- Barney C. Black (Please use the [BBS](#) to reply)

[16 Feb 01] I am a member of the International Hydrofoil Society and have recently read your posted message on the IHS website about the Dolphin Mk 11 hydrofoil model you are planning to complete. I thought I might have a clue as to where the Mk 11 designation you mentioned may have originated from: Grumman had in the mid 70's proposed to develop a *FLAGSTAFF* Mark 11 Patrol Hydrofoil which was to be a modernized and upgraded version of the PGH-1 *FLAGSTAFF*. The *FLAGSTAFF* patrol hydrofoil built in 1968 had many design similarities with the Dolphin passenger hydrofoil built two years earlier. The *FLAGSTAFF* Mk 11, which was also referred to as the *SUPER FLAGSTAFF*, was to have had a greater payload and range than the original *FLAGSTAFF*. According to Jane's Surface Skimmers 1974-75 the principal differences between the upgraded hydrofoil and its predecessor were to be a gas turbine of greater power output, an improved right-angle drive for the propeller shaft, and the use of larger foils and struts. This would have enabled the full load displacement to increase from 67.5 tons for the *FLAGSTAFF* to 83.5 tons for the Mk 11. Although Jane's '74-75 indicates that the development of the Dolphin class had been discontinued, it is just possible that the improved design features developed for the *FLAGSTAFF* Mk 11 prompted Grumman to resurrect plans for the commercial variant of the hydrofoil as a Dolphin Mk 11? The *FLAGSTAFF* Mk 11 was never built. For additional information and photos of the sole Dolphin that was completed, download the January 2001 issue of Classic Fast Ferries available at <http://classicfastferries.go.to>. Was the model you started building in '77 from a kit or did you construct it based on drawings that were available at the time? That may help to clarify where the Mk 11 designation originated from. In any case I would be interested to hear more about your model, as I am sure would other hydrofoil modelers. -- Martin Grimm (seaflyte@alphalink.com.au)

Model Building Techniques-- Scaling Lessons Learned...

[10 Dec 00] I of course try to design my models as close as possible to the state-of-the-art (full size) ORMA 60 trimaran yachts, but there are also some fundamental differences, mainly regarding building techniques and achievable weights. The basic relationships apply, as the physical laws are the same for 60ft - or 2M, 6ft, or 4ft models. The aim for the models is to get the models as close to the full size vessels as possible. For the relation of 60ft to 4ft, the scale is

15:1. Since ships are three-dimensional structures, you have to calculate: $15 \times 15 \times 15 : 1 = 3375 : 1$. So for overall dimensions like: length, width, height, the scale remains 15:1, but for the sail area it becomes $15 \times 15 : 1 = 225 : 1$ and for the structure and their weights it is 3375:1. Now if you look at the currently achieved weights of ORMA 60s, you'll find weights between 5.1 tons (or 5100 kg) and 6.6 tons (or 6600 kg). 5100 divided by 3375 is only 1.51 kg and this weight has never been achieved by a fully functional 4ft. scale model. Even if you take the high end of the ORMA 60 weight range (6600 kg) and divide it by 3375, you'll get only 1.95 kg; almost impossible to build/achieve. Actually achieved weights are between 2.25 and 3.0 kg. Now turn it the other way round: The R/C set of a 4ft trimaran including batteries and sail winch weighs about 0.33 kg. Multiplied by 3375 to scale up to full size, it would become 1113.75 kg or 1.1 tons... that is a weight of equipment for an ORMA 60 that is never reached in reality. Now you'll understand that our models cannot really be designed and built as real "scale" models to ORMA 60s. They need to be designed to their actually achievable weights. And if you miscalculate the volume of the hulls to about 0.2 to 0.3 kg to the actually achieved weight, your boat won't sail safely at all. Have a look below at the weights of the single (full size) components, then to the corresponding scale weights that would be ideal. Now take a look at the weights I have actually achieved, which are -- I believe -- the lowest weights ever achieved:

- *FONCIA*: Floats: 500 kg each; Crossbars: 500 kg each; Mainhull: 1000 kg; Mast: 750 kg
- *BANQUE POPULAIRE II*: (remember, this ship was destroyed in it's first race) Floats: 420 kg each; Crossbars: 460 kg each; Mainhull: not sure (800 to 900 kg); Mast: not sure (650 to 750 kg)
- *GROUPAMA*: (here I got most data, but I'm not sure how reliable they are) Floats: 400 kg each; Crossbars: 400 kg each; Mainhull: 800 kg; Mast: 650 kg; Centerboard: 150 kg; Forestay, shrouds, and hydraulics to tilt the mast: 400 kg each

For the 4ft models, the ideal weights therefore should be:

Floats: 0.12 to 0.15 kg each - achieved weights 0.25 kg (!) (each one is the achieved minimum!)

Crossbars: 0.12 to 0.15 kg each - achieved weights 0.15 kg

Mainhull: 0.24 to 0.30 kg ----- achieved weights 0.50 kg (!)

Mast: 0.19 to 0.22 kg ----- achieved weights 0.25 kg

Total: 0.91 to 1.12 kg ----- achieved weight 1.55 kg

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As you can see, these are only the main components. A lot of other parts relate in the same way: rudder, centerboard, centerboard trunk, boom(s), sails, forestay and shrouds and so on. The achieved weight that is most irritating to me is the weight of the crossbars! Although these parts are the most difficult ones to build, I almost achieved the ideal weight. So the (maybe strange

and maybe wrong) idea came up in my mind, these crossbars could be too weak. It would be bad if they bend too much, but even worse, if they break! But they SEEM to be strong and stiff enough (according to my tests) This then would mean all hull shells I had built so far although they are very light already - must still be far too heavy. That is one more reason, why I left the workshop alone for some time and went back to drawing and calculating again. Unfortunately, it also confused me quite a bit; and held me back from continuing the model itself. Fact is, not one R/C trimaran model-builder except me (neither for Mini40, Formula 48, 2M nor for any other size) has been willing so far to share the actually achieved weights of his own models with anybody else. The R/C multihull enthusiasts should be able to work together and help each other. So I will simply publish my own data from now on, and others can compare my modeling results to their own. I hope some good discussions will happen in the near future. I also will publish all data of my older and bigger models and also of my new (although I started to build it two years ago) 2M carbon trimaran soon. -- Ernst Zemann (petra.zemann@chello.at)

Modelbuilding Scaling Lessons Learned

[18 Jan 01] I have read the posted message of 10 Dec 00 by Ernst Zemann (above) and offer this reply, I know it is fairly lengthy! Ernst indicated that in his experience it is not practically possible to achieve a proper scaled weight for an ORMA 60 trimaran yacht model of 15:1 scale. While I have never built a sailing yacht model, I have in the past built RC model aircraft and an RC scale model of a hydrofoil passenger ferry. I thought it may be an interesting contrast with the ORMA 60 models to look at the achieved weights of those models compared to their full scale equivalents.

Looking first at a scale aircraft model. I have built a 1:6.75 scale de Havilland DH82 Tiger Moth bi-plane model from a kit. This model is powered by a .40 size two stroke internal combustion model aircraft engine. With a full tank of fuel and all radio control equipment fitted (4 channels with servos), the model weight is about 2.500 kg (the plans suggest anything in the range of 2.3 to 2.5 kg). By comparison, the maximum takeoff weight of the full scale DH82 is variously listed as being 803 to 827.8 kg which, when scaled down to 1:6.75, would correspond to 2.611 to 2.692 kg (up to 7.7% more than the actually achieved model weight). It should be noted that the Tiger Moth can carry two people at say 75 kg each and that would make up part of the full load weight of the aircraft. At model scale these two people would correspond to a total of 0.488 kg whereas my 'equivalent' of a pilot is the radio control equipment (quite old gear with a large battery and servos) which weighs around 0.550 kg. In any case, this example demonstrated it is possible to build a scale aircraft model to a weight less than the actual aircraft weight scaled down to model size using scaling laws. This seems surprising given that full scale aircraft are typically already lightly constructed. The model in question is quite solidly built, though the wings and fuselage consist largely of fabric covered balsa wood. The reason the model can be built to less weight than its 'scaled weight' is perhaps explained by strength considerations as discussed at the end of this message.

Turning now to my 1:20 scale model of a Rodriguez RHS 140 hydrofoil passenger ferry. The initial intention was to ensure that the model weight was correctly scaled and therefore that the model floated at the correct waterline. As the full scale vessel displaced 65 tons (or about 66 tonnes) fully loaded according to Jane's Surface Skimmers 1974/75 the corresponding model

weight could therefore be permitted to be up to 8.250 kg*. If it was less than this weight, then ballast (or preferably more batteries to give improved endurance) could be added to achieve the correct scale mass.

* Note: For model resistance testing, which is usually performed in fresh water towing tanks, the test results are usually extrapolated to the full-scale craft operating in salt water. For such tests the model should float at the correct waterline corresponding to the full-scale hydrofoil operating in salt water. As a consequence there is a slight correction that needs to be made to the model mass to account for the difference in water density between fresh water (~1000 kg/m³) and salt water (~1025 kg/m³). The 1:20 scale RHS 140 model would in that case be ballasted to: $66000/20^3/1.025 = 8.049$ kg.

During preliminary trials of the hydrofoil model before it was fully completed the performance was found to be somewhat sluggish at a weight of only 5.500 kg. This was considered to be due to the insufficient power available from the twin electric motors used to propel the model and also a less than optimum choice of propellers. I therefore accepted that the model weight should remain less than the properly scaled weight to maintain a reasonable foilborne performance. While the model has not been completed yet, the final weight is estimated to be 5.920 kg. A breakdown of this weight is as follows:

Component	grams	% of total
Hull	2440	41
Superstructure	645	11
Forward foils and cross beam	245	4
Aft foils	150	3
RC receiver, servos, RC batteries etc	550	9
1800 mAh NiCad batteries (2)	660	11
2x Motors and controllers	585	10
Deck fittings	250	4
Shafting, propellers, and couplings	150	3
Tubing for fenders etc.	75	1
Stainless steel hand railing	170	3
Total:	5920	100

This is only around 72% of the correct scaled weight so the model could in this case again be built to less than the scaled weight. There is at least one reason why such a light weight could be achieved. This is simply that the model does not have to contend with 140 scaled down passengers on board (that being the maximum capacity of the RHS 140). At full scale these would weigh around 10.5 tonnes while the correctly scaled passenger weight at model scale would still have amounted to 1.312 kg. Of course my model does not have dummy passengers nor does it have any interior outfit, all of which would have added weight to the model and brought it closer to the scaled weight. At the start of the project to build this model, I estimated I

had plenty of weight budget to spare and therefore I did not skimp on the hull construction material. The model is therefore quite solidly built from 2.5 mm plywood. The foils are solid wood construction with steel rod reinforcement at the leading and trailing edges. Once again, it can be seen that it is relatively straightforward to build a scale hydrofoil ferry model at a weight that is less than that of scaling down the corresponding full scale hydrofoil displacement. Fellow hydrofoil modellers in Denmark have built much lighter models than mine despite their being of a similar size. In one example, this has been achieved even though a high degree of detailed outfit has been included on the model. Some of these models are built of light alloy sheeting.

Ernst remarked with some satisfaction that he has managed to achieve the weight target on the crossbars of his ORMA 60 yacht model. This has reminded me of an interesting result I once stumbled across when it comes to scaling of strength between model and full scale craft, or for that matter from one size of hydrofoil to a larger geometrically identical one. It turns out that if an identical material is used and the construction of the structure (be that a foil or a cross bar) is also accurately scaled, the model will experience less stress than the larger scale equivalent for the same scale loading cases. I will use as an example the stress in two cantilevered beams being equivalent to one another except that they are at two different scales:

The smaller beam is solid aluminium alloy, say 6062-T6 grade with a yield strength of 110 MPa and Young's Modulus (E) of 70 GPa, and has a cross section of 10 mm x 10 mm and a cantilever of 1.0 m span. One end is rigidly fixed to a wall. On the other end of this horizontal beam a mass of 1 kg is suspended. The maximum stress in the beam develops at the wall end and can be calculated by applying a common engineering formula:

$$\text{Stress} = M \cdot y / I \text{ (Pascals)}$$

where:

M = the moment exerted in the beam at the wall end = mass x gravity x Span = 1.0 x 9.81 x 1.0 = 9.81 Nm.

y = the distance from the Neutral Axis of the beam cross section to its extreme fibres, which in this case is half the height of the beam or 5mm (0.005m) since the neutral axis lies at the centre of this symmetrical section beam.

I = the Moment of Inertia of the beam cross section. For a solid rectangular cross section this is given by: $b \cdot h^3 / 12$ where b is the base width and h is the height of the cross section of the beam. Hence $I = 0.01 \times 0.01^3 / 12 = 8.3333 \times 10^{-10} \text{ m}^4$.

Consequently, the stress in the beam is:

$$\text{Stress} = 9.81 \times 0.005 / 8.3333 \times 10^{-10} = 5.886 \times 10^7 \text{ Pa or } 58.86 \text{ MPa}$$

Now, if we double all the dimensions of the beam and cube the mass suspended from the beam (following the reasoning of mass scaling given by Ernst), the beam cross section is now 20mm x 20mm while the span is 2.0 m. Of course the weight suspended from the beam is now increased

by the dimension cubed, so it becomes $1 \text{ kg} \times 2 \times 2 \times 2 = 8 \text{ kg}$. Repeating the above calculation process for the larger beam and mass we now get the following stress in the larger cantilevered beam:

$$\text{Stress} = 156.96 \times 0.01 / (1.3333 \times 10^{-8}) = 1.1772 \times 10^8 \text{ Pa or } 117.72 \text{ MPa}$$

So it can be seen that the stress level has doubled rather than remaining constant as may at first have been expected. The example is such that while the smaller scale beam is still well below the yield stress, the larger scale beam has exceeded the yield stress for the same alloy. Taking this result the other way, the structure of a model in some instances can be built to less than the geometric equivalent thickness if the same material is used, or alternatively, a weaker material can be selected. A good example of this is the pair of foils on my 1:20 scale RHS 140 model. While the foils supporting the 65 ton full scale RHS 140 are constructed of hollow welded steel, the scaled foils for the 5.5 kg model are instead constructed mainly of solid wood. These foils have been demonstrated to be sufficiently strong even when the model has been tested by towing it in rough head seas when the model was ballasted to its correct scale weight of 8.25 kg. If the full scale hydrofoil had employed solid wood foils rather than steel foils, they would surely break on the first attempt to lift out of the water when becoming foilborne!

Returning to the example of the two cantilevered beams, it is also worth looking at how the deflections at the tips of these two beams compare to one another when the mass is applied. The formula for the tip deflection of a cantilevered beam with a load applied at the tip is:

$$\text{Deflection} = F.L^2/(2.E.I)$$

where:

F = The force applied due to the load, ie $1 \times 9.81 = 9.81 \text{ N}$ for the smaller beam case.

L = The beam length or span = 1 m for the smaller case.

E = Youngs Modulus for the beam material = $70 \times 10^9 \text{ Pa}$ or 70 GPa.

I = Section modulus of the beam as defined previously

Now, for the smaller beam, we have a deflection of:

$$\text{Deflection} = F.L^2/(2.E.I) = 9.81 \times 1.0^2 / (2 \times 70 \times 10^9 \times 8.3333 \times 10^{-10}) = 0.084 \text{ m} = 84 \text{ mm}$$

Likewise, for the larger scale beam the deflection is 168 mm or twice as much as the smaller beam. So, just as with the stress level, the deflections increase in proportion to the scale. It must however be appreciated that allowable deflections for engineering design purposes are usually related to the size of the structure itself. In this example it can be seen that the deflections remain in the same proportion as the dimensions of the structure so are not a bigger problem at larger scale than at the smaller scale. -- Martin Grimm (seafite@alphalink.com.au)

Update on PHM Model

[8 Sep 00] We are currently trying to research the water jets. However my engineer is currently building a kit plane and his free time for other projects has disappeared. Our hope is to continue this project as time permits. Meantime we are all focused on other projects, models and work. Thanks for the message I will forward it to our crew -- Aimee Eng (umi_ryuzuki@hotmail.com)

Hydrofoils, Inc. Discontinues R/C Model Product Line

[27 Jun 00] I have tried to contact Hydrofoils, Inc. They are mentioned on your site as manufacturer of a very interesting R/C electric hydrofoil. Unfortunately I heard from someone that they don't deal with and don't build the R/C models anymore. Do you still have any contacts to this company? Do you know if there is any of these models in stock anywhere, maybe a last surplus at Hydrofoils Inc.? Can you please help me in solving this puzzle? -- Thomas Lange (tomlange@ukonline.co.uk)

Response...

[23 Jun 00] We are not selling models anymore, and are currently concentrating only on the ferry industry. Our current business focus is on larger, high-speed marine transportation industry as indicated by the 100-kt ferry on the front of [our web site home page](#). We no longer have the models, smaller hydrofoils, parts, or plans in production. We will advise you should we reenter that market. -- Ken Cook, Hydrofoils, Inc. (kencook@hydrofoil.com)

Radio Controlled Model Kit Wanted **Found!**

[4 Jul 00] I have been looking for a radio controlled hydrofoil kit for some time, without luck - are you aware of any available? -- Nick James (ncjames@lineone.net)

Response...

[4 Jul 00, Updated 26 Feb 01] I suggest you contact the IHS photo archivist [Malin Dixon](#) because he is [personally involved in motor-powered R/C](#) model hydrofoil boats. There are only two R/C kits I know of personally; one was offered by Hydrofoils, Inc., but they have recently discontinued their model hydrofoils to concentrate on full size ferry vessels. The other is a historical reproduction of the German VS-8... from 32nd Parallel, whose website at <http://www.32ndparallel.com/vs8.htm> seems to have dropped off the net recently. There are some R/C kits, discontinued now, that can still be obtained... Shockwave, PT-50, Super Comet, etc. From time to time one of these will show up for sale on the [Ebay auction site](#). There are photos in the [IHS photo gallery](#). There have been articles with plans in modeling magazines such as Marine Modeling Monthly (Traplet Publications UK) about building hydrofoil R/C boats, see Graham Taylor's [RAPIER](#) and [MKI](#) as two examples. I have presumed that you want a motor powered boat. If it is a sailboat you want, take a look at the [750mm site in Australia](#). Hopefully this info is of help to you. If you encounter any other hydrofoil model products or websites in your search, please let me know about them so I can cover them on our site. -- Barney C. Black (Please use the [BBS](#) to reply)

[26 Feb 03] I thought I'd write just to let you know that after 22 years of searching (and 3 years since posting my original email on IHS) I have finally managed to find a Super Comet PT50 model. I was approached by email in response to my posting here, and I took a risk - after 22 years I thought it was worth it, and the model arrived today. It was found in a model shop in Italy, and it looks as though all of the parts are there including the assembly instructions and decals. I'll post some pictures when completed - hopefully in a month or so. Thanks for your help in finding the model.

[2 Jun 03] Thought I'd just send you a picture of the completed Condor 1. The kit has been great fun to put together and was very well engineered despite the age of it. Trials have been extremely successful with the boat going straight up on its foils and even turning without coming off - a problem which I believe these models suffered from. I think the modern equipment I've used has helped - the motor is more efficient as is the electronic speed controller - and the weight has been reduced as well. -- Nick James (ncjames2@cwgsy.net)



750mm Radio-Controlled (R/C Model Sailing) Yacht Web Site

[3 Jun 00] Please check out [our site](#) for possible inclusion on your links page? We have been using inverted T-foils on our rudders for years to prevent nose diving. -- Malcolm Smith, Secretary, 750mm R.C. Yacht Assoc. (mal@cybernavitics.com.au)

Response...

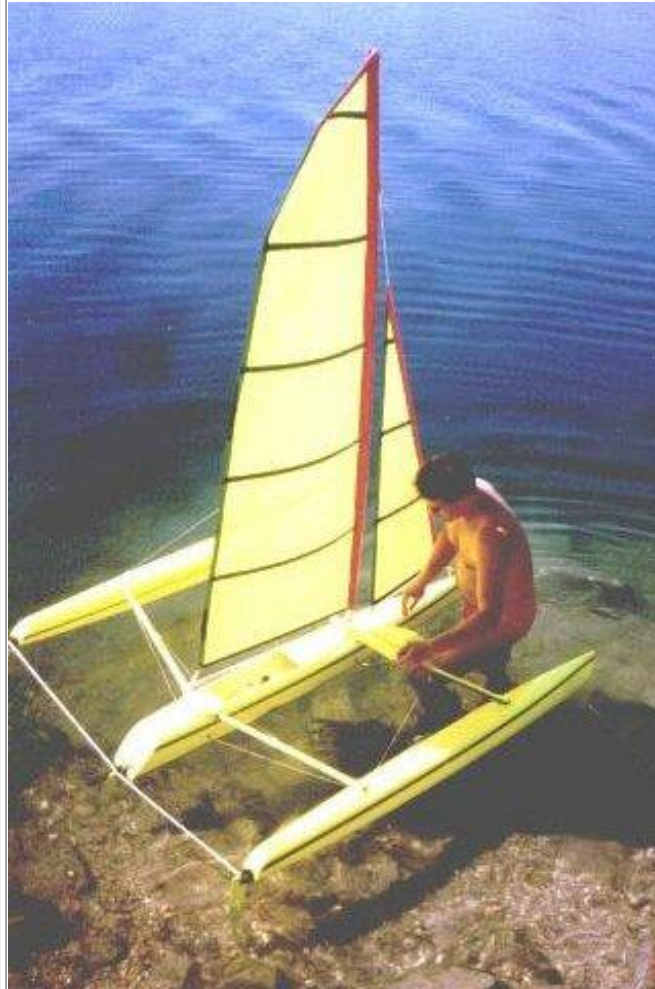
[3 Jun 00] We have added a link to your interesting site as requested and are especially interested in the [sub-page on future developments for fully hydrofoil-supported variants](#).

Source of Model Testing

[18 Feb 00] I thought, it could be of interest for you, that there is a lot of model-building and -testing going on here at Vienna/Austria, though it's far away from the main boatbuilding places! - If anybody has a new design and wants to test a small version, before he starts the REAL one, feel free to contact me; - don't forget, a model of 2 meters is only 1/125 expense of a real 10 Meter Yacht. I'm building these models on request, but also to have a comparison to the speed and performance of the outrigger boats (proas - models and big ones up to 33 ft this far) I'm building. In spring I will start to build a NEW, bigger, faster and lighter Proa - so if you are interested, please reply to me. It's a cold and lonely place right now here at Austria for a boatbuilder. -- Ernst Zemann (ernstzemann@hotmail.com) website: (<http://www.multihull.de/zeman/>). *[The webpage is no longer operative. Instead try <http://community.webshots.com/user/boatbuilder> - Editor]*

Response...

[18 Feb 00] Thanks for your proposal, but I have the same service in France... One of biggest model building company in the world and an hydro laboratory are offered to me a free service using engineer students to realize it... All my passed boats have been model tested... It's a good way to get some information on réalité of the VPP. If you request some information on proas, don't hesitate to ask to me. -- Guy Delage (guydelage@guydelage.fr)



Source of PT-20 Model Kits

[1 Mar 00, updated 10 Dec 00] I have a German model magazine where I can order a blue print, parts list, and description how to build a model PT-20 Tragflächenboot (hydrofoil) for about US\$15.00. The model is 1:25 scale, 83 cm long, 30cm broad. Also some hovercraft model plans (SRN-1 US\$15.00 and Bell SK 5 US\$25.00 in French), warships, towing, sailships, airplanes, and even engines... more than 2000 different plans! For who is interested I can scan the list of models. Here are the addresses for ordering the plans:

Phone: 07221-508722; Fax: 07221508733;
E-mail: vth-service@t-online.de; Address
:Verlag für technik und handelswerk GmbH,
Bestellservice, D-76526 Baden-Baden,
Germany

That is their head office. One can also order plans in Holland: Phone :0031-294-450460;
Fax: 0031-294-452782; E-mail:
muiderk@euronet.nl; Address :De
muiderkring BV, Postbus 313, NL-1380 AH
Weesp. They both accept: Eurocard,
Mastercard, Access, and Visacard. -- Mark
van Rijzen (dutchhydrofoils@wanadoo.nl)



Hydrofoils For R/C Model Sailing Catamaran

[21 Jan 00, updated 5 Feb 01] I was hoping to add hydrofoils to my new 2m sailing boat. It seems its much more complicated than I thought. I am worried about stability. The model is six foot long with out riggers six foot wide with a mast of about nine feet. The hulls are about eight inches wide. So its very wide for its length and weight. I am worried that the foils will just make it skim on top of the water. Is it just trial and error to get the angles at the proper angle? Its like I just entered a different world, there is so much to know, but it looks fun. Please look at the web site, they are the fastest model sail boats on earth, without hydrofoils. R/C Sailing - <http://home.attbi.com/~radiosailing/2m/> -- Jerry H. Grigg (griggair@netscape.net); Fax: USA (916) 721-1417

Response...

[21 Jan 00] You will need a height control system and a roll control system if you are to have fully submerged hydrofoils. It is no good to just fix the angles; you need to reduce the angle of attack of the front foils as the boat lifts to its correct flying height. A simple skate has been used to control the front foil angle for ride height control in [TALARIA III](#), a converted Bayliner, and on Trampofails, a human powered hydrofoil, and several others. A skate runs on the water in front of the hydrofoil, and this is attached to the front foil so that the height of the skate alters the angle of the front foil. This controls the height of the front, and the back follows the front in height control, just as the front follows the skate. The roll control is more difficult. In [TALARIA III](#) an electronic control system was used to control flaps on the rear foils to stop it falling sideways, and on the Trampofail it was up to the rider to move up to the high side if it started to roll. The wide wing, low speed and the undivided attention of the rider on the Trampofail made this possible. A skate on each side has been used, as in *HALOBATES* (see www.foils.org/gallery/) for the pictures, but the skates tend to get very large if you are trying to control the angle of larger rear foils. You can't get the amplification affect of the ride height control with a fixed rear foil, which relies on the rear foil having a larger angle of attack when it is deeper, which is true if the front is held at a fixed height. In a sailing boat, there is a large roll torque from the sail, so you want to run with much more lift on the lee side, and probably down force on the windward side, although that can be a bit dangerous, because if you lift a foil out of the water there is no downforce and you capsize. Anyhow you need to alter the angles or flaps of the main foils to counteract the torque from the sails. This will have to respond too quickly to do by hand. Our model used a "heading hold" gyroscope, with a trim input from an accelerometer that measured the tilt. The gyroscope was mounted with its axis fore - aft, as it was holding that axis steady, while it was designed to be used in a model helicopter with its axis up - down, preventing spins. There was a fast servo connected to the output of the gyroscope, and that altered the angle of attack of the foil tips, one up and one down, like ailerons on a plane. Many sailing hydrofoils use V-foils, often mounted far from the center of the boat to give roll stability. As the boat rolls, the down side has more wing in the water, so more lift. They need to be very wide but they don't need a control system. Email me if you have any more questions. -- Malin Dixon (gallery@foils.org)

To Build a PHM Model

[29 May 99] I have been researching the possibility of constructing a scale model of the Boeing *PEGASUS* hydrofoil. I have some line drawings from *Floating Drydock*. Some of the things I haven't been able to find is good documentation of the hull form, I am looking for hull stations/frame plans. And the stowed configuration of the foils. If any of this information is available to the public, I would like to obtain some scale line drawings showing this data. If you have an Index of the available information pertaining to these boats and their schematics I would like to browse that file and possibly request other data and drawings. I have included photos of two other model ships I have built. Both are 1/72nd scale. The larger being 6'-6" +/- long. Both are classified as is classified as "combat model warships". The Romani class light cruiser is armed with four semi-automatic 7/32nd ball bearing guns. They operate off a 12 oz CO2 tank firing two cubic inches of air per volley. Only the number one and four turrets are armed. If the ship takes damage during a competition there are two water activated bilge pumps just forward and aft of midship. The ship is powered by a 6volt 7-10amp battery and two pitman 24v motors. It will run a scale 41kts and the running time is somewhere around....all day. The controls system

is a 7channel "ACE Nautical Commander." I believe I am up to the challenge of designing a working 3 point hydrodynamic lift vehicle. Any information that you could forward to me would be greatly appreciated. -- Aimee Eng (umi_ryuzuki@hotmail.com)

More...

[29 May 99] Over the last two years there has been a boat on the Columbia River in Portland Oregon that looks like one of the PHM or PHC class hydrofoils; it has the single stack behind the superstructure. I haven't been able to determine who owns it. As of today I'm not sure if it is still there. I realize that the 3pt fully submerged foils present a control problem but I believe that the RC helicopter gyroscopes should be able to help compensate this difficult configuration. I doubt however that I will be able to feed air over the foil and that foil control may have to be done via ailerons. I feel that the most difficult piece of modeling the phm series is the power plant. The Canadian *BRAS d'OR* at least had propellers, if I remember correctly. It also had the simpler V-foil configuration. Leave it to me to pick a difficult challenge. This is probably why I have yet to actually begin construction. Not to mention the lack of Hull data. -- Aimee Eng (umi_ryuzuki@hotmail.com)

Response...

[30 May 99] We have been making a [model submerged foil hydrofoil](#), and I suggest that there are three important things to consider if you want a model to actually lift.

1. *Lift*. The foil lift is the dynamic pressure times the foil area times the lift coefficient. The dynamic pressure is half the density of water times the velocity squared. The lift coefficient is up to about 1 and depends on the angle of attack but 1 is a reasonable maximum. If you use metric units of m/s, kg/m³ etc there are no conversion factors.
2. *Thrust*. You need to overcome hull drag up to the point where the boat lifts. The hull drag is usually much larger than the foil drag, and is approximately proportional to boat weight. The hull drag goes up very rapidly with boat speed, up to planing speed, but that is often about lift speed. If I remember correctly, the PHMs were water jet driven, and water jets will scale very badly, especially at the much lower take-off speeds of a model.
3. *Control*. I can send you the circuits that we are using, that are designed to work with model radio servos, if you want. Hydrofoils are unstable in ride height and roll, so you need to control both. It is impossible to do so by hand, because the boat will fall over too fast for you to react in time. Neither control has any input from the radio receiver.

For the ride height you need to be able to change the front foil lift from maximum to zero in about 200 ms, even if the back of the boat is changing height as well. We have a 60 ms FET servo (about \$100) controlled by a capacitive height sensor. The sensor is a rigid insulated wire parallel to a strut. The capacitance to ground is dependent on how much is submerged, or the ride height. This is modified by a vertical accelerometer, to prevent the boat jumping out of the water as it reaches take off speed. We need slow control and fast control. Slow control holds the height

correct but fast control keeps the vertical speed low at take-off or over waves. For roll control, the servo must be able to increase the lift on one side and reduce on the other enough to hold about a 20° roll. It also has to be fast. We have a heading-hold gyroscope from a model helicopter, with its sensitive axis along the boat, and the gyroscope input comes from a lateral accelerometer. Again this is slow and fast control. Slow control keeps the boat from rolling and fast control keeps the roll speed low. -- Malin Dixon (gallery@foils.org)

Response...

[21 Jun 99] The level sensor that we are using on our RC model hydrofoil is not a finished product that is for sale. I can advise you, but I cannot tell you what will definitely work. The sensor is a capacitive sensor. The wire is insulated, and the capacitance to the water depends on the rod diameter, the immersed length, the thickness of the insulation and the dielectric constant of the insulation. The dielectric constant of water has an effect but it is so much larger than the dielectric constant of the insulation is what matters. We have used this to control the angle of the front wing to give ride height control, but on its own it is not enough. It is fine for slow height changes, but fast height changes are a problem. The problems are that the angle of the front wing changes as the rear of the boat lifts, and that the boat can achieve a significant upwards speed while still too low. We have modified the signal from the height sensor with a vertical speed signal derived from an accelerometer. The gains from the height and the vertical speed are separately adjustable, and feed a fast servo motor that controls the angle of the front wing. The system needs to be fast, because the height is unstable and it only takes fractions of a second to achieve a big vertical speed. A model of a PHM will need roll control as well. -- Malin Dixon (gallery@foils.org)

Response...

[15 Jun 99] It appears that you are looking at two different hydrofoil ships. First off, the *PLAINVIEW* (AGEH-1) was stored in the mud flats of Astoria for many years. It has an exhaust on the back end of the superstructure. This ship is now moored a few miles upriver, and is owned by a church. The church accepted it as a donation. The ship moored in Astoria now is the *HIGH POINT* (PCH-1). The owner, Capt. Ronald Fraser's estate is attempting to sell it. Capt. Fraser's sister in California is the executor, and his nephew Will is the ship's caretaker. I personally have not met or talked to Will, but I understand he is willing to show the ship to interested parties. He has very little background on the ship and its present restoration status. *HIGH POINT* was moved from Portland to Astoria about a year ago to conserve cost of moorage. *HIGH POINT* has its turbine exhausts on the stern, one on each side and an outdrive in the center of the stern for hullborne operations. If you have any particular questions, I will try to get you the answers. -- Sumi Arima (arimas1@juno.com)

PT 50 Scale Model Hydrofoil

[16 Sep 99] I'm looking for info about the [scale model hydrofoil PT-50](#), that I have seen on your photo gallery. I'm rebuilding a PT-50 that I got for free when I was 16 years old and knew nothing about hydrofoils. He had built the model to 60% of completion and never got it foilborne. He didn't have any information or the original box, only the (incomplete) model. I

have never got it foilborne either. I'm now 26 and captain on a Voskhod that is in use in Holland by Fast Flying Ferries. If you (or somebody else) have some information about the PT-50 model, please help. I also want to be a member of the IHS. -- Mark van Rijzen
(dutchhydrofoils@wanadoo.nl)

Response...

[16 Sep 99] I was delighted to hear from a working hydrofoil captain, and to receive your photos. Of course we want you to participate as a valued member of the IHS. Information about how to join can be found on the [IHS website](#). If you have any questions after reading the information on that page, I will be glad to answer them for you. We have no info about the radio controlled scale model that appears in our photo gallery... this photo is from the EBay auction site; I never actually saw the kit. As for the real thing, the best source of details would be an old copy of *Jane's Surface Skimmers -- Hydrofoils and Hovercraft*. This may be available at a library locally. PT-50 was a 63-ton passenger hydrofoil ferry designed by Supramar for offshore and inter-island services. The prototype was completed early in 1958. By 1973 there were more than thirty operating regular passenger services in areas ranging from the Baltic and Mediterranean to the Japanese Inland Sea. We have only one photo on our website, located at <http://www.foils.org/gallery/Patane.jpg>. Your scale model is named *CONDOR 5*. I believe that the *CONDOR* series was built by Hitachi Zosen and operated by Setonakai Kisen. I believe that some of the Condors are in operation today, but I do not know about the *CONDOR 5* specifically. -- Barney C. Black (Please use the [BBS](#) to reply)

Follow up message...

[16 Oct 99] I was glad to receive a e-mail of the IHS, and one from Malin Dixon (he put my picture on the IHS website photo gallery). I discovered some information about the Condor Ferries and the PT-50. [Condor Ferries](#) still exist, but they have no more hydrofoils. They have pictures of the fleet on their website. The website of Rodriquez Cantieri Navali has photos; they built 20 PT-50s, but none of them was built for Condor. They built only three Condor vessels: Condor 4 an RHS 140 delivered in 1974; Condor 5 an RHS 160 delivered in 1976; and Condor 7 an RHS 160F delivered in 1985. Although there was no PT-50 built as Condor 5, I named my model PT-50 "Condor 5" because at that time I had one picture and one postcard of a hydrofoil... Right! the Condor 5, which I now know is an RHS 160, not a PT-50. -- Mark van Rijzen
(dutchhydrofoils@wanadoo.nl)

RC Hydrofoil With Automatic Control System (ACS)

[19 Sep 98] We have managed to get a model radio controlled hydrofoil working. I think that it is the smallest fully submerged hydrofoil ever, but that's only because I've never heard of a smaller one. Here is a brief description, and the website is: www.foils.org/gallery/model.htm. The boat took a long time to develop. What we ended up with was something like this. This is from memory, so there might be small errors. Motor and drive: Model car motor, about 11 turns, driven from 8 C-cell NiCd batteries and electronic speed controller. 6:1 gearbox and 55 mm pitch propellor, 32 mm diameter. Gives about skeg thrust when stationary. Hull is from a model planing craft, but the total weight is now 3.8 kg. Wings are made from the front wing of a

[Trampofoil](#) A1 cut into several pieces. Span is about 250 mm and chord about 60 mm both ends. Take off speed is about 1.5m/s. Top speed is much faster, but we haven't measured it yet. Controls: Standard radio control gear controls motor power and rudder. Rudder is on trailing edge of front strut and is not very responsive. Turning radius is several meters. All that is the easy part. Here is the difficult part: The boat is unstable in height and roll, so control systems have been fitted for both of those. Height: Capacitive level sensor fitted in front of front strut measures ride height and controls angle of attack of the whole front wing. High speed servo motor (100 ms) is used. There is no driver input. We still have some problems. What we think is happening is that as the rear takes off, this causes the front angle of attack to fall, and the height control system is too slow or has too little gain to stop the front falling. When the front is low, it starts to rise, but when the front is low, the rear is pointing down (it has a fixed angle to the boat), so the rear falls just as the front rises, and the cycle starts again. Roll: The rear wing is in 3 parts, separated by the rear struts. The middle part is fixed, and the two outer parts, about 70 mm of span each side, move in opposition for foil control. A pendulum angle sensor is used for slow roll control, with a gyroscope for fast roll control. These control a fast servo motor which moves the outer wing parts. There is also an input from the rudder, to alter the angle as a turn is started. This seems to work well, but there were a lot of bits to get working. The boat is not very difficult to drive. Without the control systems it would be impossible. The battery life is about 5 minutes. -- Malin Dixon (gallery@foils.org)

Tethered Hydrofoil Project Remembered Partially

[22 Mar 98] When I was a kid (I'm 32 now) I remember flipping through a pile of Popular .* mags and found an article on building an .049 sized tethered hydrofoil. There was mention of RC, so I'm guessing it was circa early 70s. Any info greatly appreciated as hard searches have yielded nothing. -- g. (DSprock@aol.com)

Response...

[23 Mar 98] If you manage to locate a comprehensive index of Popular Mechanics articles going way back, whether by looking in your main library or contacting the magazine, I would like to know about it. I get a lot of inquiries about old articles in the magazine and would like to know where to send the inquirers to find an answer. I wish Popular Mechanics would do as National Geographic has recently done and put all their back issues onto a CD-ROM collection. You might want to visit IHS member Ken Cook's website at web page: <http://www.hydrofoil.com>. His company offers several radio controlled racing hydrofoil models. If you decide you want one of his kits, it would pay you to join IHS before buying, as he offers a good discount to IHS members! Finally, if you know the specific magazine and date of issue that you want, you can search for it on the internet auction sites, particularly [Ebay](#). -- Barney C. Black (Please use the [BBS](#) to reply)

Update to Previous Response...

[2 Sep 00] Note that Hydrofoils, Inc. is no longer manufacturing or supporting R/C Models. They are devoting their efforts to design and sale of full-size vessels. Suggest you visit [our links page](#) for several sources of hydrofoil models. - Barney C. Black (Please use the [BBS](#) to reply)

Hydroplane Model Sought

[20 Mar 98] Do you have any information which would be helpful for building a 24" model of a hydroplane for racing purposes? I've been racing hydroplanes in competition for several years, and hold several records, but the yearn for speed has me looking to foils. -- Andy Kunz (montana@pop.fast.net)

Wants to Add Foils to Victor Products Kit

[16 Oct 97] I am interested in obtaining any technical drawings or pictures, that might aid me in the design and installation of hydrofoils on my Victor Model Products "Wildcat" Radio Controlled Catamaran. Any suggestions as to which type of foil (ladder or single) to use would be greatly appreciated. I would like to start this project soon, so I can test the boat in the early spring. -- Tracy L. St. Phillips (Laser13021@aol.com)

This Page Prepared and Maintained By...

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