The NEWSLETTER

International Hydrofoil Society

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FOIL ASSISTED TOWING SYSTEM CAN BENEFIT THE NAVY'S LITTORAL CAPABILITY

By Mary Zoccola

[Reprinted with permission from *WAVELENGTHS* (November 2000) Naval Surface Warfare Center, Carderock Division]

An improvement in delivering cargo could revolutionize littoral warfare and generate cost savings for the Navy. The Foil Assisted Towing System permits the close-coupled towing of craft or other payloads using partial hydrofoil support. The new concept borrows ideas from trucks and hydrofoils. Conceptually, the towing method is analogous to a highway tractor-trailer rig, which is supported on the front by the transom of the towing craft. A hydrofoil supports the aft end of the trailer. The program's goal is to build a scale model FATS and demonstrate it successfully in a real operational environment. Combatant Craft Department (CCD) personnel who worked on the project were John Almeter, Jason Marshall, and Dennis Bushey; they have applied for a patent.

Background

Towing has a long and profitable history in marine and land transportation. Worldwide, tugs tow a wide variety of barges in various manners. Current trends in marine transport are toward greater transport speeds for certain high value cargo. Naval ar-

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WHERE ARE YOU IN CYBERSPACE?!

IHS relies on electronic communication with the membership to improve timeliness and reduce mailing costs. If you are a member with email, **let us know your email address!** Thank you.

2001 DUES ARE DUE

IHS Membership is still only US$20 per calendar year (US$2.50 for students). Your renewal or new membership is critical. Please remit 2001 dues as soon as possible. We regret that high bank fees make it impractical for IHS to accept payment by credit card or a check drawn on a non-US bank, or by other than US funds. Overseas members with no easy way to send US funds, are advised to send money order to IHS or US Dollars cash.

INSIDE THIS ISSUE

PRESIDENT'S COLUMN

During the last several monthly Board of Directors (BoD) meetings it was suggested that the major points of discussion be summarized and shared with the IHS membership. Toward this end, I have attempted to do this here.

Program activities plans include having Charles Edwards, President of CargoLifter, Inc. speak on his company's development of lighter-than-air cargo lift vehicles at the 8 March Joint Dinner Meeting. The next Joint Meeting (June, second week) will be the responsibility of IHS. Mark Hoggard, of the NSWCCD, is the leading candidate to speak at this meeting. The 50-foot VSV (Very Slender Vessel) that Mark's group is testing would be the principle subject addressed. The test craft at Norfolk, Virginia is capable of 50-60 knots, with a significant payload. Mark Bebar has subsequently firmed up plans for a speaker during the second week of June.

On the subject of the initiative to place AMV documents "ON LINE", (see article by Ken Spaulding in the Winter IHS NL, page 5) it was agreed to proceed with the development of a reference list on the IHS web site. Ken Spaulding agreed to assemble an all hydrofoil inclusive list from several sources for review by Board members and other key IHS members before posting on the web site. Reviewers will be asked to add items to, or delete items from, this list adding comments where appropriate. When available, abstracts from the Advanced Ship Data Bank (ASDB) at the NSWCCD will also be added. A priority/category system will be proposed. It is expected that the resulting list will include at least 300 references. This new list will be an open posting on the web site available to all web site visitors (actual document access would be only to IHS members). List users will be asked to add comments, and/or new references, and to indicate their interest in obtaining actual documents.

Scanning of AMV documents to a CDROM will continue. The initial CDROM will have at least 40 to 50 documents (mostly related to hydrofoils). The method by which this CDROM will be made available to IHS members has yet to be determined. It will be our intention to make the CDROM available to all members at minimum cost.

At the January BoD meeting, under the New Opportunities agenda item, Bill Hockberger summarized highlights of the January Transportation Research Board (TRB) meetings held in Washington, DC. Bill is a member of this group, specifically, the Ferry Committee. He has found their annual meetings to be most productive with respect to current US fast ferry activities Clearly there are significant expansions of ferry service underway in many parts of the US. Bill mentioned operations in New York and Long Island Sound, San Francisco and Vancouver. After 2003, marine engines will not be exempted from IMO compliance (clean fuel will be required). See article on this subject by Bill Hockberger on Page 8.

John R. Meyer, President

WELCOME NEW MEMBERS

Eugene P. Clement - I am interested in hydrofoils from the point of view of utilizing an adjustable hydrofoil at the stem of a stepped planing boat, for stability and control of the running trim angle. Recently Tom Lang very kindly provided me with the numbers of his patents, and also those of Gordon Baker. Patents such as those provide valuable and easily-accessible technical information. It seems to me that the IHS could provide an additional valuable service by including a listing of patents like those of Lang and Baker - including the title, date, and the name of the inventor. I hope this may prove to be a practical suggestion.

Jose Alberto Rosas Rodriguez - Jose is from Panama. He is a student in Naval Architecture at the Escuela de Ingenieria Naval, Universidad Austral de Chile.

Ernst T. Tschoepke - Ernst is German, spent many years in Berlin, but currently is living in Sri Lanka part of the year. In 1970 he joined Lufthansa and took over international responsibility for advertising, design and corporate communication. In 1987 he took an early retirement which turned out to be an excellent move since he spends the winters and some times some of the summer in his house in Sri Lanka. His idea is to run a ferry service with hydrofoils in Sri Lanka. Roads are much more congested and travel time from Colombo to the South takes up to six hours for a mere 120 km. Ernst hopes to interest local in-

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chitects are approaching this emerging requirement in many ways. Traditionally, towing is done at modest speeds, under 10 knots. Low speeds are adequate for low-price, bulk cargo such as iron ore, but are often inadequate for perishable and finished goods. Towing goes beyond just "cargo." Boats and equipment are often towed behind larger craft when it is impractical to stow the boat/equipment or when the larger craft lacks means to unload or load the boat/equipment. Transportation or other requirements may constrain the dimensions of a ship, which can make towing essential, a common condition for military craft. To be done, high-speed towing has to be technically feasible and economical. Control, resistance, and loads are major technical issues. The economics include initial procurement, maintenance, fuel and manning costs.

Description and Operation

A FATS could be used for towing small equipment and cargo. The towed item is semi-rigidly attached to the towing craft at the stern in a manner similar to that of a tractor-trailer rig. The transom of the towing craft supports a small percentage of the weight of the towed craft. When being towed at high speed, a hydrofoil supports the majority of the towed weight. At slower speeds, hydrostatic forces support the towed craft. Large high-speed craft can use this concept to tow boats, equipment, cargo, and fuel bladders. However, when using this approach it is questionable whether it would ever be practical to tow thousands of tons of cargo. Specific requirements would determine applicability.

Since it can have extremely low resistance when on foil, the hydrofoil is an attractive option. The low resistance translates to smaller horsepower requirements and fuel consumption. Various problems have prevented the hydrofoils from being more widely used. For example, control and stability are major problems. Propelling a hydrofoil can be extremely difficult. In practice, the hydrofoil's simple concept presents a challenge in actual working environments. [Ed Note: Hydrofoil control and stability issues have been addressed using automatic control systems which have become small, lighter, more reliable and less costly using modern electronics. Propulsion is more complex than conventioal boats, but many solutions exist and are successful.]

Conventional hydrofoil problems are often avoided by using a hybrid craft that is part hydrofoil, part some other craft type. Examples: Techno-Superliner, Super Shuttle 400, and Foilcat 2900. Hybrid hydrofoils, such as Russian Turya and Matka class of craft are a mix of semi-planing hull and a hydrofoil. The bottom of the craft itself supports the aft end of the craft. A hydrofoil supports the forward end. These craft have a displacement of 250 tons. This approach allows a conventional inboard propeller propulsion.

Some could argue that the FATS is a hybrid hydrofoil system. The bottom of the towed craft supports the forward end. A hydrofoil supports the back end. However, FATS is different because hydrofoils have not been towed before by a conventional monohull. *[Ed Note: Author means "not generally" towed. PHMs and other hydrofoils have been towed in connection with sea trials.]* This application is unique because previous hybrid hydrofoils were in one craft, not the tractor-trailer rig-like arrangement of FATS. The connection to the towed craft provides stability and control. Because of the towing, complex propulsion systems associated with true hydrofoils are avoided. Spray from the aft foil and associated strut(s) is distributed largely aft of the towed craft. CCD was working on several efforts carrying boats and larger boats for Naval Special Warfare and U.S. Special Operations Command (USSOCOM).

Advantages and New Features

By providing a new method of delivering cargo, proving this concept could revolutionize the Navy's view of littoral warfare. Size of a ship and horsepower required could also be reduced, providing a great life cycle cost savings to the Navy. In theory, the FATS could be generic enough to be towed by multiple Navy assets making asset management simpler. Currently, NSWCCD is looking at several different programs for transporting various Special Operations Forces Craft aboard larger craft. To provide Navy Seals a cheaper and easier method of getting to an operational site, the transport, launch and recovery of an Swimmer Delivery Vehicle (SDV) from a Patrol Coastal or MK V SOC are being examined. Also being investigated are the transport, launch and recovery of a Rigid Inflatable Boat or Desert Patrol Vehicle (DPV) on board. The FATS concept could provide a single solution to all these design issues. DoD could greatly benefit from this enhanced capability. It is conceptually possible for large, transatlantic cargo lines to use it to increase delivery times.

TRADE-OFF NEEDED BETWEEN TABS AND INTERCEPTORS

(Excerpts - Speed at Sea. Dec 2000)

In 1998, Maritime Dynamics Inc. (MDI) conducted a series of model tests to compare and characterize the performance of trim tabs and interceptors. The company says that model tests were necessary because there was no full-scale data which compared trim tab and interceptor performance on the same hull. The tests were conducted by towing a 7m monohull model fixed in six degrees-of-freedom and measuring the pressure distribution, lift force, hull drag, and pitch moment generated by deployment of the two control surfaces.

Trim tabs have been used to optimize the running trim of displacement, semi-planing, and planing vessels for many years. MDI says that it pioneered the use of these devices in 1991 as force producers to actively control the motions of monohulls and catamarans. Well over 100 MDI ride control systems incorporating trim tabs have been commissioned on fast ferries.

The primary advantage of trim tabs cited by MDI is that they can produce larger forces for ride control than interceptors. However the company points out that trim tabs are more difficult to integrate, add weight to the vessel, and require significant power for operation. Interceptors can be easily integrated with most transom configurations, are light, and require less power for operation.

MDI highlights the fact that both control surfaces in the model tests had identical spans, as this dimension largely determines the amount of lift generated by each device. In most ride control installations incorporating trim tabs, or interceptors, the span has to be maximized within the constraints imposed by the transom arrangement to obtain heavy weather operating conditions.

Bottom pressures measured near the trim tabs and interceptors were distinctly different, MDI says. Bottom pressures generated by interceptors peak at the interceptor and are distributed on the hull plating ahead of the interceptor as shown in Fig 1. [Ed Note: Interceptors have been described in IHS Nls Spring and Summer 2000.]

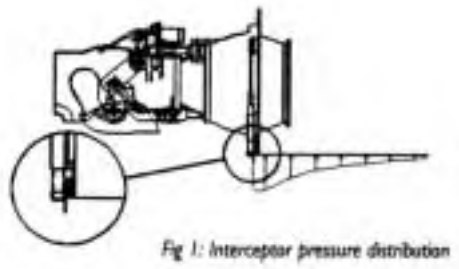

Fig 1: Interceptor pressure distribution

Pressures generated by tabs peak just aft of the hinge, and are distributed over the tab and hull plating ahead of the tab as shown in Fig 2.

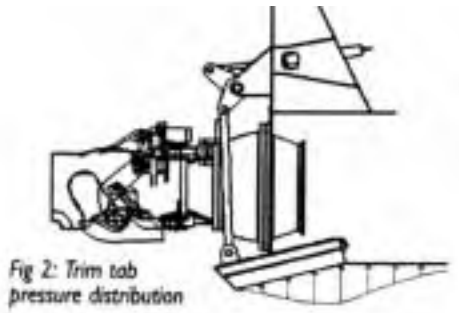

Fig 2: Trim tab pressure distribution

MDI points out that the reduction in trim with tab and interceptor deployment are nearly identical up to 55 per cent deployment. At larger deployments, the trim tabs continue to reduce the trim angle in a linear fashion while the interceptors lose their effectiveness. The tabs provided approximately 66 per cent more lift at maximum deployment.

MDI says that these free-model results are consistent with fixed-model measurements of incremental lift and drag from the two devices. These show that the lift-to-drag ratio of the devices is essentially the same, though the tabs are capable of producing larger forces at maximum deployment.

Although both control surfaces in the model tests had identical spans, it may be possible to use a larger span for interceptors depending on the aft hull lines, and at least partially offset their lower force capability, MDI says. On the other hand, tabs can be arranged to extend beyond the transom, thereby increasing their area, and increasing the total waterline length of the hull. Another aspect of the trade-off between tabs and interceptors highlighted by MDI is their potential interaction with the waterjet thrust vectoring and reversing that provides the excellent maneuverability of many ferry designs in harbor.

To get the maximum control forces available from waterjets, it is essential that the hull shape and ride control effectors do not interfere with the reverse thrust efflux at any steering angle. By using tabs that are hinged forward of the transom, they can be retracted into a hull recess, thereby allowing the operator to take full advantage of all the control power available from the waterjets. In addition to the quasi-static lift forces discussed above, MDI says that trim tabs are known to produce dynamic forces because the tab has mass, and there is an added mass of water that is dis-

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INTERCEPTORS AND TABS

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placed by dynamic operation of the trim tab. These mass terms produce dynamic lift forces due to Interceptor acceleration of the tab and associated water during active ride control. Measurements of actuator cylinder pressures during full scale trials with tabs suggest that this dynamic force can be momentarily as large as the static force during periods of large tab motions.

MDI suggests that hull resistance will be the same at optimum trim, regardless of whether the vessel is fitted with tabs or interceptors. However, if maximizing the performance of a ride control system is the objective, then trim tabs can generate significantly larger roll and pitch moments than interceptors. While not having the maximum lift of tabs for ride control, interceptors have advantages in reduced fabrication, operation and maintenance costs due to their simplicity of design and reduced hydraulic power requirements, according to MDI.

RETRACTABLE T-FOIL OFFERS SPEED BENEFIT

(From Speed at Sea, December 2000)

Incat's 96m Evolution 10 wavepiercing catamaran *Milenium* (hull 056) featured the first of a new retractable T-foil design, which is also fitted to Incat's following delivery, the 98m Evolution 1013 wavepiercer *The Lynx*. Developed jointly by MDI and Incat, the 8.75M2 retractable T-Foil stows clear of the water in the center bow when not in use. Lowered, it performs the same functions as the two 4M2 T-foils mounted under earlier wavepiercers' port and starboard sidehulls near the bow.

As the retractable T-Foil is clear of the water during calm water operation, no speed loss is experienced and fuel savings can be gained. The system is fitted with hydraulic dampers that absorb energy and allow the foil to pivot upwards in the event of hitting a floating object.

Previous T-foils were exposed to damage or loss from submerged objects and required the vessel to be drydocked for installation or servicing. The retractable T-foil reduces maintenance and operational problems as it can be serviced while the vessel is afloat, and all mechanical and hydraulic components are above the waterline.

Design and fabrication of the foil was carried out by MDI. The foil selected for Evolution 10 catamarans has a shape that is designed to allow cavitation-free operation well into the 45-knot speed range, and features MDI's standard trailing edge flaps and inverted-T foil design.

HUMPHREE INTERCEPTORS PROVEN IN SERVICE

(From Speed at Sea, December 2000)

Corsica Ferries has recently completed its second season with LA.ME's Humphree Systems interceptors, which were retrofitted to three Rodriquez Aquastrada monohulls last year *(Speed at Sea,* December 1999). LA.ME reports that speed gain and steering control benefits have been maintained, and the systems have had no problems.

The Italian company says that contracts for both steering and ride control interceptor systems are underway with several major owners/builders, and also orders for yachts and naval craft.

A Humphree interceptor-based ride control system is being delivered for an Italian owner's 22m yacht, which is capable of speeds of over 50 knots. This is to replace an existing system, and features four interceptors for trim/roll/heave control, and two interceptors for high speed steering. Sea trials are scheduled for March.

TUCUMCARI

By Sumi Arima, IHS Member

I noticed an inquiry on the IHS web page as to the location of the Tucumcari. After the Tucumcari was put on the reef, it was transported to David Taylor Naval Ship Research and Development Center, Annapolis Division (Across the water from the U S Naval Academy). The ship was stripped of many of the major equipment and the remaining hull was used to study fire fighting techniques for aluminum ships. Some of the lessons learned were the use of various plastic and fiberglass pipes, which ones held up, which ones melted, and which ones were toxic. This led to establishing specifications which are used in many of the current Navy ships. Also studied were the effectiveness of various fire extinguishing materials such as CO2, Halon, and foam.

PHM MODEL WINS PRIZE

IHS congratulates Dean Leary, of Statesville NC, for his award-winning model of the hydrofoil missile ship USS PEGASUS (PHM-1). This model took the Gold Medal in Division I Class B: Scratchbuilt Powered Ship's category of the 2000 Scale Ship Model Competition sponsored by The Mariners' Museum, Newport News VA.

Scratchbuilt models are those employing no manufactured items except cordage, chain, and fastenings such as pins and nails. Such materials as dimensioned lumber, sheet metal, tubing, wire, and milled shapes are allowed as raw materials. Photo-etched, laser-cut, cast, or similar parts mechanically or chemically duplicated by others from the entrant's original master or pattern shall be considered as scratchbuilt.

To recognize and encourage excellence in the art of building scale ship models, The Mariners' Museum holds an international competition and exhibition every five years.

The competition is open to completed models built to scale by individual modelmakers, professional or amateur, of all ages. Known by many as the "Olympics" of ship model building, this fascinating competition attracts models from every seafaring corner of the world.

Nationally recognized ship model authorities, selected by The Mariners' Museum, judged the competition and chose the winning models. The winning ship models were displayed in the Museum's Collections Gallery through Oct 2000. For more information about the Mariners' Museum, visit the website at www.mariner.org

PHMs STILL AROUND

By Dean L. Leary

I want to thank IHS once again for your interest in my model of the Pegasus Hydrofoil and to let you know I came upon four of these ships quite by accident. My wife and I were visiting the Confederate submarine *Hunley* at the Charleston Naval Base, Charleston, South Carolina. As we were driving to the site, I noticed several very familiar ships docked near the *Hunley* site. I was very excited to find four of the hydrofoils! They had been mothballed and over-painted on the upper surfaces so, as a consequence, no names or numbers were visible.

The foils were on the pier next to the ships. In addition, a good many deck features had been removed, It was somewhat sad to see such wonderful ships looking so abandoned.

I was very excited to find these ships. As a model builder, they were quite interesting to me since I had never viewed a hydrofoil up close! One of the ships had been rather severely damaged on the port bow from what, appears to have been a collision with another ship. I don't know if this information is of any use to members of the IHS. As you probably know, the Charleston Naval Base has been closed for several years, but there appears to be some commercial shipping business there.

HYDROFOIL CRAFT - DOLPHIN

(Extracted from an Ancient Flyer)

The speed and maneuverability of the Dolphin species is proverbial. Hardly any other creature of the sea is comparable. They master the elements and are able to adapt themselves to any situation with movements as swift and sure as an arrow.

The Dolphin species was the model for the development of a new type of Hydrofoil craft, conceived on the drawing board, under the project name of DOLPHIN, by the Grumman

Aircraft Engineering Corporation, New York, the American partners of Blohm and Voss. Within the framework of this partnership the final design and actual construction was carried out at Blohm and Voss, in close cooperation with engineers from Grumman Aircraft, and the first craft built was given the name *CORSARIO NEGRO*.

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DOLPHIN
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The *CORSARIO NEGRO* differs in many major characteristics from the conventional type of Hydrofoil craft already operating in great numbers on seaways and rivers. The Hydrofoils of this particular craft are completely submerged, this means they are completely below the surface of the water at all times, and must therefore be automatically stabilised by an auto-pilot. For this reason the *CORSARIO NEGRO* can maintain its top speed of 50 knots, even at an average wave height of 1.80 m. The passengers of course will hardly be aware of this seaway. The autopilot ensures that the craft skims smoothly over the water, without inconvenient rolling and pitching motions.

The *CORSARIO NEGRO* is the first seagoing Hydrofoil craft for passenger service. When foilborne the craft is powered by a gas turbine rated at 3.500 HP, which drives a supercavitated variable pitch propeller via a newly developed Z-gearing system.

The gas-turbine was selected because of its extremely favorable performance/weight ratio, a diesel engine with the same rating would weigh four times as much even under the most favorable circumstances. The drive via a Z-gearing and variable pitch propeller was selected because, on the conventional power transfer systems used up to now, with oblique shafts and conventional propellers, serious problems had been met and considerable cavitation damage had occurred. In spite of the vast number of technical innovations and the completely submerged Hydrofoils the *CORSARIO NEGRO* is in every respect a very safe craft. This measure of safety has been achieved through a number of design characteristics. These include: the auto-stabilizer system, which in case of a possible failure can also be operated manually: the designed strength of the hull body and the struts, based on every conceivable type of stress imaginable: and the second drive system which is completely independent of the gas-turbine.

Should the gas-turbine fail the craft can continue to operate as a displacement vessel by means of two auxiliary diesel engines.

With all the technical innovations the passengers' comfort has not been neglected. Already mentioned is the smooth ride, irrespective of the roughness of the sea. The fully air-conditioned passenger accommodation is furnished with comfortable upholstered seats. The effective sound-proofing absorbs the noise of the engines.

From January 1965, up to completion, the engineers from Grumman worked together with Blohm and Voss engineers on the *CORSARIO NEGRO*, whereby the cooperation exceeded by far the normal relationship between customer and building yard. Only in this way was it possible to overcome this completely new phase of advanced technology, with its problems of high pressure hydraulics, light aluminum construction, the new turbine and drive technique and the stabilizing electronics - and all this in a very short space of time! This collaboration proved that technical advance is by no means restricted by any frontiers. So it came to be that this efficient craft was created from the basic American conception and the shipyard experience of Blohm and Voss. In partnership the Garret Corporation, Los Angeles, take care of the worldwide sales.

That the idea of travel on Hydrofoil is not just a technical whim, but a real commercial proposition, is proven by the fact that the *CORSARIO NEGRO* has already been sold to a Spanish Shipping Company, who intend to introduce it into passenger service in the Canary Islands. A calculation of the earning capacity has shown that such a Hydrofoil craft can profitably be introduced on many routes such as rivers, coastal and Island services etc. The cost per passenger/kilometer is, it is true, higher than the comparative cost on conventional ferries but far less than the costs of air travel. To be borne in mind in this connection is that the traveling time between two points for both aircraft and Hydrofoil craft is in many instances the same. Remember, the aircraft is restricted to the use of airfields whereas the Hydrofoil can use practically any landing place.

With the building of this craft the Blohm and Voss shipyard has, in many respects, entered into a new era of technology, and again made a considerable contribution in the field of special service ship construction.

WELCOME NEW MEMBERS
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vestors and agencies in Germany to support this project.

Raymond Vellinga - Ray is from La Jolla, California. His background is Naval Aviation and aerodynamics. In 1968-69 he built a two-place hydrofoil having a fully submerged foil aft and surface-piercing forward, with a 45 hp outboard. His latest project is a human powered hydrofoil.

TRB 2001 ANNUAL MEETING

By William Hockberger, IHS Member

The Transportation Research Board (TRB) meeting was held in Washington in mid-January, as usual, with some 9,000 attendees. Most of TRB's activities concern highways and bridges and tunnels and the technologies that support them, but the overall level of activity is so huge that the relatively small parts devoted to rail, air and marine are still of considerable magnitude (marine being the smallest). This year there were 461 different technical sessions, generally 1 3/4 hours each with several papers or panel discussions. Each of the TRB's roughly 250 standing committees and subcommittees on different aspects of transportation also met at some point during the four days.

Many sessions on topics ostensibly for rail, air, bus or truck interests are actually very applicable to ship or ferry interests as well, so there are many more sessions a marine person would find worth attending than is indicated by those explicitly designated as marine subjects. For example, the design of a bus terminal differs little from that of a railway station or marine terminal, or even an airport in many respects. There are common elements in analyzing the economic and social impacts of transportation of all types, or planning their development or operation.

This year there was one day that provided marine sessions from 8:00 a.m. that morning until the Committee on Ferry Transportation wrapped up its meeting at 10:00 p.m. Here are overviews of several of those sessions.

National Ferry Database

The Volpe Center of the Department of Transportation (in Cambridge, MA) has updated its ferry database and will make it available shortly at no charge. It can be obtained from Mr. Bob Armstrong (mail to: armstrong@volpe.dot.gov), who made the presentation. (MS Access is required to use it.) The database includes 224 ferry operators in 43 states and territories of the U.S., operating on 352 ferry routes having 487 separate segments, with 578 ferry terminal locations. They operate 677 vessels, of which 66 have speeds of 25 knots or greater, and they recorded about 120 million boardings last year. The disk provides a map and all routes for each operator, details on all of its ferries, and data on its operating results. It shows the magnitude of the U.S. ferry industry and the opportunity that exists for new services, and it is an excellent source for someone interested in establishing a new fast ferry service.

Commercial Ferries Between New Jersey and New York City

Don Liloia, of New York Waterway, described the continuing expansion of ferry services on the Hudson River into New York. Commercial ferries on the Hudson carry 30,000 passengers a day today, and that is expected to grow to 40,000 within the next few years. New York Waterway alone now operates 23 vessels and 100 buses. Last May they began operating their first three Allen Marine 149 passenger catamarans (27 knots) and now have five, with a sixth expected in April. These boats are faster than the older ones and are extremely popular. (I've ridden one and talked with the passengers and crew about them.) The company is planning to add several more service points and boats over the next couple of years. A few other companies are doing well in the area and expanding, too.

Port Authority of NY/NJ Ferry Expansion Planning

Tom Hannan, of the Port Authority, essentially described the shore-side counterpart to the ferry expansion occurring on the Hudson River. He showed a number of locations and described what changes they would be making to provide terminals, access and parking for ferry riders. A couple of new routes would actually be from northerly New York points into the City, paralleling the western shore of Manhattan. He showed plans for new terminals, mainly featuring bow-on loading, which avoids having to tie up and enables faster turnaround. Many ferry proponents know little about the essential shore elements of a ferry system, especially in a highly developed area where making changes can be highly problematic. This was an eye-opening presentation.

Intermodal Concepts in Ferry Terminals

Martha (Reardon) Bewick gave a presentation on features of ferry systems that make them convenient and pleasing to their riders, illustrated by slides she has taken around the world. She noted that many consider waterways to be barriers to transportation, whereas they can be seen as addi-

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Interested in hydrofoil history, pioneers, photographs? Visit the history and photo gallery pages of the IHS website. http://www.foils.org.

TRB
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tional opportunities for transportation of an interesting kind. Though mainly addressing the interactions among transportation modes at terminals, she also made these interesting points: The 6,000-passenger ferries operated by Staten Island Ferries into Manhattan can turn around in eight minutes. (She refers to them as floating HOV lanes, since they carry a significant number of cars while entirely eliminating many other cars from the roads.) The two 400-passenger SeaBus ferries in Vancouver carry 15,000 passengers a day, operate with 99.9 percent reliability, and can load or unload in 1 1/2 minutes.

Expanding Ferry Services on San Francisco Bay

A program has been initiated to add as many as 40 new terminals and anywhere from 70 to 120 new 350-passenger 35-knot (nominally) ferries on the Bay. A 12 million dollar planning effort by the new Regional Water Transit Authority is ongoing now. If carried through, this will drive an enormous expansion in ferry designing, building and operating in this country. The speaker, who is General Manager and CEO of the Golden Gate Bridge, Highway and Transit District, also talked about integrating ferries into multi-modal terminal facilities, about smart cards for integrating them with other area transportation systems, and about the environmental issues that have been raised regarding fast ferries. A subsequent speaker described the analysis to determine the best vehicle for moving people between downtown San Francisco and the airport, whic pointed to an ACV, the AP-1-88-400.

The Wave-Eating Ferry

Charles Robinson presented the design and operational prototype of his "wave-eating" craft, which he developed for use on the canals of Venice. The M-hull, as he calls it, is basically a monohull but with side panels that extend down below the water on each side to intercept the bow waves. His claim is that the panels cause the waves to roll up and get ducted beneath the hull, actually increasing lift on the hull and reducing its required power at the same time as the wake/wash problem is nearly eliminated. A 30,000 pound 20-knot prototype has been built and shipped to Venice, where it is operating. Robinson showed the craft's speed-power curve and explained why he believes the design will be capable of 70-90 knot speeds with extremely low power. However, his explanation was not sufficiently scientific and solid to provide real support for that belief. The web site www.mangiaonda.com, shows a number of concepts.

RADIO-CONTROLLED HYDROFOIL MODELS

[Editor's Note: Hans Jorgen Hansen, IHS Member in Denmark, recently provided a brief description and pictures of his radio-controlled hydrofoil models. I have attempted to portray the results of some of his work here.]

Hans has been designing and experimenting with radio-controlled hydrofoil models for several years. One of his models is a plastic model that he obtained from a friend. It is 41 cm long and weighs 900 grams and is powered by an electric motor from a hair dryer (I imagine a small one) and 10 AA-size bateries. It can run for 1/2 hour at 8 knots.

The larger model is a 1/25th scale model of a "PT-150", having a length of 152 cm and weighing 11.5 Kg. The boat's name is "Carton Ondule" (French). The hull is made of glass fiber carbon reinforced polyester. After trying combustion motors for propulsion, Hans resorted to electric power consisting of two "540 Gold" motors

from Tamiya. Batteries were 7.2 volts, 1.5 amp using four pairs. Boat speed was 8 knots and ran for 50 minutes.

Just last year, Hans installed more powerful motors and the model attained a speed of 15 knots for 30 minutes.

The propellers, 42.5 mm diameter and medium pitch, are made by "Graupier". The are driven by a tooth belt. Motor control is a "Tekin" regulator which he received as a birthday gift from his 2 sons several years ago. A blower provides cooling of the controller and motor.

We congratulate Hans for this work, his report and pictures.

SAILOR'S PAGE

World Sailing Speed Record

By Martin Grimm, IHS Member

[Correction to Part I of this article in the Winter 2000 NL: Crossbow II was a catamaran with a side-by-side sail arrangement, thereby different from the original Crossbow which was a proa layout with a conventional main and jib.]

[This is Part 2 of an article with the same title that appeared on this Page of the Winter 2000-2001 Issue]

Sailboarders Steal the Show

In the early Speedweek events, it was considered that *Crossbow* was at an advantage in attaining the outright sailing speed records because of her relatively large size. That belief was later challenged when sailboards began to dominate in holding the absolute sail speed records.

By 1983, the speed records in three of the five classes of sailboat were held by hydrofoils, *Mayfly* at 23 knots in the A Class, *Icarus* at 24.5 knots in the B Class and *nf*^{2} (Neither Fish Nor Fowl) in the C Class. Only in the Unlimited Class did *Crossbow II*, a catamaran hold the record at 36 knots while at the other end of the scale, Jaap van der Rest had attained a speed of 24.6 knots in the 10 sq.m Class using a sailboard. Jaap demonstrated that it was possible for a sailboard to be faster than most of the other classes despite their greater sail area!

A sailboarder by the name of Pascal Maka finally wrestled the outright sailing speed record off *Crossbow II* in 1986 when he achieved a speed of 38.86 knots at Sotavento.

The absolute sail speed record was incrementally increased by sailboards until finally in August 1993 Thierry Bielak achieved a speed record of 45.34 knots on his 35cm wide modified sailboard in 40-knot winds at Camargue in France in the shallow man-made canal. That record still stands for sailboards but in absolute terms has now been exceeded by the *Yellow Pages Endeavour.*

Trifoiler Longshot

The January 1991 issue of Popular Science describes the trimaran hydrofoil craft (or trifoiler) named *Longshot* that was designed by engineer Greg Ketterman and built with his brother Dan. This craft carried a biplane sailboard type rig, one attached to each outrigger hull. The foils consisted of two curved surface piercing elements attached to each of the outriggers and an inverted T foil doubling as a rudder at the stern of the centre hull. The angle of attack of the bow foils is controlled by surface sensors attached to the outriggers which in turn twist the cross beam attaching the outriggers to the centre hull thus changing the bow foil incidence.

The 201-pound *Longshot* gained the world sail speed record in the A Class at 37.18 knots on Stafford Lake in Lethbridge, Alberta while piloted by Russell Long. This was also the world record for sailboats with 100 square foot sail area or more. Ketterman believed it should be possible to exceed 50 mph (43.45 knots) when sailing *Longshot* in strong steady winds and indeed on the Internet it is suggested that *Longshot* achieved a top speed of 43.59 knots (~50.2 mph).

Yellow Pages Endeavour

The current absolute world sailing speed record is held by *Yellow Pages Endeavour.* This craft achieved a speed of 46.52 knots over a 500 metre timed run on 26 October 1993 at Westernport Bay near Melbourne, Australia. Unlike the sailboard records that were achieved in strong winds, this new record was set in winds of 19.5 knots giving some indication of the efficiency of the design. The crew consisted of helmsman Simon McKeon and sail trimmer Tim Daddo. The *Yellow Pages Endeavour (YPE)* had thus finally broken the

(*Courtesy of Peter Robinson, 1993)*

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domination that sailboards had on the speed sailing scene for most of the previous decade.

The craft was designed in 1992 by Lindsay Cunningham, a retired Telecom engineer, and was built by him with the help of friends. Lindsay Cunningham is perhaps more well known as the designer of the successful Australian challenger and subsequent defending boats for the International Catamaran Challenge Trophy, also known as the 'Little America's Cup'.

The 12m craft consists of three lightweight planing hulls connected together by a tripod configuration of braced streamlined struts. When at speed, the downwind pair of hulls are planing while the two-man crew in the third gondola which is facing to windward fly several feet above the water. The 12m high wing attached to the centre of the tripod structure. The craft is fitted with a number of foils however these are intended for steering and course stability rather than to lift the craft from the water. The craft was designed to reach maximum speed when tracking at 115 to 120 degrees off the wind. Because of its asymmetric layout, the craft is intended to sail on a starboard tack only.

During the early trials of the craft it failed to beat the then current record of 44.66 knots set by Thierry Bielak. Later, the craft apparently even reached a maximum speed of 54 knots (100 km/h) though this was not sustained over the 500 metre measured distance. Finally in October 1993 *YPE* achieved the outright record as listed above.

The helmsman of *YPE*, Simon McKeon indicated that it was almost impossible to have full control over the craft at world record speeds and that split second decisions were required to sail the craft at such speeds. The steering and stabilizing foils were operating at such high speeds that foil cavitation would lead to unsteady side forces being developed.

Extreme 50 and Other Contenders

Not content with holding the absolute world speed sailing record, Lindsay Cunningham has gone on to develop *Extreme 50* which has a similar layout to the *YPE* but incorporates a number of refinements which are intended to improve the performance over *YPE* by about 14%. In winds of 18-20 knots, *Extreme 50* has reached 43.35 knots.

Although *Extreme 50 (Macquairie Innovation)* is once again not a hydrofoil-supported craft, other contenders for the sailing speed record certainly are. The Speed Sailing Resource Internet site (http://www.dcss.org/Savineau) contains short summaries of a range of sailing speed record holding craft or contenders, both for short courses and open ocean challenges. Some of the more interesting challengers are *Charente Maritime II* an asymmetrical catamaran with biplane sails that has achieved 37.82 knots and *Techniques Avancees* a surface piercing hydrofoil catamaran with a pair of rigid sails that has achieved 42.1 knots. An interesting sailing hydrofoil project by student engineers in Toulouse, France is *Veliptere*. This design consists of a 12m long craft supported by hydrofoils and is fitted with two 26m span wings, one horizontal for stability and the second inclined from the vertical to provide sailing thrust. While a model has been tested, funds were being sough for construction of the full-scale craft.

A hydrofoil speed sailing record contender is described at Dave Culp at his SpeedSailing site (http://www.dcss.org/speeds/sheerspeed.html). This design is based on a single foil supporting the craft weight with a combination of surface sensors and airfoils controlling its attitude.

Another interesting contender for the absolute speed record is *Bootiful* by the Unlimited Speed Sailing Company. This could be described as somewhat like an oversized catamaran sailboard with a large sailboard type rig. Details of the craft are at www.ussc.co.uk

The 'Gosh' – What Might Have Been

Another stunning looking hydrofoil designed to break the World Sailing Speed Record was described in the September 1979 issue of Hovering Craft and Hydrofoil. It is not apparent that this design was ever built.

The craft was to be 10.5m long and had a projected weight, including crew, of 2998 lb. It was to be fitted with twin asymmetric inclined surface piercing foils on both ends of a 'flying proa' platform driven by a slotted asymmetric section wing sail. It was intended to achieve 58 knots in a 20-knot mean wind on a one way

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starboard tack. The tips sections of the tapered foils were designed to supercavitate and fences were also to be fitted to prevent foil ventilation.

The three man crew was to also serve as a counterbalance within a streamlined gondola on the end of a 10.5m airfoil section boom projecting to starboard. The airfoil boom was fitted with flaps to control the righting moment while travelling at speed. The gondola was to be fitted with a hydrofoil to assist with take off at around 5 knots.

The article concludes that a sponsor is needed before construction of the craft can commence, though it was hoped that the craft would be ready by October 1981. Does anyone have more information about this craft? There are some remarkable similarities between it and the layout of the *Yellow Pages Endeavour* and *Extreme 50.*

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ABM CHAIRMAN SIGNS UP SANTA

(From ABM Alliance)

IHS Member, Martinn Mandles, ABM's Chairman of the Board, and his wife Connie, recently vacationed at the North Pole aboard the Russian nuclear-powered icebreaker *YAMAL*. The highlight of the trip for Connie was taking a photograph of polar bears who ventured close to the ship. For Martinn the highlight was opening an ABM office at the North Pole from which the Company will provide all elevator, security, supply and of course, heating services for Santa's Workshop.

Martinn Mandles, who in 1967 was the first naval officer to command the Boeing-built hydrofoil *TUCUMCARI*, is now based in Los Angeles as Chairman of the Board of ABM Industries, Inc., where he has been employed since 1972.

With annualized sales in excess of $1.8 billion dollars and more than 60,000 employees, ABM is the largest facility services contractor listed on the New York Stock Exchange. The ABM Family of Services includes American Building Maintenance, American Commercial Security, Ampco System Parking, Amtech Elevator and Amtech Lighting.

Martinn is also a 1999 graduate of the Russian Basic Training Course for Cosmonauts at Star City near Moscow.

NEW BENEFIT

IHS provides a free link from the IHS website to members' personal and/or corporate site. To request your link, contact Barney C. Black, IHS Home Page Editor at webmaster@foils.com.

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LETTERS TO THE EDITOR

Boeing Jetfoil Model 929-115 Spare Parts Source...

[18 Feb 01] We have available for sale initial Spare Parts, Support Equipment, Gas Turbine (new and never been used) Allison Model 501 KF 100, Power Section (ASP 916) Turbine Unit, Gas Turbine attachments for mounting, Powerjet 20 of Rockwell / Rocketdyne parts, Perkins diesel engine assembly and parts, etc. The spare parts and equipment were delivered along with the ship; they are stored in air-conditioned environment. We have full documentation as Operation & Maintenance, Spare Parts Catalogues/Manuals, and various control and testing equipment. — Michael Pechlivanidis (consult@setejed.com.sa); SETE Technical Services S.A.; P. O. Box 5166, Jeddah 21422; Kingdom of Saudi Arabia; Tel. No. +966-2-6220022 Ext. 3160; Fax. No. +966-2-6991082

Need FLYING FISH Design Details for Model...

[18 Feb 01] I'm searching for further information — plans, etc., on the FLYING FISH for a model I plan to build. FLYING FISH was outfitted at Miami Shipbuilding Corp. for her role as the DISCO VOLANTE. In the limited edition DVD of the movie ThunderBall, there is a section on the "Making of Thunderball" that has a scanned photo(b+w) of the FLYING FISH in the MSC yards.— Doug Binish (DBinish0757@aol.com)

Reactivating the Indonesian Jetfoil Fleet...

17 Feb 01] Would you advise who knows the Standard Test for Fuel Nozzle of Allison 501 KF Gas Turbine Engine used on Boeing Jetfoil 929 type? There are five Jetfoils in our country, Indonesia. One is a commercial type with around 225-passenger seats. This vessel has been in use for several years, and the 2 501 engines are burned out. There are Allison documents with the ship, but I can't get the answer to my question from them. Two of the other Jetfoils are troop transport type with around 100 passengers on first deck. We plan to operate one of these at Surabaya-Indonesia as a chartered vessel for plant or offshore services. Another two Jetfoils are patrol type unfinished yet. The two patrol type units are hull (one deck) with engine and Automatic Control System (ACS) only. They have never been used since they arrived in our country in the beginning of the 1980s. We have planned to modify Patrol type to be a Commercial type. Do you have any idea how much the approximate cost for this project? Do you know who has the surplus of Allison 501 KF engine; we need two units. — Sentot Adi Pramono, Operation Director at PT Indonusa Ocean (sentot@lycos.com); Jln. Dukuh Kupang XXI - 16 Surabaya, 60225; Indonesia. Phone: 62 81 133 6557; 62 31 567 2257; Fax: 62 31 561 2293

Response...

[17 Feb 01] Allison was bought by Rolls Royce in 1995. There is descriptive information about the Allison 501 engine on the Rolls Royce website (use the search feature to search for "Allison," but no specific info on sales of new or reconditioned units or on maintenance procedures. They do offer parts and maintenance service in various countries, but you will have to contact them directly for specifics. The US Navy uses this engine, but I have no idea whether they have put any into surplus. — Barney C. Black (webmaster@foils.org)

Need Copy of 1994 Shanghai Conference Proceedings...

[17 Feb 01]I am looking for the following conference proceedings: International Conference for New Ship Technology into the 21st Century (NEWS-TEC'94). The conference was held on Shanghai, China in 1994. It has a few papers about the hydrofoil developments in China. The Office of Naval Research (ONR) had a copy which they tell me they destroyed?! Can you suggest anybody else who would have a copy of this conference proceedings? — Günther Migeotte (mailto:migeotte@ing.sun.ac.za); Dept. of Mechanical Engineering; University of Stellenbosch; Banghoek Rd; Stellenbosch, 7600.

Response...

[18 Feb 01] You may contact The Shanghai Society of Naval Achitects & Marine Engeneers. E-mail: ssname@uninet.com.cn. Fax: 86-21-64721270. The name of the society's secretry is Mr. Bing-Jin YE. — Shitang Dong (stdong@online.sh.cn)

Industrial Designer Wants to Correspond in German about Hydrofoils...

[16 Feb 01] Mein Name ist Ulrich Paul. Ich bin Industrie-Designer und arbeite als Entwickler in der Vorentwicklung einer Firma in der Naehe von Koblenz. Ich entwickle seit Jahren nebenbei an Segelboote und Muskelkraftboote in Verbindung mit Tragflügeln. In erster Linie in Zeichnungen und Konzepte, da mir fuer die Umsetzung im Moment die Zeit fehlt.Trotzdem würde ich mich ueber Kontakte sehr freuen. — MfG U.Paul (u-u.paul@freenet.de)

Jetfoil Model...

[15 Feb 01] Back about 1980 I built a Boeing Jetfoil to a scale of 3/8 I think. Anyway 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 con-

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trol**.** 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 (qwert74@netscapeonline.co.uk)

Response...

[15 Feb 01] IHS member Harry Larsen, who knows a lot more about the maths 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 (malin@onspec.co.uk)

[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. — Robin (robin.christine@netzero.net)

PT-50 Model Kit Wanted...

[13 Feb 01] I am looking for a model PT50 hydrofoil. Can you tell me if you know of any for sale in any condition? Would it be possible for you to buy it for me if I forward to you either money or my credit card details? - John Leaver (trev.32@bushinternet.com)

Response...

[13 Feb 01] 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. - Barney C. Black (webmaster@foils.org)

Afghan Runabout...

[9 Feb 01] It is sometimes surprising to see hydrofoils suddenly appearing when watching movies, documentaries or news items on the television. For example, in the movie 'The Russia House' a couple of Meteor hydrofoils pass by in the background on a river in Moscow(?) during one scene. Imagine my surprise when last night, while watching the world news, I realised I was viewing a Volga or Molnia hydrofoil runabout shown as part of an item on US humanitarian aid being provided to a drought stricken region of Afghanistan. But the little hydrofoil was far from running foilborne, rather it was shown resting in a forlorn state in the dried out lake bed of what was stated to be Lake Kaga (I am uncertain of the spelling). The Molnia was a Soviet six-seat hydrofoil sports runabout, while the Volga was the export version with various design refinements including a redesigned bow foil. It wasn't possible to say which of the two types the one in the Afghan footage was. — Martin Grimm (seaflite@alphalink.com.au)

Looking For an ex-Coastie...

[9 Feb 01] Maybe you can help me run down a former hydrofoil guy.

When I was in Annapolis for the Chesapeake Sailing Yacht Symposium, I met a former Coastguardsman who lives in Annapolis not too far from the Eastport Yacht Club and used to be involved with the Navy PHMs. I didn't get a good look at his nametag, but I think his name was Phil Donough or something like that. He had some design concepts and patents he wanted to show me, but when I tried to find him later in the party he was gone. Can anyone give me a lead on who I was talking to? — Tom Speer (tspeer@gte.net); website: http://home1.gte.net/tspeer

Response...

[10 Feb 01] I don't know what type of design the coast guardsman talked to you about, but I have designed several hydrofoils sail and power. The small two or four man boats should have a market where someone needs a whaler sized boat but finds the water to rough to go over a few knots. My design will do 28 knots in seas that the whaler could not take. It is self righting and fuel efficient. Let me know if you are interested. — John Slattebo (dijslatts@earthlink.net)

Ferries, Wanted to Buy...

[8 Feb 01] I am looking as exclusive broker for buyer for one or two hydrofoils "Kolchida", year built - 1984, Ukraine, very good condition for business in the Northern Caribbean, Florida, Bahamas. Discussions and information will be confidential, details can be obtained via my email address.- Mrs. Steinigk (steinigkr@tpp24.net)

Sri Lanka Ferry Project Proposed, Info Needed...

[4 Feb 01] I am looking for all kinds of information about hydrofoils. I am in the process

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of planning and designing a concept to start and run a hydrofoil service along the coastline of Sri Lanka. Mainly and first of all from the airport which is close to the shore and the capital Colombo along the Southwest to the South, connecting Colombo with Bentota, Galle, Matara and finally Hambantota. All those are places of general interest and partly of special touristic interest. Later, after the war in the North has subsided this service shall be extended around the whole island. The reason for this is the unbearable traffic situation on the roads. Actually, there is only one road to the South. This road is not bad but always heavily congested and as it is practically the living room for thousands of people no vehicle can move fast on it even if there was less traffic. As it is it takes more than three hours to travel the distance of about 120 km from Colombo to Galle if you are fast! and about five hours for the 135 km from Galle to the airport, north of Colombo. Earlier experiences with hydrofoils in various parts of the world as in different places in Europe, in Hong Kong, Japan or Australia gave me the idea to introduce boat services in Sri Lanka. It would cut the travel time short and at the same time would save people from the fumes and perils of this heavy and unclean road traffic as it is run up to day.What I need is all the possible information about the operation of hydrofoils for the described task. I have to know in detail the cost of operation as there is consumption, capacity, crews on board and on land, spare part keeping, travel times, average and possible maximum speeds in relation to fuel consumption and so on. I also need to know, of course, where and under which conditions I can buy used as well as brand new hydrofoils and where and under which conditions I can get professional assistance to judge what is on the market. As far as the planning goes we would have to start with the purchase of three to five boats. To give you some more background information: I myself am a German national. Age 71, living for 14 years now, about six months a year in Sri Lanka where we (my wife and myself) bought a small estate close to Galle in the South of the island in 1983. I retired 1987 from my job as Lufthansa manager after nearly twenty years of world wide responsibility (and experience) for the entire advertising, design and corporate identity presentation as well as publishing the log book for Lufthansa. The whole operation in Sri Lanka is planned to be funded by private investors as well as by the DEG, Deutsche Entwicklungs-Gesellschaft, a government organisation responsible for development aid in third world countries. - Ernst Tschoepke (ETschoepke@aol.com); Tempelberg; Kaduruduwa/Galle; Sri Lanka; phone: 09 42503

Human Powered Vehicle Website Features Hydrofoils...

[28 Jan 01]I enjoy perusing the IHS site, it's a great resource. Have you seen my human-powered hydrofoils photo gallery? The boats there represent some of the best in the world, and I'm sure you've heard of many of them over the years. I'm in the process of building a foil-assisted HPB (Human Powered Boat) to challenge the 24hr distance record in August, after which I hope to begin construction on a fully foilborne HPB for sprint racing. During that project, I'm sure I'll be enlisting the help of IHS members frequently! In other news, I'm very close to releasing a video series on HPBs, entitled "WaterCycling 2000 - The State of the Art". There are eight hours of edited footage on four volumes, with great sections on most of the famous hydrofoil HPBs. A detailed segments listing can be found at www.HumanPoweredBoats.com/Forms/F_HH2000_VideoOrder.htm, and all proceeds will be donated to the HPVA (Human-Powered Vehicle Association). — Ron Drynan, VP/Water - HPVA; email:Ron@HumanPoweredBoats.Com;website:http://www.IHPVA. org/hpva/

Letters To the Editor allows hydrofoilers to ask for or provide information, to exchange ideas, and to inform the readership of interesting developments. **More correspondence is published in the Posted Messages and Frequently Asked Questions (FAQ) section of the IHS internet web site at http://www.foils.org.** All are invited to participate. Opinions expressed are those of the authors, not of IHS.

Mitsubishi RAINBOW Lessons Learned...

[18 Jan 01] Just a quick note to let you know that Mitsubishi is giving a paper on its experiences with the fully submerged hydrofoil catamaran, RAINBOW at the Fast Ferry Conference in New Orleans, 13th - 15th March. The second diesel driven fully -submerged hydrofoil catamaran RAINBOW 2 operated by the company, entered service in 1998 following the 5 year operation of its sister vessel RAINBOW. The paper looks at the trials and tribulations of bringing both craft into service and how the technical upgrading of both craft allowed the pair to run a technically free service from 1999 - 2000. If you want to know more about the 17th Fast Ferry Conference & Exhibition, either drop me a line or go to the website and click on the conference logo at the bottom of the page. — Giles Clark (info@fastferry.org); Fast Ferry Conference & Exhibition; 4midable Ltd; Windmill Oast; Beneden Road; Rolvenden, Cranbrook, Kent TN17 4PF; Tel: +44 1580 240055; Fax: +44 1580 240066; website: www.4midable.net

Website Comments From Italy...

[18 Jan 01] Let me introduce myself as an old hydrofoils fan. I am 52 years old, and I have been working for the Italian aeronautical industry Alenia, in Naples since 1985. When I was a young student, I was in Sicily, in Messina, where Mr. Rodriquez was just

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launching the first hydrofoils production. The first PT20, FRECCIA DEL SOLE was starting her trials, and I was among the people astonished by the speed of this new boat, spending my free time to observe, from the seaside, its unusual shape flying over the waves. Now I am among the IHS site visitors, and I am pleased to collect the hydrofoil images for my screem saver! Regarding another smaller industry, which was producing commercial hydrofoils during the second half of the sixties, in Messina, no information seems to be available in your site, neither in the web. The name was SEAFLIGHT shipyard, and they started producing a little foil: the type CD 46. Later on, some years after, a bigger hydrofoil was produced: the type H 57. The only picture available seems to be taken from a RED FUNNEL postcard. I have some additional pictures. — Lorenzo Bonasera (lbonasera@aeronautica.alenia.it)

Grumman Concept Drawing...

[18 Jan 01] Looks to me to be a proposal/preproposal artist rendering of what eventually became the MARAD funded H.S. Denison. Don't recognize the designation of "PK-89"; all Grumman hydrofoil designs had an "M" followed by a number. Purpose of program was to demonstrate open ocean hydrofoil capabilities; which it did at a recorded speed of 60 knots. Denison was built at the main Grumman facilities in Bethpage in the center of Long Island, and trucked at night to Oyster Bay for final assembly and launching. Charlie Pieroth (SoundTM@ix.netcom.com)

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)

Responses...

[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 11 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. Also, see the IHS website. — Barney C. Black (webmaster@foils.org)

[16 Feb 01] I might have a clue as to where the Mk 11 designation you mentioned may have originated: Grumman had in the mid 70's proposed to develop a FLAGSTAFF Mark 11 Patrol Hydrofoil which was to be a modernized/ 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, 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. — Martin Grimm (seaflite@alphalink.com.au)

US Company Builds Hydrofoils...

[15 Jan 01] For Sale: New construction. Proven design, U.S. built, U.S. Coast Guard Certified and U.S. Flag. 200 passenger Hydrofoil Vessels. Cruising speed - 36 Knots, Range - 200 nautical miles. Proven stabilization system allows the vessel to operate on offshore routes. — Ken Plyler (kfppfk@aol.com)

Patrol Boat Foil, Student Design

[15 Jan 01] I am a senior naval architecture student and for my final design project I am attempting to design a hydrofoil patrol boat. I was wondering if you knew of any papers on the design process on deciding foil shape, size, placement, etc.

Earon S. Rein, MIDN USN
m015346@nadn.navy.mil

Responses...

[15 Jan 01] I assume you are aware of the model of a HYSWAS design built by the Naval Academy and

EXTRA FOR THE ELECTRONIC EDITION

Letters To The Editor

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testing of same in the tank. See John Hill, if you haven't. I was there last Thursday to see it running. The Hydronautics Report TR-463-1 we sent you should be good for a conventional hydrofoil. Hope you can work your way through it OK. Some years ago we did a design of a HYSWAS Patrol craft for the Coast Guard. It was about 235 tons with long range and excellent seakeeping characteristics.

John Meyer
President@foils.org

[18 Jan 01] For my final year project at university I also worked on a patrol boat design but didn't want to try to develop a hydrofoil design as a student because I thought it would be too hard to do! I left my hydrofoil interest for a separate thesis project that looked specifically at the heave and pitch motions of a surface piercing hydrofoil in waves. In hindsight, I wish I did do a hydrofoil design as a project as well! At the time I worked on the thesis I collected a number of papers dealing with general hydrofoil design and foil layout. While I didn't need to apply most of those papers in my studies, here are some which may be useful for your design project:

- Walderhaug, H.Aa., "A note on seakindliness of hydrofoil vessels as influenced by foil characteristics and centre of gravity position.", I believe this was published in International Shipbuilding Progress.

- Pascoe, Norman P. and Hobday, A.W., 'A theoretical study of the relative behaviour of three fully submerged hydrofoil configurations with regard to dynamic longitudinal stability and incidence-cavitation boundaries', Hovering Craft and Hydrofoil, Vol. 2, No.1, pp31-35, October 1962

- Jewell, D. A. "Hydrofoil Performance in Rough Water", Paper presented at AIAA/ SNAME Advanced Marine Vehicles Conference, San Diego, CA, February 25-27, 1974.

Before reading those more detailed papers, I suggest you get a good overview of general hydrofoil design considerations but also including foil size and layout considerations by looking though the following books or journals listed on the IHS website:

- Hook, Christopher and Kermode, A.C., Hydrofoils - Without Formulae Series (No. 16?), Pitman Paperbacks, Sir Isaac Pitman and Sons Limited, London, 1967.

- DuCane, Peter High-Speed Small Craft , David and Charles (Holdings) Limited, Devon, 1974, Fourth Edition, Chapter 3, pp 12-54,

- Eames, M.C., "Principles of Hydrofoils." Naval Engineers Journal, Volume 97, Number 2, February 1985. ISSN 0028-1425. Published by the American Society of Naval Engineers, Inc. (ASNE). This special edition features comprehensive reviews of a range of "advanced naval vehicles," including hydrofoils.

- Crew, P. R., "The Hydrofoil Boat; Its History and Future Prospects." Quarterly Transactions, The Institution of Naval Architects, Vol. 100, No. 4, October 1958 gives good background information.

- Bakken, Sigmund and Merritt, Richard G., "Hydrofoils - Ideal for the North Sea", Navy International, Vol.82, No.3, March 1977 compares the seakeeping performance, namely sustained speed versus wave height, of hydrofoils with conventional naval surface ships.

There are also a number of previous questions and answers concerning foil design on the website which may assist you.

Before considering the foil layout you also need to decide whether you want to develop a fully-submerged or a surface piercing hydrofoil design. The US Navy hydrofoil developments culminating in the PHM were almost exclusively of the former type, though surface piercing hydrofoils were also operated by some navies mainly as coastal patrol craft. Examples of the latter are militarised Supramar / Rodriquez PT 20's and also Chinese patrol hydrofoils. The Canadian ASW hydrofoil (items 13, 17 and 18 of the IHS website deal specifically with this) was more of an ocean-going surface piercing hydrofoil design. Surface piercing hydrofoil designs are generally naturally stable in heave, pitch and roll. Fully submerged hydrofoil designs are reliant on autopilot controlled flaps etc to remain stable. If you are seeking good rough water seakeeping characteristics, I would suggest you opt for a fully submerged hydrofoil design with an autopilot system for maintaining the attitude of the craft as these are generally regarded as having better seakeeping performance than similarly sized surface piercing hydrofoils. I don't think you will be in a position to develop the autopilot design as part of the design project unless you are a real whiz kid. I think it would be sufficient to try to perform a resistance estimation for the craft from hullborne to foilborne condition as part of the project and assume that with a foil

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layout similar to other past fully submerged hydrofoils that it will somehow be possible to develop a satisfactory control system around it to keep the boat stable in waves.

I don't know what size or capability of hydrofoil you are thinking about for your project but if I were in your shoes, I would probably search for any literature on the USS PEGASUS class Patrol Hydrofoils (PHM) and adapt your design from that! After all, naval architecture is an evolutionary rather than revolutionary business!

Martin Grimm
Seaflite@alphalink.com.au

Follow Up Question...

[18 Jan 01] We were sort of toying with the idea of using supercavitating foils. Do any of you know where I can get some good info on supercavitating foil sections, or the design of supercavitating hydrofoil vessels. I don't remember who asked, but I am pretty sure we are just doing our hull with FastShip and then doing analysis using NavCad. If you have a better suggestion (which can be handled at an undergraduate level) I'd love to hear it as well.

Earon S. Rein, MIDN USN
M015346@nadn.navy.mil

Responses...

[18 Jan 01] Two suggested sources are as follows:

- Altman, R., "The Design of Supercavitating Hydrofoil Wings," Technical Report 001-14, Hydronautics Inc., April 1968.

- Martin, M., "The Stability Derivatives of A Hydrofoil Boat - Part II", Technical Report 001-10(II), Hydronautics Inc., January 1963.

[18 Jan 01] The best info I'm aware of on supcav foil sections is the Carderock work in the 1970s on the "TAP-2" series of base-vented supercavitating foils. The work may have been done by Young Shen but I'm not sure.

Mark Bebar
BebarMR@navsea.navy.mil

Future of Foils, Student Project

[12 Jan 01] I'm working on assignment on sea transportation. I really hope you will be able to help me out. What I was wondering is if you know who builds them, for whom, why do we need them, how are they made, where, when and the future? If you don't know these things, do you any good sites that I could find them out? I have had horrible luck finding any information on both the Internet and encyclopedias.

Stephen Aiken
Aiken@attcanada.net

Responses...

[12 Jan 01] I suggest first that you read the Regional Ferry Plan San Francisco Bay Area - Final Report. Also, I have sent you a paper called "Defining a Ferry Business." These sources will give you the idea of the various issues involved and the analysis required. As to manufacturers, look on the IHS links page. Also look at the FAQ page. In the USA the "buzzword" for transportation design is "Intermodal" i.e. in designing systems for the transportation of passengers and freight, one mode of transportation can feed into or draw from another... the routes are coordinated, and the interfaces are compatible and optimized. The USA funds research and demonstration projects to promote this concept. For more info, search the internet for "TEA-21" and "ISTEA." If you have specific questions after reading these sources, please send them to me by email... The more specific you can make your questions, the better chance you have of receiving a useable answer. Also, look at the FAQ page devoted to student projects and feel free to correspond directly with anyone there you think might be of help to you.

Barney C. Black
Webmaster@foils.org

[18 Jan 01] I think there definitely are niches in which hydrofoils are the best craft for the application. The PHMs and other hydrofoils have shown how seaworthy and fast a small ship can be, and there will be future roles requiring such performance. Hydrofoil-assisted catamarans have shown how great a boost in speed can be obtained by adding a foil or two, as compared with just adding more power. The large number of surface-piercing hydrofoils operated on rivers and lakes in Russia and elsewhere have shown their comfort and reliability and good performance for a relatively low cost. It's a bit of a mystery to me why more companies requiring these kinds of performance aren't choosing hydrofoils. It's probably due in part to a misperception that the cost has to be high, or that the hydrofoils and control systems must be complicated and therefore insufficiently rugged. At this point I think I see a new reason for considering hydrofoils: the growing concern about wake and wash produced by fast marine vehicles. I think hydrofoils can naturally produce less wake and wash, with their energy going mainly into underwater turbulence rather than into surface waves. (What the negatives may be from that I'm not sure — someone will think of a bunch, no doubt.) As for size, when we had our IHS panel discussion on the future prospects for hydrofoils, on the occasion of the IHS 25th anniversary, we reached a consensus that about 1500 tons seemed to be a practical upper limit. The upper limit on speed was set by foil cavitation and was thought to be about 55

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knots or so, I think — although more recently there has been comment about 70 knots being attainable.

Bill Hockberger
Hockberg@erols.com

Hydrofoils For Sale, Egida Agency

[9 Jan 01] Kindly ask you to remove from your web-site infomation about Meteor hydrofoil built 1988 - vessel sold a few months ago, enblock with 3 our other hydrofoils. Here is latest update:

- Fully exclusive offer: for sale 7 (seven) passenger hydrofoils "Voskhod-2" type built 1980-1989 Ukraine, 72 PAX, service speed 32 Knots. Single screw 6 blades bronze; Main engine: 1 X M-401 "Zvezda", 1 X 1100 HP @ 1600 rpm. Full details available upon firm interest. Price Ideas USD 75 - 85,000.- as is /try FOB B.SEA/

- Fully exclusive for sale 3 (three) hydrofoils "Meteor" type built 1983, 1986 and 1989 Zelenodolsk Russia, 123 PAX, service speed 34kn; Main engines 2 X M-400 "Zvezda", 2 X 930 HP (max 1100); 2 screw, 2 x 6 blades bronze; Full details upon firm interest. Price Ideas USD 85 - 127,000.- as is /try FOB B.SEA port/

- For sale - 2 (two) new engines M-401 type Zvezda, Prices USD 38,000.- each or USD 70,000 enblock.; Payment: bank tranfer or L/C against B/L subj dets (FYG engine maker price exceeds USD 55,000). World-wide delivery.

All details above offered in good faith but without guarantee. On behalf of the Owners we will arrange the whole range of the services to the customer: clearance, freight forwarding, formalities etc. - up to C.I.F. delivery to any country of destination. Inspection: Ukraine. Contact us now, we will take care about everything you do need. All vessels suitable and can be easy converted (even by the Owners as per buyers request) for marine coastal operation. Remarks: hydrofoils subject to sale as per BIMCO SALEFORM. All vessels offered for sale are subject to their availability, prior sale or charter, unless otherwise agreed before/after inspection.

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Foil Design Code

[4 Jan 01] The XFOIL airfoil design/analysis code has been recently placed in the public domain for download at http://raphael.mit.edu/xfoil. I suggest this as a link for your site.

Mark Drela
Drela@mit.edu

Info For Books, Films, Articles Volga Engine Info Needed Fast...

[8 Dec 00] We have just aquired a Volga 28 foot hydrofoil and urgently need technical information on the engine. I believe it is a Yak engine and the number is GAZ-53,90 the. Have you any information or can you suggest anywhere where I might find it. This is a very urgent request as the boat is being used in a major motion picture we a currently shooting here in Casablanca. Please please let me have anything you can as soon as possible. My email address is jonathanfrost@yahoo.com, fax no +212 22 30 15 45 mobile +44 7831 643 172. HELP!

Jonathan Frost

ENDEAVOR Photo Needed

[19 Sep 00] I am an assistant editor at Blackbirch Press, Inc., a children's book publisher in Woodbridge, CT. We are currently working on a book about boats and are looking for a color photo of the Yellow Pages Endeavor. Would you know of where I can get such an image? Please get back to me as soon as possible.

Emily Kucharczyk
Staff@blackbirch.com

Responses...

[9 Oct 00] There was an article on the Yellow Pages ENDEAVOUR (note spelling with a "u") in the Australian magazine titled "1994 Boat Directory" Volume 15. This is published by ACE Magazines Pty Ltd, a division of Associated Communication Enterprises Pty Ltd (incorporated in Victoria), 272 Rosslyn Street, West Melbourne 3003 VIC AUSTRALIA. Phone -61 3 3290277, Fax: -61 3 3281511. Publisher was Mark Day and Managing Editor was Geoff Hawthorne. The article has several colour photos of this stunning record breaking sail craft and its crew. I believe it still holds the world water speed record for sail powered craft. I also recall there was a photograph of it in the Guinness Book of Records. Perhaps either of those publishers would be prepared to assist. The designer was Lindsay Cunningham and I imagine he would be living in the Melbourne area as that is the city near where the craft made its speed record runs.

Martin Grimm
Seaflite@alphalink.com.au

[4 Jan 01] Here is the description from the 2000 edition of Guinness: "On 26 October 1993 the trifoiler Yellow Pages ENDEAVOUR reached a speed of 46.52 knots (86.21 km/h or 53.57 mph) while on a timed run of 500m (547 yards) at Sandy Point near Melbourne, Victoria, Australia. This is the highest speed ever

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reached by any craft under sail on water. The craft has a 12m high sail and three short planing hulls. It was designed by Lindsay Cunningham and piloted by Simon McKeon and Tim Daddo, both from Australia." One comment on that description: The word "trifoiler" suggests that the craft was somehow foil supported. Although I have heard that the team had explored the possibility of using hydrofoils to achieve higher speeds, this apparently never eventuated due to the difficulty in achieving steady foil lift for such an application as the foils would have transitioned between fully wetted and supercavitating operating conditions. I am keen to try to follow up on what became of the craft and plans for the hydrofoil option. Prior to the Yellow Pages ENDEAVOUR gaining the sailing speed record, it was held by a wind surfer. Thierry Bielak of France rode his windsurfer to a speed of 45.34 knots (84.02 km/h or 51.21 mph) at Camargue, France.

Martin Grimm
Seaflite@alphalink.com.au

[3 Feb 01] A few years ago I saw a photo in a windsurfing shop purporting to show the setting of a windsurfing record of 54+ mph. I can't recall where the shop was. There is a sailor named Mike Delahanty who runs Gorge Sails (in Washington state, near Hood River) who was the speed champion about that time. Perhaps he could tell you the current situation.

Rich Miller
rich@mail.ski.org

The NEWSLETTER

International Hydrofoil Society

P. O. Box 51, Cabin John MD 20818 USA

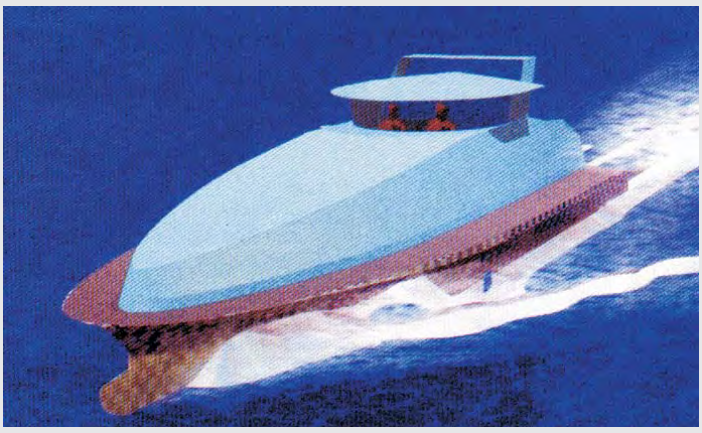
Editor: John R. Meyer | Summer 2001 | Sailing Editor: Martin Grimm

MONOMARAN TEST CRAFT DUE TO START TRIALS IN US

From Fast Ferry International, January-February 2001

Trials of a 13m vessel built to evaluate a new fast ferry concept developed in Norway are due be begin in the United States in March. For the past four years, TechMan, a naval architecture and marine engineering company based in Sandane, has been working on the project.

The design, known as the MonoMaran, has recently been granted an international patent. TechMan's Rune Odegard explains, "Sponsored by the Norwegian Research Council, the project was initially limited to basic research related to drag and seakeeping capabilities of a 47 metre passenger/ vehicle version. This included model tank tests and seakeeping analysis.



An extended Pilot project has now been sponsored by the Norwegian Regional Development Fund.

Rendering of MonoMaran MM53CX Test craft

The conceptual design is based on a trimaran fitted with a foil system. The craft operates as a trimaran in the low speed mode and as a super-slender monohull in high speed mode at speeds of up to 50 knots, where 50%-85% of displacement, depending on the design

See MonoMaran, Page 3

WHERE ARE YOU IN CYBERSPACE?!

IHS relies on electronic communication with the membership to improve timeliness and reduce mailing costs. If you are a member with email, **let us know your email address!** Thank you.

2001 DUES ARE DUE

IHS Membership is still only US$20 per calendar year (US$2.50 for students). Your renewal or new membership is critical. Please remit 2001 dues as soon as possible. We regret that high bank fees make it impractical for IHS to accept payment by credit card or a check drawn on a non-US bank, or by other than US funds. Overseas members with no easy way to send US funds, are advised to send money order to IHS or US Dollars cash.

INSIDE THIS ISSUE

PRESIDENT'S COLUMN

I am pleased to report that the IHS continues in a growth mode. Our membership has increased, our major products (NL and website) are top quality and well received by our members. We have provided a catalyst to communication by publishing and updating the membership roster. We are engaged in two efforts to preserve and to make available the major hydrofoil technical documenta tion, developed over the years at great expense in terms of money and effort. An AMV CDROM (not restricted to hydrofoils) is in process. It will constitute a major breakthrough in making technical documents readily available to the community. Work continues to finalize a CDROM product that is readable and useful to our members and the general advanced marine vehicle audience. Cost of production and distribution is being worked out.

George Jenkins has made a brief analysis of the Society's membership. It is as follows:
- 72% of our membership resides in the United States.
- There are 58 members in the Washington, District of Columbia Metropolitan area and environs. The next highest area is the State of Washington, with 16 members.
- There are 18 other countries represented in the IHS
- Most of these countries have less than 5 members
- The non-US countries with the largest memberships are Canada (8) and the United Kingdom (13).

The IHS presence on the World Wide Web spearheaded by Barney Black, represents, more than ever, a dedicated effort to respond promptly to all inquiries. The web site continues to generate truly international interest and a surge in membership. The diverse backgrounds and interests of these new members has expanded IHS's scope well beyond the ferry market and the military hydrofoils. The surge of new information arriving via the internet provided the material and impetus to upgrade and expand the newsletter, which has generated even further interest and membership. The Society is more fully living up to its mission to promote hydrofoils of all types, sizes, and applications. Of late, we really owe a debt to Martin Grimm, Tom Speer, Malin Dixon, and Bill White... they have been pitching in with helping Barney maintain the Site, and thorough technical answers to just about every such inquiry we have received over the last few months.

Steve Chorney has completed a conversion of the two separate IHS Membership Lists into one. This list can be viewed and printed out from the IHS web site. You should have received notice of this from Barney Black along with a password since it is meant only for IHS members in good standing (dues paid). If anyone has a problem with down-loading this list, please notify me immediately, and other provisions will be made.

John R. Meyer,

President

WELCOME NEW MEMBERS

Cary S. Holmes – Cary found out about the IHS through the company he works for, namely, SEAJETS, Ltd in Florida. He is a maintenance engineer working on the Boeing Jetfoils *Kara* and *Kristen*.

Matthew Kirk – Matthew works for Trane Corp. as a service engineer in Florida. Boating has been a large part of his life. On reading about Boeing Jetfoils, he wondered why small fishing boats couldn't be equipped with foils for better fuel economy and speed. He would like to find someone in his area who has ideas about hydrofoils.

Gary Shimozono - Gary is employed at Navatek Ships, Ltd., Honolulu, Hawaii. They are working on the development of new hullforms. Their designs have small waterplane areas and lift is derived through a combination of buoyant and dynamic lift. The company is involved with small scale tank tests, as well as, construction and testing of large prototype vessels. The company's designs derive a portion of its lift through dynamic pressure, and thus his interest in hydrofoils.

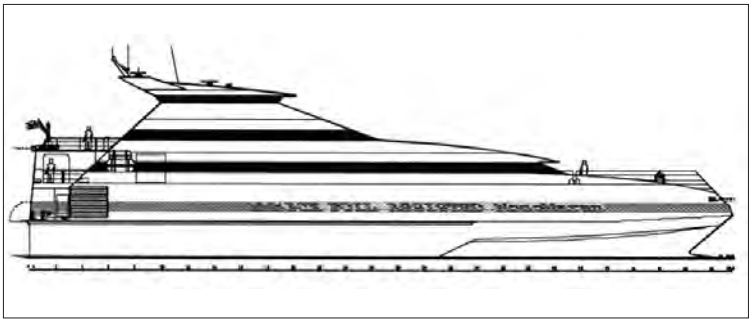
Kirk Torstenson - Kirk received a degree in Naval Architecture/Marine Engineering from Webb Institute of Naval Architecture in 1993. He has previously been involved in various ship design projects at John J. McMullen Associates and ship dockings at Baltimore Marine Industries. He joined Maritime Applied Physics Corp in January 2001 and has been involved in various aspects of the Company's projects including the HYSWAS Program.

MonoMaran
(Continued From Page 1)

version, is carried by fully controllable lifting surfaces, with the sidehulls well above the waterline. Propulsion systems would be comprised of diesel engines and flush intake waterjets.

According to Rune Odegard, "The drag is expected to be around 50% of that of catamarans and monohulls operating at similar deadweights at 45-50 knots. At lower speeds, significant drag reductions are also achievable. The foil system cancels roll motions while simultaneously providing damping of heave and pitch motions.

"Compared to sea state accelerations of modern catamarans and monohulls of similar overall length, equipped with T-foils and trim tabs or interceptors, the levels are expected to be reduced to approximately 50%. Low wash capability is one of the related environmental assets."



Side View of MonoMaran MM53CX

In addition, "Damage stability analysis indicates unmatched safety and stability aspects. Even without a double bottom, full raking bottom damage does not result in any inclination whatsoever."

Ten versions of the MonoMaran having overall lengths ranging from 15m to 78m have been evaluated "in order to be able to analyze the concept's performance and applicability as a fast ferry transportation platform". The five smaller designs could carry 44-450 passengers, while those of 45m and over could be fitted out for 350-900 passengers plus 36-200 cars.

Rune Odegard reports, "The feasibility study included a comprehensive analysis of capital and fuel costs for a given route compared with other fast ferry designs. The results show that the MonoMaran concept may have significantly lower operating costs.

"Based on a daily route distance of 500 nautical miles, and with current Norwegian fuel prices, the difference in operating costs in relation to a modern diesel powered catamaran with the same service speed and deadweight is calculated to be in the range of US$3 million annually.

"The analysis also indicated that building costs are competitive with other fast ferries in the 40+ knot speed range, basically due to much lower power requirements and related cost savings."

Maryland based Island Engineering Inc. designed a cavitation-free foil system for the MonoMaran. Rune Odegard discloses: "Based on the encouraging results of the feasibility analysis, IEI decided to join the Pilot project as a major financial and technological co-sponsor." IEI was subsequently awarded a contract to build and test a one-quarter scale model of the MM53CX, a 53m ferry designed to carry 450 passengers and 68 cars at up to 50 knots.

MonoMaran MM53CX Characteristics are:

Length overall: 53.7m
Length waterline: 48.5m
Beam: 20.0m
Depth, Moulded: 5.9m
Passengers
- Main saloon 358
- Upper saloon 80
– Total 438
Crew: 12
Cars: 68

The test craft measures 13m by 5m and has a displacement of 7.7 tons. Referring to this, Rune Odegard says, "The seagoing model is one of the largest and most sophisticatedly equipped fast ferry models ever produced.

"Built in aluminum, and fitted with a non-scale temporary superstructure, it has a complete main and trim foil system with control and monitoring systems developed and built by IEI.

"The design includes computer controlled hydraulically operated flaps, a 400 hp marine gasoline engine, transmission, independently maneuverable twin water-jet installations, generator, bow-thruster, GPS, autopilot, radar, depth sounder, etc. The steering system also incorporates joysticks, with override capabilities allowing manual banking, pitch, heave and roll control.

"The model will undergo an extensive test program with David Taylor Research Center as a third party witness. This will include drag measurements in calm water and wave

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MonoMaran
(Continued From Previous Page)

heights, measurements of acceleration in sea states, wake/wash measurements, and independent measure ments of foil drag.

"The program will also evaluate maneuverability and seaworthiness capabilities, including full speed turning radius, dead ship motion accelerations in waves, zero to full speed acceleration and crash stop distances."

TechMan is now seeking qualified yards for "exclusive or range limited licence production". Rune Odegard confirms that several potential yards, owners and technology investors are "keeping a close eye" on the outcome of the Pilot project.

The test craft is scheduled to be launched during the middle of February and TechMan says that interested parties are welcome to take a demonstration run as soon trials commence on the Chesapeake Bay.

2000 DELIVERIES AND ORDERS

(From Fast Ferry International, February 2001)

2000 was not a good year for fast ferry deliveries and orders. The total of 42 deliveries and 29 outstanding orders at year end compares badly even with 1999's figures of 57 and 35 respectively. Commenting on these a year ago, we pointed out that the total of 92 fast ferries delivered or on order was the lowest since the magazine started compiling figures in 1986.

The analysis continued, "Deliveries were not that much lower than in previous years. In fact they are higher than during several years since then. What has dragged the total down is the very low figure for outstanding orders at year end."

The reluctance of operators to order new vessels continues, apart from in the United States, where eight vessels were delivered and contracts for seven more were placed during 2000. Activity in both the USA and the rest of the world centered on passenger only vessels.

Contracts for vehicle ferries proved elusive in 2000, 11 of the 14 delivered during the year were ordered in 1999 or before, as were two of the five vessels that are scheduled to be delivered during the coming months. In addition, contracts for some of the vessels that have been delivered have involved long term leases rather than outright orders.

Two of the vessels delivered during 2000 were completed in the previous year, and three of those due to be delivered during 2001 were launched between one and four years ago. One, Swath International Super 4000 swath *Cloud X,* has been a regular feature of the 'Outstanding orders' section since 1993!

As always, a fast ferry is regarded as a vessel, delivered to or ordered by a commercial company, capable of carrying at least 50 passengers, or an equivalent amount of passengers plus cargo, and having a minimum service speed of 25 knots.

A breakdown of the various fast ferries by hullform and size categories is shown in the next column. This was taken from the same FFI issue.

DELIVERIES AND ORDERS AT DECEMBER 31, 2000

	Deliveries	Orders	Total
Catamarans	33	19	52
Foil assisted catamarans	-	-	-
Hovercraft	-	-	-
Hydrofoils	1	-	1
Hydrofoil catamarans	-	-	-
Monohulls	5	9	14
SES	-	-	-
SWATHs	-	1	1
Wavepiercing catamarans	3	-	3
Totals	42	29	71
Passenger Ferries			
50-99 seats	1	-	1
100-149 seats	7	1	8
150-199 seats	5	-	5
200-249 seats	2	7	9
250-299 seats	-	4	4
300-349 seats	6	2	8
350-399 seats	3	3	6
400-449 seats	4	6	10
450 + seats	-	1	1
Totals	28	24	52
Passenger Vehicle Ferries			
10-49 cars	2	1	3
50-99 cars	3	-	3
100-149 cars	-	-	-
150-199 cars	2	1	3
200-249 cars	2	1	3
250-299 cars	4	1	5
300-349 cars	1	-	1
350-399 cars	-	-	-
400-449 cars	-	-	-
450-499 cars	-	1	1
Totals	14	5	19

****

FOILCAT PAPER DELIVERED

At the recent FAST FERRY Conference held in New Orleans, a paper entitled: "EXPERIENCES WITH THE FULLY SUBMERGED HYDROFOIL CATAMARAN, THE "RAINBOW" was presented. The authors from Mitsubishi Heavy Industries, Ltd. were: Naoji Toki, Toru Kitamura, and Shingen Takeda. This is an excerpt from the paper.

Oki Islands is located in southwest part of Japan Sea, about forty-miles away from Japanese mainland. Until 1993, on the route to Oki Islands from Japanese mainland, a 40m mono-hull type high-speed craft and three conventional ROPAX ferries were operated. And there were also aviation services from a near-by airport. The reputation of the 40m mono-hull craft was not favorable because of its unavoidable discomfort and low seakeeping ability in heavy sea condition. The original "Rainbow" was constructed as a replacement of the 40m monohull craft and could satisfy the several requirements such as improved ride quality in high seas, and relatively low operational cost, etc. She was completed and put into commercial service on the route in 1993.

Mitsubishi Super Shuttle "Rainbow"

Following the success of the original "Rainbow", the second craft was ordered in 1997 for the same route and named the "Rainbow 2".

The second diesel driven fully submerged hydrofoil catamaran, the "Rainbow 2" successfully entered into service in 1998 following a 5-year operation of the first craft, the "Rainbow". In the design stages of the "Rainbow 2", special attention was paid to the modification of the motion control system (APF: Auto Pilot on Foils).

Although APF for the original "Rainbow" could eliminate wave excited motions, there still remained some levels of vibration. To clarify the cause of vibration phenomena several numerical simulation studies were performed. As a result of the studies, small damping of the motion control system at relatively high frequency range was found. To reduce the vibration, 4 kinds of refinements which should increase the damping of the system, were introduced to the APF for the "Rainbow 2".

The result of the refinement was verified during sea trials of the "Rainbow 2", and it was verified that the vibration levels of the "Rainbow 2" were decreased to about 10% of those of the original "Rainbow".

Consequently, it is concluded that, by the refinement, not only was ride quality improved, but also reliability of various equipments on the craft was enhanced. Shown here is a photo of "Rainbow".

The successful refinement was applied also to the original "Rainbow". Then, from 1999 to 2000, no trip cancellation was caused by technical failure of the both craft. Because the improved two "Rainbows" could expand the efficient services successfully to more ports within the area, one-day round-trip to the mainland was made possible for more residents on Oki Islands. And, as the result, commercial aviation service from a near-by airport was discontinued. The two "Rainbow"s proved that this type of craft could be a solution for the demand of high-speed transportation to isolated islands.

Particulars of Rainbow 2 are:
Length overall: 33.43 m
Length water line: 28.50m
Beam moulded: 11.00 m
Depth moulded: 4.20 m
Hull-borne draft: 4.50 m
Foil-borne draft: 2.10 m
Dead weight: App. 34 tons
Passengers: 317
Main engine Mitsubishi S16R-MTK-S x 4
Power: 2,565PS x 4
Water Jets: Mitsubishi MWJ-5000A
Trial maximum speed 46 knots
Service speed 38 knots

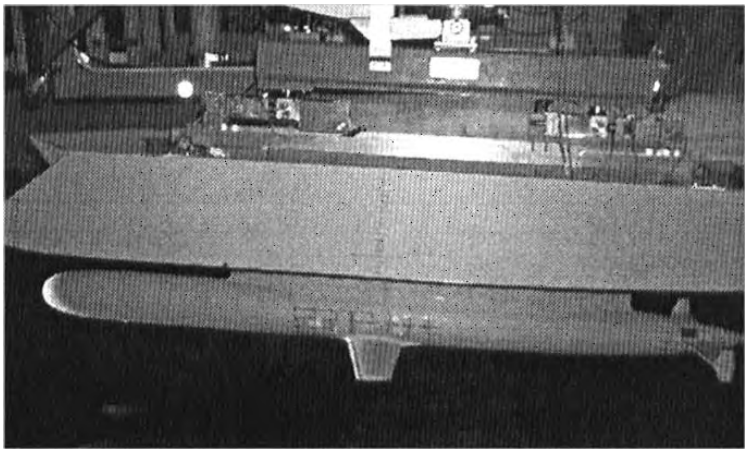
In the design stages of the "Rainbow 2", special attention was paid to the modification of the motion control system. The paper summarizes the process of how the points of improvement were identified, how the improvements were made, and subsequently verified. The reader is referred to the entire paper included in the Proceedings of the Conference for further details.

CALM WATER TESTING OF THE HYSWAS CONCEPT

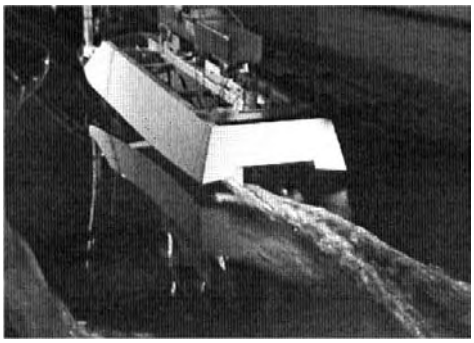
[This is an extract of a report by Peter Mitalas, Midshipman 1/c, U.S. Naval Academy, April 2001]

The purpose of this student project was to gather data to investigate the lift characteristics and powering requirements of the HYSWAS concept as a potential "Streetfighter." The HYSWAS (Hydrofoil Small Waterplane Area Ship) is a vessel characterized by a conventional upper hull mounted on a slender strut, which is connected to a cylindrical lower hull. Attached to the lower hull are two sets of foils, one forward and one aft. The vessel lifts out of the water and "flies" at a certain speed by a combination of buoyant lift from the lower submerged hull and dynamic lift provided by the foils.

The model used in this experiment was a 1/25 scale variant of the 850-ton HYSWAS designed by MAPC (Maritime Applied Physics Corporation) under a U.S. Navy Small Business Innovation Research project. The model is shown here mounted on the Naval Academy carriage.



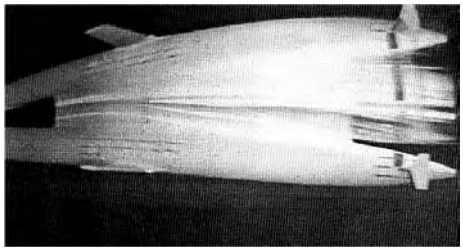
The tests were conducted in the Naval Academy Hydromechanics Lab's 380-foot towing tank using a two-phase test program. The first phase of testing was used to collect lift and drag data for three conditions: bare hull, bare hull with main foil only and bare hull with both foils added. The second phase of the program was used to establish angles of attack for the main and aft foils, which gave the required amount of lift and balanced the moments at given speeds. In both phases, visual video analysis was performed.



The report presents data for various foil angles of attack, the amount of lift achieved and how the lift broke down among bare hull, main foil and aft foil. Equivalent Horsepower (EHP) curves for the bare hull at 3.5^{o} trim and for the bare hull with main and aft foils attached at 3.5^{o} trim were also reported.

Shown above is a freeze-frame image from the aft video camera. Note the narrow wake from the slender strut in the figure.

Finally, sketches of the waterline and underwater flow were made from video analysis. The visual flow analysis sketches showed that the strut and foils have a drastic effect on the water flow around the model. An example of an underwater video clip is shown here. Note that the upper image is a reflection of the model at the water surface.



[Ed Note: I was privileged to witness some of the model tests. I noted that the bare hull drag data showed excellent correlation with several theoretical drag calculations plus the results of a computational fluid dynamics program previously performed.]

MIDN 1/c Peter Mitalas, a naval architecture major, is from Jacksonville, FL and is a member of the 24th Company of the U.S. NAVAL ACADEMY. He will report to NAS Pensacola in July 2001 to become a Naval Flight Officer. MIDN Mitalas's Independent Research Project during the spring semester of 2001 focused on studying the performance of the HYSWAS (Hydrofoil Small Waterplane Ship) concept he referred to as "Streetfighter". The model was constructed in the Technical Support Department Model Shop. All testing was performed in the Naval Academy Hydromechanics Laboratory's 380-foot, towing tank. MIDN Mitalas's advisor for this project is Prof. Bruce Nehrling.

PHM UPDATE

(By Eliot James, IHS Member)

This is the first real winter we have had here in Missouri for a few years and it has been a real pain as far as tending PHM Aries. We were ice bound in a low river for several weeks, actually about 8 inches of ice let us walk completely around the ship, at one point, the pressure on the hullborne jet nozzles caused a small leak that sealed back up when we freed and kept free the nozzles from the ice.

When the ice thawed and it begins to rain the river floods, which brings down drift that pulls the anchors we use to keep the ship away from the bank of the river, this lets the ship drift in, then when the water recedes the ship can hang up on the bank. So we use a barge to pull it out and keep the drift clear of the bow among other things.

We were approached by a company that wanted to use the ship in a movie, they seemed very interested and had a really interesting script but this project seems to have stalled as we were supposed to hear something by January and didn't. So we are back to establishing a non profit organization. We are applying for, and been told we are welcome to, the Historic Naval Ships Association (http://www.maritime.org/hnsa-guide.htm) as an Associate member.

It is quite an organization that it seems will be very helpful in helping us establish an organization for the preservation and rehabilitation of the Aries. Next is the establishment of a non-profit organization and applying for tax exempt status, this will let donations be tax deductible. From there, plans are to apply for accreditation with the American Association of Museums (AAM) as well as being listed in the National Register as a National Historic Landmark.

I have obtained the definitions and standards from the US Department of the Interior, National Maritime Initiative and I believe we meet enough of the National Register criteria. This would open up a lot of opportunities including qualifying for grants for the preservation and rehabilitation process. We continue to be frustrated at the ineffectiveness of our FOIA requesting copies of the SOOMMs that we know to exist. We have been trying since September '97 and what we have so far is that the documents while they do exist, and are of no use to anyone other than us, in fact should have been thrown away long ago since the only applicable ships are long gone, are still stuck behind a wall of red tape. If anyone has any idea how we can get our hands on the SOOMMs, or know of anyone to talk to about it, please let me know. We are working on being ready for hullborne cruising this summer and hitting some of the larger waterfront events to sell tours of the ship to help put fuel in the tanks so that next fall we can venture south. We hope to obtain dockage someplace a lot warmer than Missouri for next winter!

ANOTHER PHM STORY

Howard Kukla, former Field Engineer for the Sperry Corp for the MK92 FCS (Fire Control System) on PHM 3 and 4, recently provided some interesting history.

He was there when the MK92 FCS's were installed at Boeing, and was there for the commissioning of PHM 3 and 4. He ultimately was on the ship escorting both of them from Seattle to Key West through the Panama Canal. In fact, one of the pictures on the IHS web site was taken by him from the deck of the support ship USS Fredrick prior to an unrep. He would like to know who the IHS got it from.

He then supported all activities on both ships for the next 9 months after their arrival in Key West. It is a time in his life he can never forget.

He has numerous documents from PHM 3 and 4, commissioning brochures, as well as many pictures from the cruise from Seattle to Key West. He is proud to be one of the first civilians to drive a PHM after commissioning.

LITTLE SQUIRT Today

By David Lednicer

In December of last year, leaving Paine Field in Everett Washington, I spotted a familiar shape next to the fence. Going over, I checked and sure enough, it was *LITTLE SQUIRT,* up on blocks for storage.

It was against the fence, on Boeing property, close to the main airport entrance drive, just beyond the Museum of Flight restoration facility. The photo shown here was taken by Bob Desroche (Robert@blrvgs.com).

HYDROFOILS ON LAKE TITICACA

By Helmut Kock, IHS Member

[Ed Note: This article was based on a letter I received recently from Helmut.]

I was recently surprised to get a copy of everything that has been published about me on the Internet through my old friend Darius Morgan in Miami, the owner of Crillon Tours Hydrofoils of Lake Titicaca in Bolivia. My son-in-law in Chile and my grandson in Germany also are searching for everything which has been published about me and the hydrofoil boats.

Recently, I found a copy of a publication written many years ago about American tourists who visited Bolivia and took the tour across Lake Titicaca in the hydrofoil boats. It must have been in 1967 on the first hydrofoil boat, which came to that lake.

It took a long time for me to digest and get over the very emotional visit to Chile, which I made over a year ago. Which interrupted the work on my memoirs. Now I have started again, trying to unravel the many episodes in the sixties when I built the "Albatross" in California and then the mass production of that model in Pennsylvania. Then to get fourteen boats in service to the New York Worlds Fair. Four boats went to Lake Titicaca in Bolivia and three to Washington D.C. Four went to Miami and others to the Caribbean, Lebanon and Alaska.

In 1969 came my involvement with the two Russian built hydrofoils, the "Raketa" and the "Kometa". I still owe their story to the International Hydrofoil Society, which I had promised to provide at the end of my article in 1993.

Why several hydrofoils on such a remote lake on the top of the world? It began thirty-five years ago through Darius Morgan, the dynamic owner and developer of this enterprise, which promised great development and expansion. It started with four, twenty-passenger "Albatross" type hydrofoil boats. In 1976, I built the "Bolivia Arrow", the fifty-foot, forty-passenger vessel. Because of the problems with my eyes a second boat could not be built. So Mr. Morgan went to Italy to purchase the sixty-passenger "Seaflight". Later on, a twenty-eight foot Russian-built hydrofoil boat was purchased to be put in service on the lake to take tourists to visit an island to see the construction of reed boats made there.

All boats are kept in constant, excellent condition. There is a crew of mechanics, pilots and sailors for the boats.

There is no regular passenger service on the lake. Only that which is scheduled for tourists which come from all over the world.

The quantity of passengers varies from day to day. From a single person to groups of any size, and so the boats are selected according to the amount of passengers, and also to economize on the fuel consumption because the price of fuel has risen enormously in Bolivia.

The fuel consumption of the "Albatross" type hydrofoil boat is eight gallons per hour. The forty-foot, thirty-passenger, stretched "Albatross" type hydrofoil boat, which carries thirty passengers, uses only ten gallons per hour. The fifty foot "Bolivia Arrow", with forty passengers, uses twelve gallons per hour. So the "Seaflight" is used only rarely when large groups come by.

The tourist service of Crillon Tours is really exceptional. It was based on and can only be maintained with such fast hydrofoil boats.

The founder of Crillon Tours has been living in Miami for many years. The office in Bolivia is managed by his son and daughter.

It is a pity that the tremendous potential for tourism in Peru and Bolivia can not be expanded due to the political and financial turmoil in those countries.

I thank the IHS for the deep interest the Society has demonstrated for my work.

CRILLON TOURS

This tour company has opened and developed Lake Titicaca to the world. The company operates its own modern infrastructure of 16 buses and vans, 7 dependable hydro-

Continued on Next Page

Interested in hydrofoil history, pioneers, photographs? Visit the history and photo gallery pages of the IHS website. http://www.foils.org.

CRILLON/TITICACA

(Continued From Previous Page)

foils, 2 hotels: Inca Utama Hotel & SPA in Huatajata and Posada del Inca on the top of the Sun Island, the unique "Andean Roots" cultural complex, and a central office building in La Paz.

The best selling programs in the Andes include unspoiled Bolivia with its exotic and fantastic attractions, represent over forty years of experience, excellent service, reasonable prices and exclusive programs. One can visit the Crillon Web site: www.titicaca.com.

Crillon is the only Bolivian Company with an international license for Lake Crossings and/or land travel to and from Peru. Our Hydrofoils are the only ones on Lake Titicaca complying with international safety standards certifications.

RUSSIAN HYDROFOILS

By Konstantin I. Matveev, IHS Member

The biggest hydrofoil (in the world) is shown in the first picture. This is a Sokol type craft named "Aleksandr Kuhanovich". It has deeply submerged foils (aft) and auto- stabilization system with respect to roll and trim. Its displacement is 465 tons; maximum speed 60 knots. In a Sea State of 4 to 5, speed is 52 to 53 knots. Power of the main engines is 3x18,000 HP. It was built by Zelenodolsk shipyard in 1977.

The NATO classification for this Sokol type hydrofoil is *BABOCHKA*.

Also shown here is a model of the new passenger hydrofoil, *IZUMRUD,* designed by Zelenodolsk shipyard. This hydrofoil is supposed to have auto-controllable foils with a passenger capacity of 180.

Model of *IZUMRUD*

[Ed Note: This information was provided by Konstantin as a consequence of my query about BABOCHKA because I had never been able to find a picture of this hydrofoil in the foilborne mode. We are grateful to Konstantin for this contribution.]

ANOTHER RUSSIAN HYDROFOIL

By Claus Plaass, IHS Member

I recently came upon a Russian Hydrofoil now operating between the islands of the Greek Cyclades Archipelago.

As the sun set, we walked the pier and after a short introduction, the mate on watch took us for a private guided tour around the boat. Having served as ship engineer for Shell tankers, I wanted to see her gas turbine and gearbox in the engine room, but unfortunately the captain, who keeps the keys, was off duty.

The 1st mate pointed out that expensive and unreliable spare parts and reduced seaworthiness are an issue for further operation of the craft. Her interior design, in silver and bright aluminum, was rather worn-off, but one could still get the typical smell of PVC softeners and Soviet mothballs.

For your information, I am doing documentaries for German radio and TV. I am thinking about a series portraying the pushers, and "avant-gardist" scientists of hydrofoils and advanced marine designs, so any contacts would be highly appreciated.

SAILOR'S PAGE

A-CAT FOILING

By Dave Carlson

[This is an excerpt from a message sent to Barney Black, 9 April 2001. From Foiling Report #57, April Fools Day, 2001. Jacksonville, FL. Photos by Rob Lyman, owner of Daddio, RC-27.]

After winning the River City Regatta...(11211 with the Catnip in conventional stock condition versus a variety of other Cats (Nacra 6.0, Prindle 19, Hobie 18 and Hobie 16), I went out foiling.

I have slightly modified my old wooden epoxy/plywood Catnip to use the surface-piercing foil system, but using sturdier, simpler, different support arms compared to those Dave Keiper invented. This system works pretty well now, and the A-cat zooms along airborne nicely and stays up for minutes at a time. Nothing having to do with the boat or foils has broken yet - and this foil set is 3 years old. A-class woodie with small foil set, both foils set about +5 degrees. Rudders+4 degrees with one lower fin only.

Charlie Johnson, another old P19 racer and Rob Lyman went out with the JAX Rudder Club committee boat and Rob's camera and chased me. They got some good shots.

I foiled pretty well; could stay up even though the air was very puffy-estimated 12-15 knots in streaks, then 15-20 knots of air: It felt like I was doing 18-20 knots. I capsized once at slow speed off the foils just after a jibe when the mainsheet was at the wrong angle and I couldn't release it. No problem although one sticky H16 rudder cam stayed locked down which was a nuisance. I had to go back to shore to pop it up. The foils otherwise worked pretty good.

After Rob and Charlie went off for a rescue (many cruisers motored in with torn sails, and one lost its rudder entirely which broke off at the shaft), I kept foiling until cold - for a good 2 hours.

HOW TO BUILD AN R/C MODEL SAILING HYDROFOIL?

By Jez McKean

I have recently decided I'd like to build a radio controlled (R/C) model sailing hydrofoil (about 1 meter 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 am looking for some suggestions on how to build this model and from what materials etc. Budget will be rather limited so some alternatives would be much appreciated. — Jez McKean (jez@jazzle.co.uk); Ashdown House, Basmore Lane; Shiplake on Thames; Oxon RG9 3NU UK

Doug Lord felt it was great that someone had an interest in modeling an RC foiler. The conditions Jez referred 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 one would require an extraordinarily deep foil. That may be 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 configura-

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tion. It basically comes down to a catamaran or trimaran; I would suggest a trimaran 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 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 F^3 that may help: 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 196 sq. 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 5-6 mph wind.

You might want to contact Dr. Sam Bradfield to ask permission to use brilliant and simple altitude control system for a one-of 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 take a look at our foiler on our site at: www.microsail.com. – Doug Lord (lorsail@webtv.net)

MicroSail's MicroFoiler F^3

By Martin Grimm, IHS Member

Details of this hydrofoil sailboat are also provided on MicroSail!'s website: www.microsail.com, from which the following summary was prepared.

This is a lovely looking model sailing hydrofoil trimaran with an overall length of 55.75", a beam of 62" and displacement of between 7.9 to 8.2 lb depending on battery size and radio control gear. The model can be operated using a two channel radio control unit though a five channel system would be best.

The MicroFoiler F^3 is capable of flying on the foils in as little as five mph of wind. The boat is said to be exceptionally maneuverable while on the foils, yet still sails well off the foils.

This boat is being produced as a strict One-Design Class with weight and dimensions held within strict tolerances. The boat, foils and rig were designed by Doug Lord with the help of Dr Sam Bradfield (designer of the full size Rave hydrofoil built by Wilderness systems which will be featured in the next Newsletter) and his team at HydroSail Inc. For the model, MicroSail has licenced the use of Dr. Bradfield's altitude control system; a brilliant and simple design that is used virtually unmodified. The F^3 is however not a scale model of the Rave or any other full size foiler; rather it was designed specifically as a model.

LAS VEGAS COMPANY TO LAUNCH HYDROFOIL SERVICE IN HAWAII

[Ken Plyler, IHS Member, provided an article from the Maui Sun newspaper, from which the following was extracted.]

A Las Vega Company has told the legislature (in Hawaii) it plans to inaugurate hydrofoil service for commuters on Oahu, with a run between Maui and Molokai.

Skeptics wondered where the ferries and/or passengers would come from, and whether high-speed Jetfoils could co-exist with humpback whales. William E. (Matt) Dillon, president of Rainbow Transportation Group, made a presentation to the legislature last week. His company is registered to do business in Nevada and has a Las Vegas address, but no telephone listing.

Dillon told the House Committee that Rainbow could be operating by the end of the year with four 250-passenger Boeing Jetfoils. Rainbow is planning to use the boats identical to or perhaps the same boats as used by Sea Flite in Maui waters some years ago. He told lawmakers he is not deterred by the Sea Flite failure.

Federal money is potentially available for ferry operations. Rainbow's plan is to move commuters around Oahu at the morning and afternoon rush hours, then use the same boats to shuttle between Maui and Molokai in the middle of the day. Eventually, Dillon said, he would expect inter-island routes to Oahu and the Big Island. He said there are "big ifs", including finding docks at crowded harbors, all of which are operated by the State.

A foreseen difficulty is that of a speeding hydrofoil hitting a whale. The whale population is increasing, according to Adam Pack of the Marine Mammal Laboratory, and already this year an inflatable whale watch boat, the Maui Explorer, has hit a whale. A full-grown whale weighs more than 40 tons and is about 40 feet long; Boeing Jetfoils are 90 feet long.

SINGLE LEGGER

By Ron Drynan

Mr. Kotaro Horiuchi has a long and amazing career of boat building, much of it with Horiuchi Labs of Yamaha Motor. He sent me his book called "A Locus of A Boat Designer", [ISBN4-8072-4201-6], in which there is great detail on Single Legger and many of his other projects. He tells me there's a new book coming out soon which will cover the HPB and engine-powered hydrofoils in detail. Unfortunately, the books haven't been translated from Japanese yet, but the pictures and charts are still quite useful.

He built the boat in 1955, it has a 350cc 18hp outboard with a 16" extension, it's manually "flown" (no surface sensor), and as you saw, he reports 1.4G turns! There were several versions made including a tandem, and eventually Yamaha built the OR-S1 with a fully enclosed cockpit in one, two, and 12 seat configurations, but couldn't market them because of liability concerns. The design eventually found its way to production as the Yamaha Marine Jet with no foils.

I'll definitely let you know how it goes with the LegShell and the 24hr attempt. More info on HPVA: http://www.IHPVA.org/hpva/,also www.HumanPoweredBoats.com

NEW BENEFIT

IHS provides a free link from the IHS website to members' personal and/or corporate site. To request your link, contact Barney C. Black, IHS Home Page Editor at webmaster@foils.org.

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LETTERS TO THE EDITOR

Hanning-Lee WHITE HAWK Revisited...

[9 May 01] When the Hanning-Lees attempted the water speed record on Lake Windermere in the early 1950s, my father was the Rolls Royce mechanic that went to sort out starting problems on the Derwent engine. If you want the full story, it was a bit of a shambles with nothing planned. It was all left to RR, as the mechanics that accompanied the boat did not have a clue. My father I think at the time was Test Superintendent at the RR factory in Barnolswick where the engine was tested. It may have been fitted there, but I am not sure of this. I also know that he also went up to Barrow on a number of occasions — Keith Weightman (weightman@eircom.net)

Luerssen Hydrofoils...

[4 Mar 01] A shipyard manager from Luerssen Werft GmbH, Bremen told me something about the small hydrofoil Luerrsen built in the early seventies. This boat was a experimental prototype, fully developed by Luerssen. It worked well, but the idea fell out of favor at Luerssen so they donated the boat to the "Auto & Technikmuseum - Sinsheim. He said also that Luerssen built 6 experimental hydrofoils including the shown one after World War II. These were mostly built without a yard number (sounds like Luerssen tried to keep these experiments as secret.). He could not say where these boats are today, but if someone will search in small yacht harbors, some sheds, warehouses, scrapyards and the depots of the German authorities and the navy, he could find astonishing things. (So I have found a small Russian type Ekranoplan in a small shipyard near Hamburg last year). I got the name and the phone number of one of the chief developers of the Luerssen experimentals, a guy named Dr. Osterstehte. I will call him and ask him to get some closer information about the experiments. By the way: Do you know the concept of the"Wenddelsches Schnellschiff" (transl. Fastship), developed by Professor Wenddel, a former collaborator of Baron von Schertel. An experimental prototype exists in the collection of the German Navigation Museum in Bremerhaven, Germany. Another idea was the hydrofoil project of the German engineer Dr. Ingo Schloer. He has worked out a concept, which looks like the crossing between a SWATH, a fixed wing hydrofoil, and a PHM. There is a picture of it in a German book about Fast Attack Craft. This project vanished into the drawer for uninteresting projects in the German Ministry of Defense. I will inform you, if can get more information about the Luerssen hydrofoils. — C. Schramm (C_Schramm@t-online.de)

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)

Response...[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)

PHM Plank Owner...

[4 May 01] I was a Plank Owner on the USS TAURUS PHM-3. I am building a personal web site and am building a section on the TAURUS, it's not finished, but coming up fast. Maybe your members would be interested. — L. R. Hargis MSCM(SS/SW), NAS Whidbey Island, WA; email: (HargisLR@aol.com) website:http://www.members.tripod.com/masterchiefscorner

PHM Hull "Print-Thru"...

[4 May 01] Might I trouble you for your thoughts on PHM Hull print thru visible on structure? — Arthur M. ("Bo") Hoover (amh@tsgcom.com); Technical Services Group; 12015 Cloverland Court; Baton Rouge, LA 70809; Phone:225-751-9800; Fax: 225-753-1726; website: www.tsgcom.com.

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Letters To The Editor

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Responses...[4 May 01]I was the Chief Engineer of the USS GEMINI (PHM 6) in 1987-88. I don't think the print thru you are referring to in the hull plating is a big deal. All ships oil can their plating to some extent, even the 563' steel hull Spruance Destroyer I was on. I think it's a function of the high-speed stresses the hull goes through and the thickness of the plate of Navy ships. The hull will oil can some, but the superstructure of a PHM above the main deck will show this even more since the bulkheads are really thin. That is my operator's opinion, but I defer to the real engineers if their opinion is different then mine. I went to visit Elliot James and the ex-ARIES. It reminded me that the ships are miserable without a functioning air conditioning system. That is one of your biggest priorities, after hullborne propulsion, steering, and a bow thruster. I never saw a PHM in the special cradle that Boeing made for the hydrofoils, but I did see the cradle. Looked like a HUGE boat trailer. In my time on the PHMs we used a floating dry dock to get them out of the water. We were right off the ICW near Mayport for the yard availability during my tour, in a shipyard that now works on tugs. The floating dry dock is no longer there. By the way, there are some fixed fins on the bottom for directional stability that you need to keep in mind dragging them out of the water. When I was on the ex-ARIES, I thought some windows in the Combat Information Center (CIC) would make that a nice main deck salon. Much of the engineering spaces are not required now without a gas turbine engine, but with 132 feet of ship you can have a few feet of wasted yacht. — Jon Coile (jon@coile.com) [4 May 01] I was not directly involved with PHM program, since it was a construction program. I was the Head of the Hydrofoil Trials Unit, a part of David Taylor Naval Ship Research and Development Center, U.S. Navy. Our part was to provide consultation and even ran some development work such as evaluating the firing of Harpoon missiles off a flying hydrofoil. I am not familiar with your term "print thru". If you are talking of the visibility of the frames on the hull, it is due to the welding and construction technique. Boeing chose to use the aircraft technique of assembly of the hull upside down on jigs rather than the method most shipyards use which is to allow the hull to move as it is welded and control the shape by welding sequence. The later ships became better as the welders became more proficient. — Sumi Arima (arimas1@juno.com)

[4 May 01] I have never come across the terminology "print thru" or "oil can" when referring to hull plating before, but I think it is the same as what is also referred to as the "Hungry Horse Look". In other words, the hull shell plating or superstructure plating is dished in between the stiffeners when viewed from outside giving it the look of a starved horse with its skeleton showing through! That is indeed fairly typical of lightly constructed naval ships, and would presumably be even more so for the PHMs. It would be caused by a combination of distortion of the plating due to the welding process during fabrication and later by sea loads acting on the hull. It typically reaches a steady state point where no further significant deflection occurs with further years of service and does not mean the structure has failed. Fatigue problems would be more apparent by signs of cracking of the plating or stiffeners or evidence of attempts to re-weld cracks, which is somewhat problematical for alloy ship structures as the heat affected zone around the weld repairs may just promote further cracking in the same area! — Martin Grimm (seaflighte@alphalink.com.au)

Producibility Improvements...

[3 May 01] I am aware that PEGASUS (PHM-1) was built to metric units and the follow-on hydrofoils in imperial units. Also, didn't the follow-on PHMs have structural mods to make production more simple? The issue of Naval Engineers Journal (around 1985) dealing with ANVs describes some of this. I am interested to hear more about this.— Martin Grimm (seaflighte@alphalink.com.au)

Response …[3 May 01] The production PHM (PHM 3 Series) Program conducted a set of Producibility Studies in the 1977-78 time frame. These studies were aimed at improving producibility (reducing cost) for the 5 follow ships and covered a number of areas. Two of the key areas were Struts-and-Foils and Hull Structure. There was no change from metric to British units however. To my knowledge, this issue was never raised since all of the production drawings for the lead ship (PEGASUS) were in metric, and it would have been cost prohibitive to switch to British units. Strut/Foil Producibility studies were driven by the need to address the problems with stress-corrosion induced cracking in the chordwise direction on PHM 1 aft foil. The 17-4 PH steel used for PHM

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Letters To The Editor

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1 was especially susceptible to such cracking propagated from within the hollow foils when sea water intruded into the foils and there was no way to remove it. PHM 1 operations were modified to add an oil/wax substance called 'Floatcoat' to adhere to the internal surfaces and delay corrosion. The cracking was centered in areas of high stress caused by center-of-lift fluctuations resulting from flap actuation at foilborne speeds. The solution for production PHMs was to eliminate the aft strut-to-foil welded connections in the high stressed areas close to the aft struts and 'hog' solid billets of 17-4 PH into an inverted tee solid structure, with the foil skins welded to this solid inverted T further outboard. There was a weight increase in the foil system of several metric tons. For Hull Structure producibility, the structural detail design was extensively modified to reduce the large number of different scantlings used in the lead ship (this was done on PHM 1 for minimum weight). By modifying the design to use fewer tailored scantlings, especially forward in the ship, the meters of welding in the follow ships was drastically reduced with a savings in man-hours for welding. There was a weight increase in SWBS Group 100 of about 4.5 metric tons if memory serves me. — Mark Bebar (BebarMR@navsea.navy.mil)

Hot Personal Hydrofoil... [15 Apr 01] I thought you might be interested in my hydrofoil that I built some years ago. I would be happy to send you lots more photos as I am thinking of selling it. The hydrofoil which I call the 'Manta foil' (as in the Manta Ray) was developed with the idea of selling the product or concept to a larger manufacturing company and claiming a Royalty. We got a long way down the road and were involved with some financial backers (some better than others), but as the partners involved dissolved their partnership (amicably) we all went our separate ways, Graeme Vanner was a partner as was Gavin Cawood and Myself. When the Partnership dissolved I took the debts and for that I took with me all the equity in the company - its products, prototypes, tooling, intellectual property and so on. I was intending to develop the Manta Foil to sell myself in small numbers but my wife and babies have got in the way. I am an industrial designer/ stylist and used to style cars but now design Motor Yachts from 50 - 200 feet. At the moment I am torn between selling the prototype, or looking for a manufacturer but I haven't really got time to do it myself. Any potential buyer would receive the benefits of the knowledge gained in the work and testing to date. — Steve Gresham (stevegresham@btinternet.com)

Wave Theory Sources...

[15 Apr 01] I am trying to see how water waves work, mainly deep water waves. They describe a circular pattern of the water particles, and some sites mention about a slow progression of water particles as the waves pass. The sites have not been detailed enough so I am still searching. — Gilbert Schmidt. (docscience@hotmail.com)

Response...[15 Apr 01] There's a comprehensive treatment of ocean waves and the motion of boats in waves in Principles of Naval Architecture Vol. III, available from SNAME. Another classic is Theory of Seakeeping by Korvin-Kroukovsky (1961), also from SNAME. If you do a web search on "polyspectra" you will find some modern material on current research. — Tom Speer (tspeer@tspeer.com); website: http://www.tspeer.com; fax: +1 206 878 5269

[15 Apr 01] I would think most good general oceanography texts would provide this. I have one that has what I think is quite a good overview: Essentials of Oceanography, 3rd Edition, by Harold V. Thurman, Merrill Publishing Company, 1990. If you find it, "Chapter 9 - Waves" is simple and clear. Other books by Willard Bascom, B. Kinsman, and G.L. Pickard would probably give good treatments. (Bascom had an article in a 1959 issue of Scientific American that's good, also.) — Bill Hockberger (hockberg@erols.com)

[4 Mar 01] The clearest description of deep water waves I've seen is in Principles of Naval Architecture (New York: SNAME, 1967, 7th Printing 1986) edited by John P. Comstock. It is in Chapter IX "The Motion of Ships in Waves" by Edward V. Lewis, in particular Section 1 "Ocean Waves." I would guess that this, or a later edition, is still avail-

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Letters To the Editor allows hydrofoilers to ask for or provide information, to exchange ideas, and to inform the readership of interesting developments. **More correspondence is published in the Posted Messages and Frequently Asked Questions (FAQ) section of the IHS internet web site at http://www.foils.org.** All are invited to participate. Opinions expressed are those of the authors, not of IHS.

Letters To The Editor
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able through SNAME. — John S. Pattison

[4 Mar 01] Easiest rules of thumb (theory not withstanding): 1. Wave pitch is 20 times wave height. 2. No significant wave action below Sea State 2 wave heights. — Nat Kobitz (KobitzN@ctc.com)

PHM as Gun Platform...

[11 Apr 01] In the earlier stages of PHM development, the German Federal Navy was interested because they were planning to replace the conventional fast attack craft due to their inability to operate at higher sea states. The German company Luerssen Shipyard was involved in this project. A manager the shipyard told me about his experiences with the PHM. He said that the PHM tested (maybe PEGASUS?) developed low frequency vibrations when it ran through higher short seas. Because of this vibration problem it was thought not to be a stable platform for the 76 mm Oto Melara gun. Is that true? — C. Schramm (c_schramm@t-online.de)

Response...[11 Apr 01] I don't recall any vibration problem that affected the gun. When the gun was fired, the sonic height sensor reacted to the noise, causing the ship to change height. A circuit was installed in the height sensor electronics to eliminate this problem. When the radar height sensor was used, this problem did not exist. — Sumi Arima (arimas1@juno.com)

[4 Mar 01] Doesn't ring a bell with me. The production pump re-design by Aerojet was focused on the higher HP rating for increased full load weight and reducing stress in the material through thicker structure on the pump. — Mark Bebar (BebarMR@navsea.navy.mil)

[4 Mar 01] This is news to me. I am unaware of any limitations on the gun due to ship vibrations. Yes, the PHM, which the German representative (Dr. Bakenhaus) rode, was PEGASUS. I remember him being onboard in Port Hueneme for rough water trials. I do not recall him being onboard for the gun firing trials out of Puget Sound. — Philip Yarnall (yarnallp@nswccd.navy.mil)

PHM Fuel Consumption...

[11 Apr 01] How much fuel does a PHM hydrofoil need, if it runs foilborne at a speed of 45 - 50 knots? What kind of fuel in which quality is needed? — C. Schramm (c_schramm@t-online.de)

Responses... [11 Apr 01] The specific fuel consumption of the LM2500 GT engine at about 15,000 to 16,000 hp was 0.430 lb per hp hour. So at 45 knots the fuel rate was about 6450 lbs or 2.88 L tons per hour. This is equivalent to about 0.064 LTons per mile or about 143 lbs per nautical mile. This was the characteristic of the LM2500 engine operating at these power levels. It would be that way on any ship! (But at a different speed perhaps.) Note that the LM2500 has been improved over the years, so these numbers are out of date. In looking back at the requirements for fuel in the original shipbuilding specification, I note that the reference is to the manufacturer's spec for the specific requirements for cleanliness, temperature, and pressure... I do not have these. The shipbuilder spec required a Facet Model 670350-1 filter/separator with DFM Flow rate 95 liters/minute. Before that in the fuel line there were to be two 5-micrometer pre-filters for particulate matter. Two types of fuel could be used interchangeably, DFM per MIL-T-16884 and JP5 per MIL-T-5624. I am not sure if this info will be of much use to you in current times, but it is all I have right now. Probably the manufacturer General Electric (GE) would be the best source of current specifications and requirements for the engine. — Barney C. Black (webmaster@foils.org)

Human Powered Vehicle Videos...

[4 Mar 01] Well, I've finally finished the "WaterCycling 2000 - The State of the Art" video series! There are eight hours of fantastic footage on four tapes, with features on the great hydrofoil and expedition boats, racing coverage from 1986 through 2000 showing events from the North America, Europe, and Japan, and promo videos from 18 boat manufacturers. All told, there are over 200 different boats on these tapes. For a limited time, I'm offering the set for $25US to I/HPVA members, $30US for non-members, including shipping. After that, the Human Powered Vehicle Association (HPVA) will take over distribution, and the price will be somewhere in the $40-$50 range + shipping. All proceeds will be donated to the HPVA. Please visit www.HumanPoweredBoats.com/Forms/F_HH2000_VideoOrder.htm for a detailed segment listing and to order your copy. — Ron Drynan (Ron@HumanPoweredBoats.com) website: www.HumanPoweredBoats.com

The NEWSLETTER

International Hydrofoil Society

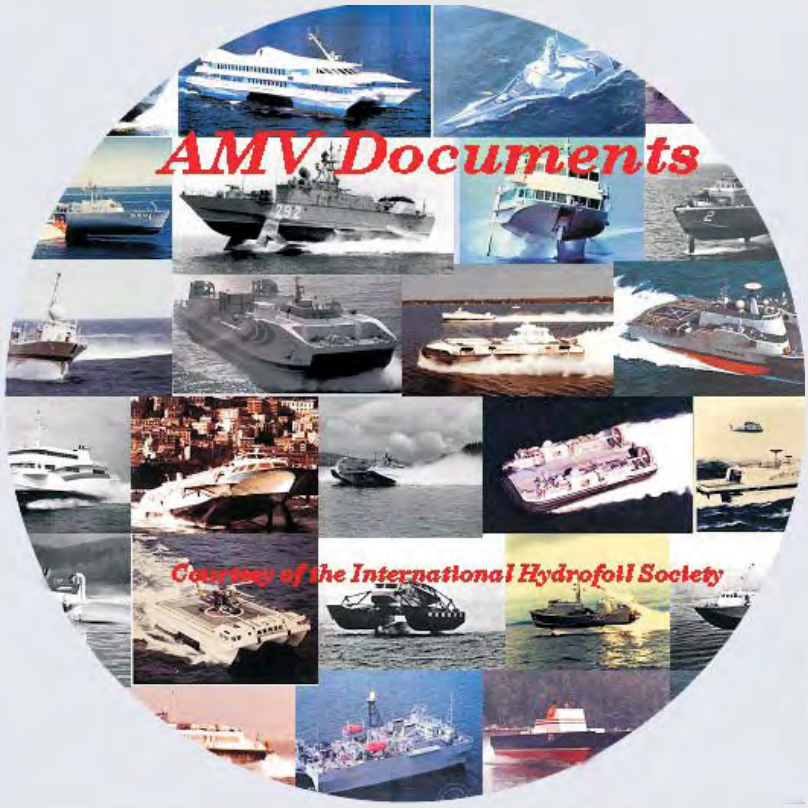
P. O. Box 51, Cabin John MD 20818 USA

Editor: John R. Meyer | Autumn 2001 | Sailing Editor: Martin Grimm

ADVANCED MARINE VEHICLE CD-ROM AVAILABLE

The International Hydrofoil Society has available a CD-ROM collection of technical information on Advanced Marine Vehicles (AMVs), including hydrofoils. The price including postage is US$5.00 (five dollars), regardless of destination. Orders must be pre-paid, and are being accepted now.

Instructions on how to order can be found on the IHS website at http://www.foils.org/ihspubs.htm



See CD-ROM, Page 3

WHERE ARE YOU IN CYBERSPACE?!

IHS relies on electronic communication with the membership to improve timeliness and reduce mailing costs. If you are a member with email, let us know your email address! Thank you.

2001 DUES ARE DUE

IHS Membership is still only US$20 per calendar year (US$2.50 for students). Your renewal or new membership is critical. Please remit 2001 dues as soon as possible. We regret that high bank fees make it impractical for IHS to accept payment by credit card or a check drawn on a non-US bank, or by other than US funds. Overseas members with no easy way to send US funds, are advised to send money order to IHS or US Dollars cash.

INSIDE THIS ISSUE

PRESIDENT'S COLUMN

As you can see from the article on page 1 of this Newsletter, the IHS has achieved a major goal. Your Society has produced a CD featuring 57 technical documents on a variety of Advanced Marine Vehicles (AMV). It all started with an ambitious effort by Ken Spaulding (IHS Member and Secretary) when he was chairman of the SNAME SD-5 Panel. The intention was to provide to the AMV community a listing of about 500 key technical documents with annotated bibliographies. The list was generated, but the bibliographies were not developed.

Later the idea of selecting many of these documents and making them available "On-Line" was considered. However, this goal was confronted by barriers we could not easily overcome. It was finally agreed to scan a group of documents and import them to a CD. This has been done with the help of NAVSEA. Also, Barney Black has enhanced many of the documents that were scanned by adding "hot links" to aid the reader in finding his way through the larger reports. Further details are given in the article. We hope that many of our members and others in the AMV community will order this CD in the near future.

All of our members received Ballots for the election of a new Class of Board members for 2001 through 2004. There was an overwhelming vote for the following:
Sumiyasu Arima
Malin Dixon
John Meyer
William White

We welcome the addition of these Board Members to the current other Classes given on page 12 of this Newsletter.

Shortly thereafter, the Board of Directors elected the following members to serve as officers of the Society for the next year:

President: John Meyer
Vice President: Mark Bebar
Secretary: Ken Spaulding
Treasurer: George Jenkins

I personally want to thank all of the above members for their willingness to serve the Society, and I look forward to the months ahead as we continue to make progress in fulfilling our mission.

I was very pleased to hear about a San Diego -Oceanside High Speed, Low-Emission Ferry Demonstration. SCX, Inc., headed up by Stan Siegel (IHS Member) was named as the successful bidder for this project. Details are provided on page 8 of this NL.

Bill White has uploaded a new update to the Links page on the IHS web site. In addition, he has split up a few subsections that were getting too large to fit within a web page. As a result there are now new links on the page, namely: Educational Section Codes, Legislation and Conferences Section and Brokers/Builder section. We appreciate what Bill and Barney Black are doing to keep the web site up to date and immensely informative.

John Meyer

President

WELCOME NEW MEMBERS

Christian Beiner - After graduation from the FH Karlsruhe as a mechanical engineer, Christian Beiner joined MTU Friedrichshafen in 1988. He worked five years in the development and design department, mainly on gas-turbine propulsion plants for marine applications. In 1993 he transferred to the technical sales department as project engineer, later on becoming team leader responsible for processing several propulsion-system orders for various navies. In 2000 Mr. Beiner was awarded responsibility for the engineering and sales of propulsion systems for commercial marine applications.

Roderick Clayards - Rod, from Saanichton, British Columbia, became involved with hydrofoils through the H.S. Victoria in 1967 and has been interested in them ever since. He flies seaplanes for Harbor Air Ltd., the largest all seaplane airline in the world. Flying in that area, he has had an opportunity to see the Boeing Jetfoils from time to time.

Axel Mainzer Koenig - Axel, from Portland, Oregon, is CEO of 21st Century Data Analysis. He has an interest in Fast Marine Transportation (present and history as well). He has a particular research interest in wave phenomena, especially computational issues, wake wash, dispersive waves. His academic training is in applied mathematics with an M.S. at the University of Iowa in 1983. He is multilingual in German, French, and some Russian. Axel has expressed an interest in assisting with language issues in connection with the IHS website.

AMV CD-ROM

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A list of document titles included in the CD-ROM can be viewed at http://www.foils.org/AMVlist.pdf You will need the free Adobe Acrobat Reader plug-in for your internet browser to view this list.

A description and disclaimer is at http://www.foils.org/AMVinfo.pdf This is also an Acrobat file.

This CD-ROM contains a collection of valuable technical and historical material along with a numerical and an alphabetical index of the contents. To keep the price low, the CD-ROM was assembled and reproduced on a "best efforts", minimum-expense basis with the support of the U. S. Naval Sea Systems Command. The original scanning has been edited to some degree, and Table of Contents "hot links" were inserted to enhance several of the documents.

The text of the AMV documents has been processed through an automatic Optical Character Reader (OCR). While this greatly enhances the usability of the documents in that the resulting text is searchable by key words, there is also a disadvantage. No OCR software is 100% accurate, especially when processing documents whose physical quality has deteriorated through age or copying. Thus the OCR conversion has almost certainly introduced some errors into the text, ranging in seriousness from inaccurate data down to changes in font style or size.

Accordingly, the IHS can assume no responsibility for the accuracy of this material. The user should be aware of this caveat, especially when using data from the CD-ROM in a critical application. If a poor quality scan or other error has resulted in a serious loss of information, please report these problems to editor@foils.org or president@foils.org for clarification as well as for correction in a future edition.

The user will need the free Adobe Acrobat reader to open the various files. One can download this program from the IHS web site: http://www.foils.org

It is intended to offer a second edition of this CDROM when other documents can be scanned and added to the first edition.

17TH FAST FERRY CONFERENCE

(*From Fast Ferry International, April 2001)*

The 17th Fast Ferry Conference and Caribbean Exhibition was held in New Orleans, Louisiana, on March 13-15. Nineteen papers were presented in seven technical sessions. The first paper, on the subject of the United States fast ferry market, was presented by Tim Kelley of Dalton & Kelley. His statistics on US ferry operations (285 companies carrying 115 million passengers and 31 million vehicles annually) were a good introduction to the country's ferry systems.

More interesting yet were the fast ferry statistics. Only 25 of the 285 operators use fast ferries and there are none using high speed vehicle ferries. One possible explanation for this lack of modernization may be found in the disparity in federal funding for waterborne passenger travel, when compared to other modes of transportation. Tim Kelley reported that the US government spends $44.95 on every rail passenger and $2.45 on every air passenger but only $0.74 on each ferry passenger.

Of particular interest to the international community at the conference was Tim Kelley's prediction that there is virtually no chance that the current administration in the United States will take any action to cancel or relax the Jones Act.

However, he is optimistic about a convergence of the archaic US Coast Guard code for vessel classification with the IMO High Speed Craft Code, as currently indicated by the delegation to Det Norske Veritas of plan approval for Alaska Marine Highway System's proposed passenger/vehicle catamaran.

Prospects for fast ferries in the Caribbean were considered by Peter Wild of GP Wild International, who first addressed the global distribution of fast ferries. Current regional capacity, he said, is 35% in the Far East, 27% in the southern Mediterranean, 14% in Northern Europe, 9% in North America, 7% in Australasia, 2% in the Caribbean and 6% elsewhere.

The 2% in the Caribbean consists of 34 craft, mostly in Guadaloupe and the Virgin Islands, of which 79% are catamarans, 9% are hydrofoils, and 12% are monohulls. As one would suspect, the highest rate of recent growth has been in the tourist market in Cuba, followed by Venezuela and the Dutch Antilles, and Peter Wild predicted that routes in these coun-

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17th FF Conference
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tries would continue to lead growth in the Caribbean.

Hull Monitoring

Hull monitoring systems for large fast ferries were discussed by Etienne Thiberge of Bureau Veritas, who pointed out that the current reliance on sea state and wave height for when a vessel should slow down, change course, or not sail seems arbitrary and vague when technology can enable an operator to make these decisions according to a specific hull and actual conditions.

Based on trials and developments by BV in the past six years, a system has been developed that employs acceleration monitors, hull characteristics of individual vessels and other appropriate information, to give masters a clear signal, much as any other alarm on his panel, when a change needs to be made.

Hull Selection

A paper on the development of performance and cost based design discrimination for fast ferry hull form selection was presented at the conference by Sathish Balasubramanian of Band Lavis.

After describing the basic process of design synthesis modelling and the historic development of this process, he showed how the use of a whole ship synthesis model, utilizing physics based algorithms rather than empirical data, could be used to investigate the viability of a proposed vehicle ferry service along the east coast of the United States. The process is more rigorous and thorough than most algorithmic studies.
The optimization of the vessel design for minimum acquisition and maintenance cost produced conclusions that a catamaran hull form would produce the least operating cost and that a surface effect ship hull form only becomes financially competitive when speeds over 50 knots are required.

MHl Hydrofoil Catamaran

Operational experience of a fully submerged hydrofoil catamaran, Mitsubishi Heavy Industries 33m *Rainbow,* was detailed by Shingen Takeda.

Rainbow 1 and Rainbow 2 in Formation

He described the correction of vibration problems on the vessel, how they were tested on *Rainbow 2* and then retrofitted on *Rainbow.* (See IHS Summer 2001 NL; p. 5 for details)

RCS Effectiveness

Steven Goss of Maritime Dynamics, Inc. reported on the latest developments in ride control system effectiveness and recent developments by MDI to enable high-speed craft to operate in heavy sea conditions. He also explained the relative advantages and disadvantages of trim tabs and interceptors.

Environmental Considerations

Incat's Robert Clifford posed the question 'Could fast ferries become an endangered species at the hands of the environmentalists?. Rather than disputing the claims of the environmentalists, he delivered a strong message about what must be done to make vessels more environmentally friendly, addressing each major area of concern (noise, wash, smoke, fuels, etc.) and describing what has been accomplished, what remains to be done, and some possible means of achieving this.

Wake Wash

Wake wash continues to take center stage among environmental papers. Lieutenant Alan Blume of the US Coast Guard is a member of the International Navigation Association (PIANC) working group that is developing guidelines for managing wake wash from high speed ferries and he delivered a report on developments to date.

It was encouraging to learn that the working group recognizes the impossibility of establishing a universal 'one size fits all' wake-wash standard because of the multitude of variables

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17th FF Conference

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amongst vessels, waterways, and shorelines.

Rather, the guidelines will contain informative sections on the physical aspects of wake and the impact of wake wash. They will also include guideline sections for vessel operators, and port authorities.

The latter will be particularly interesting, as they will provide both risk based and standard based wake wash management guidelines. While they will not be binding, guidelines from organizations such as PIANC do have a way of acquiring the authority of regulations.

Also on the subject of wake wash, David Fissel of ASL Environmental Sciences in Victoria, British Columbia, outlined the use of an upward looking sonar in the measurement of wash from BC Ferries PacifiCat catamarans.

He described its use in both shallow and deep water measurements in Howe Sound, where the ASL sonar was left on the bottom for several weeks while information was gathered.

Marine Mammals

Andy Williams, a marine biologist with the Biscay Dolphin Research program, surprised many at the conference who expected an indictment against the fast ferry industry on behalf of whales. However, he spoke mostly about cooperation between ferry operators and marine biologists.

Much of his work in such areas as equating the noise signature of high speed vessels to the frequency response areas of various marine mammals, and the influence of wave action, was based on observations made in the English Channel from Condor Ferries 86m wavepiercing catamarans.

It was reassuring to learn that the dominant strong underwater acoustic signature of these fast ferries (~500 hrz) falls within the relatively insensitive part of the hearing range of the bottlenose dolphin.

NORTH WEST BAY SHIPS LAUNCHES 55M TRIMARAN

(From Fast Ferry International, May 2001)

In late March, more than four years after embarking on a research and development programme, North West Bay Ships (NWBS) launched the first vessel built at its yard in Margate, southern Tasmania.

NWBS decided on a trimaran to achieve "the speed and efficiency of a slender hull form combined with the stability that only breadth provides". Describing the background to the project the company says, "Prior to making the commitment to proceed with construction of a full-scale vessel, an intensive research and development programme included 1/35th scale tank testing at the Australian Maritime College, and resistance and sea keeping trials of a 10 metre self-propelled model.

"To provide accurate comparative analysis of the 1/5th scale results with the 1/35th tank tests and numerical computations; open water 1/5th scale towed resistance tests were performed by the Australian Maritime College. To date, the 1/5th scale model has logged over 1,500 nautical miles, testing resistance in order to maximise the efficiency of the vessel, and also seakeeping and handling in a variety of sea states, including extreme cases in excess of 3 metre wave heights (15m wave height at full ship scale).

"The 10m model was integral to evaluating the full spectrum of operational characteristics of this triple hull form and to thoroughly test for any unforeseen handling characteristics. Test results were beyond expectations, resulting in sufficient confidence for NWBS to proceed with a major capital investment program"

Hull

Describing the structure of 55m trimaran *Triumphant,* North West Bay Ships reveals, "The aluminium hull and superstructure contain some innovative construction techniques. Pre-welded large panel extruded sections were utilised to reduce man-hours and allow construction of curved geometric shapes that were previously only economically attainable using composites.

"The superstructure is resiliently mounted, which relieves the superstructure of any global loadings, allowing more weight efficient scantlings and resulting in lower cabin noise and vibration."

A Maritime Dynamics ride control system comprising foils forward in the tunnels and a single aft trim tab, on the centre hull, is fitted. The company explains, "The lifting surfaces consist of hydraulically actuated foils fitted above the keel between the main hull and each side hull.

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North West Bay

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There is a foil in each tunnel supported by vertical and diagonal struts

"The foils provide lift, giving the boat performance benefits and providing a ride control capability without the associated quantum increase in smooth water drag experienced with existing systems." The side hulls, the bottom of which have seven steps along almost their entire length, are barely in the water when the trimaran is operating at normal service speed.

Main Engines

Triumphant is powered by three MTU 16V 4000 M70 diesels, rated at 2,320 kW at 2,000 rpm, positioned in a longitudinal formation. in the centre hull. These drive two Kamewa 63 SII steering waterjets and a single 63 BlI booster waterjet via Reintjes VLJ 930HR/HL gearboxes and Geislinger carbon fibre shafts.

The gearboxes provide horizontal offsets from the wing engines and a vertical offset from the aft centreline engine. Low NOx exhaust systems were supplied by Mecmar from Norway.

Two Naiad 300mm diameter 12HT 305 bow thrusters are also installed, although NWBS reports that excellent low speed manoeuvrability when using just the water jets "was one of the pleasant surprises of early trials".

MONOMARAN

(From Fast Ferry International, June 2001)

TechMan and Island Engineering report that they are currently conducting final fine tuning in the United States of a manned model of a foil assisted trimaran. The 13.7m test craft, Island Flyer, is a quarter scale version of TechMan MonoMaran MM56CX, a vessel designed to carry 450 passengers and 68 cars at speeds of up to 50 knots.

Testing is taking place just outside Lexington Park, Maryland. Reporting on the results, TechMan says, "On the first trials, the model was run at a full scale speed of 44 knots, without taking out all the installed propulsion power due to undersized water jet impellers.

"As expected, it demonstrated exceptionally low wake/wash characteristics. In rough sea conditions, with waves corresponding to full scale wave heights of approximately 4 metres, the craft exhibited exceptional sea keeping qualities with extremely low and soft motions.

"To date, the craft's Flight Control System has been operated under partial manual control, with pitch and roll stabilization active but automatic height and attitude control, and coordinated/automatic steering control, not yet in place. This keeps the operator busy but also demonstrates that the craft's operation in flight can be manually controlled. Island Flyer is presently having its water jets and Flight Control System fine tuned. "

View of MonoMaran Showing Foils

TechMan is in the process of patenting the technology used in the MonoMaran concept in 29 countries. The Norwegian company says that the manned model will be available 'for a limited period from June 11 "for representatives from yards and operators who would like to take a demonstration trip.

MonoMaran in Flight

EDITOR'S NOTE: I had the opportunity to visit Island Engineering several months ago to discuss some of the matters described above. I also had a chance to ride the craft, but unfortunately in very calm water. Island Engineering provided me with several pictures of the craft before and after it was launched that I have included above.

ANALYSIS EVALUATES RIDE QUALITY COST BENEFITS

(From Speed at Sea, April 2001)

The primary purpose of a ride.control system (RCS) is to improve passenger comfort and safety by reducing the roll and pitch angles and the vertical and lateral accelerations produced by a vessel as it travels through a seaway. A secondary purpose of an RCS is to improve fuel efficiency by maintaining an optimum trim angle on the vessel. Each of these benefits has associated costs: acquisition, operating and maintenance.

There are a minimum set of factors that should be included in a cost benefit analysis for the incorporation of ride control systems on fast passenger ferries. The factors have been collected by Maritime Dynamics Inc (MDI) over the past 15 years and have been obtained during the course of system design development discussions with fast ferry operators throughout the world.

Preparation of a cost benefit analysis requires a co-operative effort between the ride control system supplier, the vessel designer, and the operator's technical, operations, and finance departments.

Compared with the history of seagoing vessels, experience with fast ferry operation is relatively limited. It was incorrectly believed that increases in vessel size and improvements in hull form design would reduce motions to an acceptable level in all sea conditions. Unfortunately, this misconception remains rooted in the industry. Studies performed to support the design of a 40-knot 40,000 dwt high performance vessel indicated a clear need for ride control to reduce accelerations, roll angle, and waterjet inlet broaching.

Fast passenger ferries are different from conventional, slow speed ferries. Due to their higher operating speeds, fast ferries subject passengers to higher angular excursions (roll and pitch angles) and accelerations (roll, pitch, and heave). High angles of pitch and roll can make passenger movement through a vessel difficult and unsafe, particularly for young children and elderly passengers. These issues are starting to be addressed by the regulatory bodies.

It is intuitive that if excursion angles are high, passengers will be less inclined to leave their seats to use food service facilities or browse in shops. Revenue from these ancillary services will drop. In addition, it is believed that the psychological effects of high roll excursion angles contribute to motion sickness. Ride control systems can reduce the excursion angles by as much as 70 to 80 per cent. Intangibles, such as improved safety for small children and elderly passengers, should also be considered in a cost benefit analysis.

The effect of accelerations on humans is well understood and has been incorporated into international standard ISO 2631. Accelerations produce motion sickness and fatigue-decreased proficiency. The number of people who are susceptible to these problems is a function of acceleration level, the frequency of the acceleration, and the duration of exposure to the acceleration. Motion sickness is the primary acceleration -induced problem on fast ferries.

The accelerations of the vessel must be determined to estimate the motion sickness incidence (MSI) percentage. This requires knowledge of the hull form, mass properties of the vessel, arrangement of the passenger space, wave statistics in the area of operation, and length of route. Estimates, based on experience with similar vessels, can be used if not all parameters are known. Tank tests or computer simulations can be used to determine the accelerations.

Computer simulations are a very cost-effective method of obtaining acceleration data provided that they are proven. For example, MDI's simulation programs have been in continuous development for over 25 years and are very well correlated with model test data and full-scale trials data.

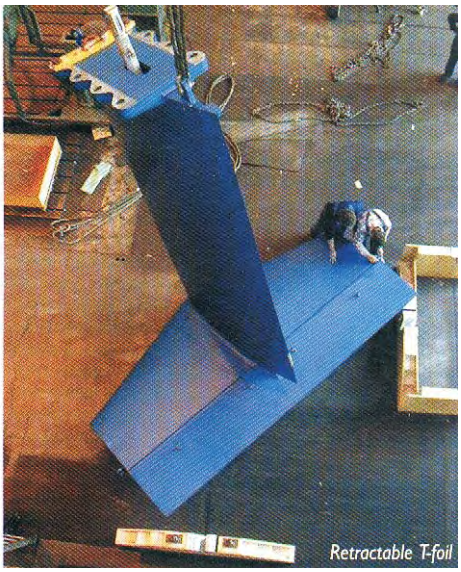
Simulation programs provide data for the calculation of MSI percentages and excursion angles (roll and pitch) for the bare hull and for the hull with ride control. Significant reductions in the excursion angles and MSI can be obtained with ride control. In one case, the incorporation of an MDI ride control system reduced the MSI from a staggering 60 per cent to less than 10 per cent.

Continued on Next Page

Interested in hydrofoil history, pioneers, photographs? Visit the history and photo gallery pages of the IHS website. http://www.foils.org

Ride Quality
(Continued From Previous Page)

It is a popular misconception that there is always a speed penalty associated with ride control systems. This is not the case: ride control systems can slightly increase vessel speed in a seaway by holding the vessel at optimum running trim. Integration of ride control effectors (trim tabs/interceptors, roll fins, and T-foils) will improve propulsion system fuel efficiency because excursion angles, particularly in pitch, are reduced and allow the vessel to maintain closerto-optimum running trim. Recently introduced retractable ride control effectors will reduce resistance in calm water conditions.


Retractable T-foil

Vessel designers can provide fuel consumption estimates for non-optimum trim conditions. These estimates can be factored into the cost benefit analysis. When incorporated with an autopilot option, the ride control system can improve coursekeeping performance with lower rudder or waterjet steering bucket excursion angles.

This also improves propulsion system efficiency. For example, rather than executing small angle course changes with the watejet steering buckets, the MDI autopilot will employ the aft fins to steer the vessel.

From an operations perspective, incorporation of a ride control system allows the vessel to maintain schedule in higher sea states, and reduces weather related service cancellations. Usually, vessel operators reduce speed in higher sea states to limit vessel motion and maintain a company mandated passenger comfort/safety level. Ride control systems allow operation at higher speed for the same comfort/safety level.

[Editor's Note: Readers who have further interest in this subject are advised to seek out the entire article in the April 2001 issue of Speed at Sea.]

HIGH SPEED FERRY DEMO

(From SCX, Inc; Provided by Stan Siegel, IHS Member)

August 21, 2000 Press Release

San Diego's Port Commission today selected SCX, Inc., as the successful bidder for the San Diego -Oceanside High Speed, Low-Emission Ferry Demonstration.

The State of California is funding the ferry demonstration program for San Diego as part of Governor Davis' Congestion Relief Program.

The Port's decision marks a win for MARI-FLITE Ferries, of San Diego — parent of SCX —, which first proposed the idea to former San Diego Caltrans District Director, Gary Gallegos, in November 1999. SCX President Stan Siegel says that "This milestone will allow us to negotiate a contract with the Port and we're hopeful to have ferry operations underway by early next year."

The SCX vision is to bring ferries to eventually provide 15 minute headways from Oceanside to San Diego and hourly trips connecting San Diego and Oceanside to West Los Angeles and LAX through a terminal at Marina del Rey.

SCX Team members include several local firms such as, Hornblower Marine Express, Cloud 9 Shuttle, Community Capital Consultants, BRG Consultants, Access San Diego, and CWA, Inc., as well as Bellingham Marine, Catalina Express and Rainmaker Marketing.

Partnering with the San Diego Unified Port District and the City of Oceanside, for the demonstration, SCX plans to run one round trip each weekday for a year, during peak commuter hours, to help take traffic off the freeway and offer a stress free alternative to North County freeway commuters. If the demonstration shows commuter interest, SCX intends to expand this operation to provide more frequent service.

SCX's demonstration boat will accommodate 149 passengers. The trip will take about 1 hour. Connecting shuttle services will be provided by Cloud 9.

Stan Siegel believes that, "…within 5 years, high-speed ferries can be carrying 800 passengers per hour during peak commuter hours, which is equivalent to an additional lane on I-5, at a tiny fraction of the cost."

For more information, photos or video clips, please contact: Lou Adamo at 858-204-3798

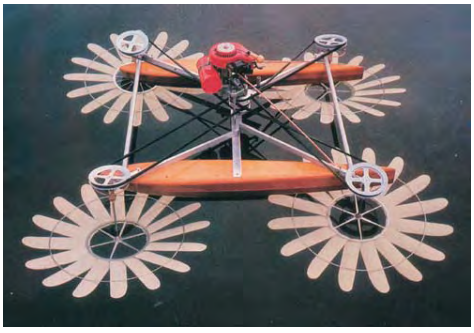
HYDROCOPTER

By Martin Grimm (IHS Member)

In response to a recent IHS inquiry about an underwater autogyro, I was reminded of a concept called "Hydrocopter". It was developed by a Boeing engineer, since retired, named Francis Reynolds, and described in *US Boat and Ship Modeler*, Fall 1991, Volume 4, Number 16.

Rather than being based on autogyro principles, the "Hydrocopter" model consisted of four powered rotor like disks mounted on inclined vertical shafts. Each shaft was connected to a centrally mounted internal combustion (chain saw) motor via drive belts and pulleys. The model floated on a catamaran hull structure while not underway.

The model could in principle have hovered above the water on its rotors, but the concept was not intended simply for slow speed operation. I think the idea had a lot of potential and it is a pity nothing further has apparently become of it.



Since I had come up with a similar concept to the "Hydrocopter" in the late 80's, I corresponded with Francis Reynolds after the magazine article was published and he provided me with additional details of his work.

Unfortunately I have never had the opportunity to explore this concept further myself and regrettably I failed to maintain contact with Francis Reynolds since our initial correspondence in the early 90's.

SABREFOIL

By Ray Vellinga (IHS Member)

About 1970 I designed and built a hydrofoil called "Sabrefoil". The boat had a 40 HP Chrysler engine with a long shaft. The picture here shows me at the helm, and my father-in-law is hanging on. It rocketed me at about 30 - 35 MPH down the Fox River in Illinois.

Of course I crashed, went through the windshield, broke my nose, almost drowned and came down with pneumonia a few weeks later. I probably shouldn't have gone that fast, tested in November, and used that much power on a small boat

The experience suppressed my compulsion to fly for a scant 30 years and now I'm ready to go again, this time with a more efficient design & less power. And that's what I am working on now.

HYDROFOILS IN HAWAII?

By Ralph Patterson (IHS Member)

Referring to an article on page 12 of the Summer IHS NewsLetter, I saw that the Star-Bulletin had picked up this story, too. This is the fourth or fifth proposed "revival" of the SeaFlite service since the demise of the three-Jetfoil service between the Islands. The news reporters seem to have memory lapses on these previously unsuccessful ventures. Kubota, however, has been around a long time, and should know what's up.

I have always thought that Hawaii is an absolutely ideal location for the high-performance hydrofoils represented by the Jetfoils, but there are MANY obstacles to the proposed revival.

One of the most important is the availability of operationally sound US-built Jetfoils, to meet the requirements of the Jones Act. Another big hurdle will be operations in the Whale Sanctuary, at least at certain times of the year. Beyond that, the stop at Kaunakakai is problematical from a traffic viewpoint, and the weather there will be tricky sometimes. Maalea is a bit better, but still a ways from Lahina and Kihei.

My feeling is that we should report the activity, enroll the company in IHS if possible, support any valid efforts, and keep a healthy skepticism in what we put in the Newsletter.

SAILOR'S PAGE

THE WINDRIDER RAVE - PART I

By Martin Grimm (IHS Member)

Although hydrofoils sailboats have been around for many years, until recently they have tended to remain the domain of experimenters and hobbyists. As such, they have generally been one off designs or modifications of existing sailboats. Consequently, the wider sailing community has perhaps considered sailing hydrofoils as quirky test craft.

The WindRider Rave can fairly claim to be the first true practical mass-produced sailing hydrofoil. While the Rave is still a relatively recent design, production having started in 1998, over the last few years it has rapidly become a popular recreational and sports sailing hydrofoil, particularly in Northern America.

This article draws on information about the Rave that is available via the Internet Rave Page (www.ravepage.com) thanks to Eric Arens, proprietor of WindRider of the Treasure Coast based in Florida USA.

The Development of the Rave

Traditionally, sailboats intended for higher speeds have tended to adopt planing hullforms or catamaran configurations. When, in the late 90's, Wilderness Systems (WindRider) decided to create a new high performance sailboat, they engaged the design expertise of Sam Bradfield and his firm, HydroSail Inc. The design brief was to develop a fast boat but not one so temperamental that it takes a team of engineers to assemble it or a test pilot to sail it. It was required to be capable of coping with typical sailing conditions. The designers knew that additional speed could be achieved though the use of hydrofoils such that the hull largely remained clear of the water. The result is the WindRider Rave, an innovative hydrofoil-assisted trimaran design that is relatively simple in arrangement, is easy to rig, and remains affordable.

The Rave foil system was designed by Dr Sam Bradfield, the founder of HydroSail Inc, and his associates Mike McGarry and Tom Haman. Styling and further design and production advice and coordination were provided by WindRider's R&D director, Rick Jones.

Dr Sam Bradfield is one of the pioneers in the field of foil supported sail craft. Since the 60's, he has been developing speed sailing boats. This began with a craft named $(nf)^2$, meaning 'Neither Fish Nor Fowl', a hydrofoil sailboat 20 feet in length with a beam of 14 feet and weight of 550 lbs. With 218 square feet of sail, it averaged 23 knots over a 500 metre course to set a Class B (235 sq. ft. maximum sail area) record in 1978. Later, that was followed with another world record for $(nf)^2$, this time in Class C (300 sq. ft. maximum sail area) when the craft achieved 24.4 knots.

By early 1998 the initial design work and construction of prototypes had been completed and these boats were used for 'shake-down' trials to refine the design for production.

The display of the third prototype Rave at the 1998 Miami International Sailboat Show attracted several orders and also interest from potential distributors.

Wilderness Systems (WindRider) already had the manufacturing expertise to produce the boats economically so the first production boat was completed in North Carolina in mid 1998 complete with modifications identified from the prototype trials. Production of the craft is continuing and further refinements are being made on the newer boats.

The Hull

The hullform arrangement of the Rave follows the same concept as the 16' WindRider trimaran that had earlier been designed by Jim Brown. The Rave features one slender main hull and a pair of slender outriggers supported by a single 15 foot wide cross beam. There is sufficient buoyancy in these outriggers (or amas) to support a crewman out at either ama without capsizing the boat. The amas are waterproof and equipped with two inspection hatches. The central hull is fitted with two moulded seats with padded adjustable backrests.

The three hulls are manufactured from robust yet relatively lightweight linear roto-moulded polyethylene. This is the first time polyethylene has been applied to a performance sailboat and is intended to provide good

Continued on Next Page

THE WINDRIDER RAVE

(Continued From Previous Page)

durability and requires minimum upkeep.

The Rave is sturdily built so as to avoid the need for running repairs. The foil, rig, and sailing loads are carried by an aluminium structure rather than the soft and flexible skins of the hulls. The cockpit is stiffened by a 6061 T6 aluminium space frame, and the same hard coat anodised material was chosen for the robust central crossbeam. The fittings and crossbeam are intended to stand up to strong wind loads.

The designers of the Rave have chosen to avoid the use of carbon fibre to reduce the cost of construction and of any repairs. A carbon spar and composite hulls could have reduced weight and translated to a few extra knots, but this would have lead to an unacceptably high purchase price.

The Foils

When foilborne, the Rave is supported by three fully submerged extruded aluminium hydrofoils. These foils are all of a similar inverted T geometry. One foil is mounted aft of the transom and the strut of this foil also serves as the rudder. The other two foils are located below each ama. The foil struts serve to provide lateral resistance in a similar manner to a conventional keel or centreboard. The forward foils are fitted with small elevators or flaps to maintain the flying height, and heel and trim stability of the craft. The incidence angle of the flap on each foil is controlled by a surface sensing 'wand' which is mechanically linked to the flap. As speed increases and the foils start to lift out of the water, the wand lowers and reduces the flap incidence until the craft flies at its equilibrium attitude. The addition of optional wand de-couplers and Doran up-hauls allows for manual flap control by the pilot.

In a stiff breeze, the windward side of the hull (or weather ama) is lifted upwards. This causes the control wand to automatically lower, which in turn generates a down force on the windward foil, helping to generate a heel righting moment. This contributes significantly to a vessel's ability to carry a relatively large sail area for its size.

It is possible to sail the Rave with the foils either fully retracted, at "half latch" or fully lowered. Sailing with the foils half way down is ideal for lighter winds that would be insufficient to sustain foilborne operation. This position maintains sufficient lateral strut area for upwind sailing yet reduces the hullborne draft to less than 2 feet. The foils can be extended all the way down by pulling a latch line and a bungee cord (to induce negative lift) for each foil. On the earlier built Raves, retracting the foils meant walking out onto the beam and lifting them. Newer or modified Raves incorporate an Up-Haul System for the foils controlled from the cockpit. By unlatching the foils briefly they will "fly" themselves up to the intermediate position. If the latch line is held

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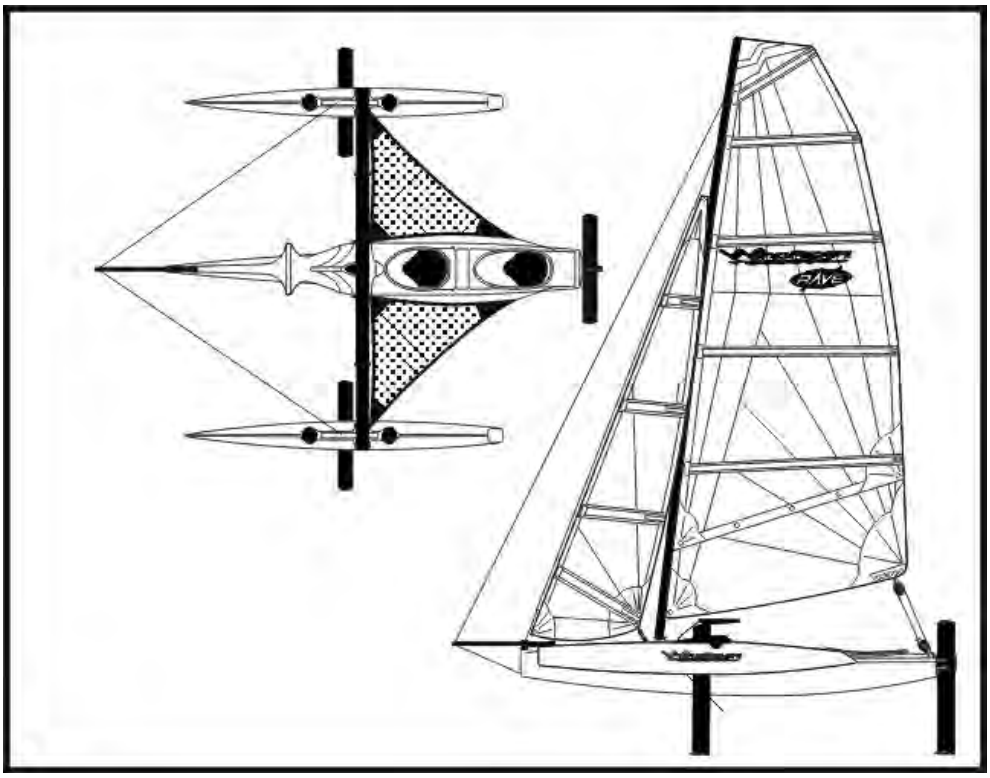

Abbreviated Specs:
Length of Main Hull: 16'
Beam: 15'
Draft (HB) With Foils Up: 1'
Draft (HB) Foils Fully Extended: 4'
Mast Height: 23'
Load Capacity: 400 lb
Total Sail Area: 195.2 sq. ft.

RAVE

(Continued From Page 11)

for longer, they can retract all the way up.

The Sails

The standard rigging of the Rave is a relatively conventional fractional sloop rig, with a rotating stayed foil shaped anodised aluminium mast , a boomless but fully-battened mainsail of reinforced transparent Mylar and a self-tacking Mylar blade jib both supplied by sail maker Neil Pryde. An optional asymmetrical spinnaker known as a "screacher" with roller-furling and bowsprit is available to provide additional power in light winds.

[Editor's Note: Part II of this article will be published in the IHS Winter 2001-2002 issue]

JUNKYARD WARS

The IHS has been contacted for assistance in a rather interesting project involving hydrofoils.

A television production company has been hired by The Learning Channel (TLC) to put together a video on the subject of "Junkyard Wars" featuring hydrofoils. Jackie Morris, in charge of production for a television series called "JUNKYARD WARS" in the U.S, and "SCRAPHEAP CHALLENGE" in England. Basically, it's a simple idea where engineers are challenged to create a machine out of junk... in only ten hours! Then the machines are raced or put to a test in some way.

The way the program works is that they start off with ten teams. These teams consist of three people, who saw the show, and applied together to be on it. They come from a variety of backgrounds but one thing they all have in common is that they can all weld, are good with engines and work with machines (i.e. They can be anything from farmers, firemen and car mechanics to Antarctic Researchers, RAF engineers and soldiers etc.

They enter this "knock-out competition" with the knowledge that they will be building machines out of junk but without the knowledge of knowing exactly what those machines might be. Whichever teams wins their challenge, goes through to the next round.

They find the experts who will be put with the teams who take part, depending on what challenge they are doing. The teams need an expert because although they have very good mechanical skills they may never have built or worked on a hydrofoil before. The expert is there to advise them on how to do this and also to help them build it. The unusual part of this is that the teams don't know what they are building until the day of the competition. So they try to come up with something that will be a culmination of both their skills and ideas.

This particular show, featuring hydrofoils, is the Series Final so the teams competing will have worked hard, and come through a few rounds, to get here. They will win the "Scrapheap Trophy" and the glory of being the winning team of the competition.

[Editor's Note: The filming that was done in August was for the "Scrapheap Challenge" and will be shown in Great Britain after the first of the year. Claus Plaas (IHS Member) was one of the team experts. We congratulate him for participating. An American version of "Junkyard Wars" featuring hydrofoils is being filmed as we write this article.]

NEW BENEFIT

IHS provides a free link from the IHS website to members' personal and/or corporate site. To request your link, contact Barney C. Black, IHS Home Page Editor at webmaster@foils.org.

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LETTERS TO THE EDITOR

Volga Hydrofoils in Sweden...

[6 Sep 01] In the Stockholm area there are approximately12 Volgas, and 7 of them are in operation. I am restoring one I bought in Estonia last year, and the interest in Volgas is rising in Sweden. — Jan Wennerström (jan@wenco.se)

Propeller For Human Powered Hydrofoil

[6 Sep 01] I'm interested in designing a prop for a recreational hydrofoil that would travel at speed of 9-10 mph. And I'd like to know if you can send me information about what NACA profiles to use, how much "twist" it shoud have, etc. I have very little knowledge on propeller design, but from what I've seen on the FLYING FISH it uses a prop that has the following characteristics: it's 16" dia, the chord is 30-40mm at the hub, and the tips end in a point so it looks like a half ellipse. It also has thin section throughout the blade length. I work as a CAD designer, and it would be easy for me to make a 3D computer model of a prop if I had all the information/specifications to design it. Then I could rapid- prototype a SLS (stereolythography) model of the prop in nylon, that would be used to sand-mold a magnesium prop that would be sanded and polished to an acceptable surface finish. Or I may make the prop out of carbon fiber. The key thing is the prop will be exactly the same as the computer model, thus reducing the chance of by-eye error. I don't have the skills to carve a prop by hand anyway. Voilà ! that's the story, hope to hear from you soon. — Felix Audet (lorraine.amyot@sympatico.ca)

PLAINVIEW as Yacht Platform?

[5 Sep 01] I would like to find out all the information on the PLAINVIEW regarding plans, blueprints, photos, "action shots", etc. This information will be important in evaluating the market for a luxury hydrofoil. — Vladimir M. Algin (v.algin@businesstalkfrance.com)

Response...

[5 Sep 01] In direct response to your quest for information on the USS PLAINVIEW, I can provide the following information: Following the decision to exit the hydofoil business, Grumman (now Northrop Grumman) shipped all hydrofoil files for "safekeeping" at the US Navy's request to the Hydrofoil Data Bank at David Taylor Ship R&D Center. I personally supervised this transfer. Your best bet probably would be locate the information there. (Grumman never was reimbursed for the transfer effort.) If you are unable to locate the information you seek from official sources, I may have some or all of the information you seek in my personal files; but it would take some time and effort to locate. I know I do have a reduced size mylar (11" high) of the hull lines and offsets. If you go this route, I suggest you forward a list of your requirements. As a professional Naval Architect, I would strongly advise against configuring the PLAINVIEW as a luxury hydrofoil yacht. I joined Grumman as a Naval Architect in 1963. The PLAINVIEW was originally designed at Grumman about two years prior, and the integration and balance of foilborne and hullborne functions in a ship design was not fully understood at the time. The design was almost totally biased to foilborne performance, particularly longitudinal weight distribution. In addition the hull density was low (i.e. the enclosed volume was too large.) As a result, the aft compartments of the PLAINVIEW could not carry any major weight without upsetting longitudinal distribution. These compartments were largely empty; their primary function was to connect the tail strut and foil to the rest of the ship. Part of the beauty of the PLAINVIEW is the long slender aft main deck, cutdown from the forward portions of the ship. What is not well known, is that the aft portions of the hull design were cut down to the final configuration during design development as a weight saving measure and to improve the weight distribution. So the intrinsic beauty of the PLAINVIEW resulted from the necessity to correct original design flaws! I wrote a paper about twenty years ago addressing the integration of the hullborne and foilborne functions in a hydrofoil ship, entitled "Hydrofoil Hullform Selection". I think it is included in the new IHS CD-ROM, but I believe it is mistitled as "Hydrofoil Hullform Section". If you haven't already, I would highly recommend purchase of this CD, as it appears to contain a lot of potentially useful information in an easy to store form. It is a bargain at $5.00! I refer you to this paper to better understand the integration of hullborne and foilborne aspects of a hydrofoil. If you can't get a copy, I may still have a copy in my personal files. In your interest in hydrofoil luxury yachts, are you thinking of a ship the size of the PLAINVIEW or a smaller scaled version? A hydrofoil the size and speed of the PLAINVIEW will certainly to expensive to design, build, and operate. If this is your objective, I would consider it to be an order of magnitude beyond "luxury". — Charles G. Pieroth (SoundTM@ix.netcom.com)

Raketa Hydrofoil Ferry For Sale...

[3 Sep 01] For Sale: Raketa Hydrofoil, Ex-Rhein Jet. The Hydrofoil lays in the Netherlands near by Rotterdam. Currently this Raketa hydrofoil is NOT in service. Price idea is $32,500-USD — Mark van Rijzen (info@dutchhydrofoils.com) Mijsstraat 9; 2461 AK TER AAR; The Netherlands; Telephone: +31(0)172-607284; website: http://www.dutchhydrofoils.com.

Likes Foils Since Greece...

[3 Sep 01] Just thought I'd say what a great Website this is and I can safely say it's pro-

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LETTERS TO THE EDITOR
(Continued From Previous Page)

viding me with many hours of pleasure when I should be working! I've always fancied building a hydrofoil as a university project. I thought my idea for a wave-slicing hydrofoil was original, so I was amazed to read all about the PHMs and Jetfoils that already utilise a fully-submerged foil system, but it hasn't put me off and we'll just have to see if I can do better! I suppose I've always been an engineer, one of those people who has to know how everything works. I've always loved hydrofoils after many holidays in Greece where many of the V-foiled Russian hydrofoils now reside. I'm hoping that my degree studies in fields such as Control, Electronics, Mechanics, Aerodynamics and Materials should actually provide me with a good basis for building a hydrofoil. I'm on a year out working for one of the world's leading Aerospace and Defence companies, but I'm already starting to consider my project. I may send you any conceptual designs I create to see if I can get any advice. — Mark Landers (mark.landers@baesystems.com); BAE SYSTEMS Advanced Technology Centre; Great Baddow Chelmsford

Source of HPB Gearbox Advice...

[3 Sep 01] I have just finished building a prop-driven sail board that has entered a race and finished in first place. The pedal power was provided by my daughter. We plan to enter other Human Powered Boat (HPB) races in the future, since she running at 6 mph for a 100 meter distance. This is a displacement craft, but I hope to convert it to hydrofoils within the next few weeks. If you need any information on gearboxes, just ask. I have been designing all types of machinery on Auto-CAD for more years than I can count. — George Ventz GEORGEVENTZ@msn.com

PHM Sighting in South Carolina...

[3 Sep 01] At approximately 7:15 p.m. on Tuesday, July 24th, 2001 a commercial tug (northbound on the Intracoastal Waterway) passed the Belle Isle Yacht Club (Georgetown, SC), pushing two Navy hydrofoils, stern first. Do you know which hydrofoils they were and what their destination was? I have about 30 seconds of amateurish video of the event. — Bob Miller (CBbi@gateway.net)

Response...

[3 Sep 01] Presumably two of the PHM Class, that are up for scrapping. — Barney C. Black (webmaster@foils.org)

Using Foreign-Built Ferries in the USA...

[3 Sep 01] I am considering whether to import a hydrofoil ferry for use in the southern USA. Is the US market protected from imported ferries? — Matt Kirk, Florida (matric39@gte.net)

Responses...

[5 Sep 01] 1. Foreign built hydrofoils cannot be used in the US under the Jones Act which prohibits foreign built boats. However they can be used if the vessel "goes foreign" i.e. from Florida to the Bahamas, Maine to Canada, NY to Canada, etc. There is a possibility that a boat can be imported under a waiver from the Jones act with a contract to build in the US. To do this, it would take excellent relations with a congressman to get the waiver. 2. The InterMar Group represents Ukrainian (ex Russian) shipyards who build hydrofoils, for example Morye Shipyard in Feodosia, Ukraine and Volga Shipyard in Nitzy Novograd, russian. We also broker used boats, for example two Olympia's, and four vessels in Toronto. 3. We continue to work on getting a shipyard in the US to build Hydrofoils. We are currently working on putting together a project in New England that would build the boats and we would import the foils. Please feel free to drop me a email to tell me more about your project. Based on the information, I'll see if I can assist you. — Tom Schneider, InterMar Group (img@one.net), website: www.intermar-group.com

[5 Sep 01] A good discussion of the Jones Act (Federal Statute 46 USC section 316) and the other cabotage statutes can be found at www.shipinformationcenter.com/p207.htm. A spirited, partisan defense of the Jones Act can be found at www.mctf.com/jonesact.htm . There was a movement to revise the Jones Act back in the 1998 time frame and a Jones Act Reform Coalition was formed. I believe that it was unsuccessful, however, and it may have since disbanded. — Barney C. Black (webmaster@foils.org)

[6 Sep 01] The statement is made that one might be allowed to import a foreign craft in conjunction with a program to build in the USA. I heard of that happening in Florida a couple of years ago (but I haven't heard any more about it since). The idea was that the operator would buy two foreign-built craft and quickly follow up by building another three or more craft in the U.S. There must have been some rationale behind it that said it would be too costly or take too much time to build all of the craft in the U.S. And as Tom Schneider says, that takes some strong support from a congressman. A second possibility is represented by the approach Island Engineering (Bill McFann) has taken with a Norwegian SES. They apparently have approval to use that craft as a ferry in the USA, but I think it's premised on the need to do a lot of work on the craft to refurbish it and make it fully acceptable for U.S. operation. That probably means they'll spend more on it in a U.S. yard to fix it up than they've spent to acquire it in its present condition. — William Hockberger (hockberg@erols.com)

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LETTERS TO THE EDITOR

(Continued From Previous Page)

World War II German Fast Attack Hydrofoil Craft...

[3 Sep 01] I am a 16-year-old undergraduate student in Parma - Italy who is performing assigned research on German fast-attack boats (in particular hydrofoils) of War World II. Although the historical part of your WebSite is a very comprehensive one, I was unable to find there some detailed technical information I need for my writing. Would you be so kind to address me to other more detailed WebSites dealing with the topic or key person (like the late Captain Johnston) who could help me further? Also, are there relevant books on the subject? Flavio Scarpignato (scarpi@tin.it) or (carmelo.scarpignato@unipr.it) e-fax: +1-603-843-5621; website: http://www.unipr.it

Response...

[3 Sep 01] Following are some quick ideas: There is a 1982 book: Strike Craft by Antony Preston; Bison Books Ltd (17 Isherwood Place; Greenwich CT 06830 USA) ISBN 0-86124-068-5. This book contains many photos and much history of German E-Boats and S- Boats... no specific WWII hydrofoil history however. There are several used copies of this book available at http://www.amazon.com. There is a photo of this book on the IHS website at http://www.foils.org/popbook.htm.

A search for fast attack boats and torpedo boats on amazon.com yielded several interesting titles, but I do not have a copy of or know the specific contents of any of these: German Coastal Forces of World War Two by M.J. Whitley; Coastal Forces (Brassey's Sea Power : Naval Vessels, Weapons Systems and Technology, Vol 10) by Barry Clarke, Jurgen Fielitz, Malcolm Touchin, Geoffrey Till (Editor); From monitor to missile boat : coast defence ships and coastal defence since 1860 by George Paloczi-Horvath; Fast Attack Craft by Anthony J. Watts; Fast attack craft : the evolution of design and tactics by Keiren Phelan; Fast Fighting Boats, 1870-1945: Their Design, Construction, and Use by Harald. Fock; Die Flottille: aussergewoehnlicher Seekrieg deutscher Mittelmeer-Torpedoboote by Wirich von Gartzen; E-boats and coastal craft: a selection of German wartime photographs from the Bundesarchiv, Koblenz by Paul Beaver; Z-vork: internationale Entwicklung und Kriegseinsèatze von Zerstèorern und Torpedobooten, 1914 bis 1939 by Harald Fock; Fast Fighting Boats, 1870-1945: Their Design, Construction, and Use by Harald. Fock; Flottenchronik - Die an den beiden Weltkriegen beteiligten aktiven Kriegsschiffe und ihr Verbleib, by Harald Fock, erschienen 1995 im Koehler Verlag."Mit diesem Buch wird erstmals der Versuch unternommen, das Schicksal der an den beiden Weltkriegen beteiligten aktiven Kriegsschiffe aller Nationen darzustellen. Das Werk umfaßt die Kriegs-und Nachkriegsschicksale für den Zeitraum 1914 bis 1980 in chronologischer Reihenfolge". There are three hydrofoil attack craft on Michael Emmerich's Kriegsmarine site at: www.german-navy.de/tb5.htm, www.german-navy.de/tb5c.htm, and http://www.german-navy.de/tb5b.htm There was a magazine article: von Schertel, Baron Hanns, "Hitler's Hydrofoils," The Best of Sea Classics, Summer 1975 and Sea Classics Jan 74, Challenger Publications, Inc. Canoga Park CA, USA, pp 4-9, reprinted from Aviation & Marine Magazine, France. Baron von Schertel first began experimenting with hydrofoil craft in 1927. This article gives details on German hydrofoil development during World War II. In 1939, the military first became interested in a 2.8 ton hydrofoil demonstration boat. Various hydrofoils followed that craft, including the VS 6, VS 8, VS 10, TS-1 Coastal Surveillance Hydrofoil, Single-Seat 3-ton torpedo boat, and the 4-ton Pioneer Corps workboat. Hopefully some of this will be of assistance to you. Unfortunately IHS is not a source of the documents cited above! — Barney C. Black (webmaster@foils.org)

[9 Sep 01] You might add another book to the reference list: Marine-Kleinkampfmittel by Harald Fock, Nikol BVertragsvertretungen 1996, ISBN 3-930656-34-5. This is the book where I found the German hydrofoil projects described. - Michael Emmerich (emmerich@german-navy.de)

Paravane Questions...

[3 Sep 01] I read Phil Morris' comments about a paravane. I have had the same idea myself, as mentioned at Jon Howe's forum at the speedsailing pages. It appears his foil is a supercavitating one. Also an interesting (and pretty) approach is the "jellyfish foiler", although what will happen when the luff-ward foil slips? I suspect the pivot point will now be the lee-ward foil, and the whole craft may bury or make a judo.

I would like to know from Phil Morris if he has had any progress in his research on making a "water-hook". Also I have read somewhere that it has been tried (as I understood it) in combination with a wakeboard and a kitesurfing kite (by whom, I dont know, I think it was one of the foil-chair or -ski manufacturers), but they couldn't control it in high speeds. No details on the setup were given. — Sigurd Grung (mermade@frisurf.no)

Letters To the Editor allows hydrofoilers to ask for or provide information, to exchange ideas, and to inform the readership of interesting developments. **More correspondence is published in the Posted Messages and Frequently Asked Questions (FAQ) section of the IHS internet web site at http://www.foils.org.** All are invited to participate. Opinions expressed are those of the authors, not of IHS.

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LETTERS TO THE EDITOR
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Need PHM Status Today...

[2 Sep 01] I took note of the pic in your photo gallery of the three 'foils as they appear today. My question to you is whether you have any information regarding their location either in that pic or at present, as well as scrapping progress. I've spoken to fellow Naval Reservists like myself who would like to see one saved from the heap. Any information you could supply would be of great help to get some kind of ball rolling if possible. Thank you for your time and for actually having a current pic. — IT3 Brian S. Bell USNR (RIP2262@aol.com)

PLAINVIEW Print Wanted...

[2 Sep 01] I was one of the first members of the crew of the PLAINVIEW. During the time that I spent on the Plainview the crew members were given a print made from a picture of the PLAINVIEW while it was foilborne. Seattle was in the background and even Mt. Rainier could be seen in the background as well. If anyone knows where I could get a copy of that print or a similar print please let me know. The picture I have in mind would have been made in 1969, 1970 or 1971. Your help would be appreciated. — Terry Haynes (t_haynes@cybrtyme.com)

Foil-Based Power Generation From Tides and River Currents...

[2 Sep 01] I think this will interest your members. I will join IHS soon. I am in AYRS and am just getting into hydrofoils. With reference to the attached draft design, I would like just to ask one question: What foil would give me the maximum combination of lift and drag factors working together... I think a fat camber foil. It will be only moving at 1-2 mts /second as the load factor will control the speed. This is opposite to all the uses of foils, so far as I know. Any help??? Ideas, etc. always welcome. — Ken Upton (cyberlifeboat@wanadoo.es)

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. — Barney C. Black (webmaster@foils.org)

MONITOR Photos...

[5 Aug 01, updated 1 Sep 01] For those interested in Gordon Baker's historic sailing hydrofoil MONITOR, some new photos have been posted on the website. — Barney C. Black (webmaster@foils.org)

Calliope – Design and Development of a 4.9m Hydrofoil Catamaran

[13 Aug 01] A couple of years ago my father and I wrote an article about one of our sailing hydrofoil boats for a conference in Hobart. The conference organisers never published it, but it appeared in AYRS Catalyst Vol 1 No 2 July 2000 and is now available via my web page at:
http://homepages.rya-online.net/ejcchapman/ Sam Bradfield suggested it be made available to as wide an audience as possible, so perhaps it could be added to the list of members web sites? — Joddy Chapman, South Brent, Devon, UK (ejc.chapman@rya-online.net)

Response... [2 Sep 01] Thanks to everybody involved for getting this interesting and enlightening article published here! My two person "bicycle"arrangement monohull foiler is almost complete, and I was particularly interested in the comments in the article on ventilation of the vertical foil (daggerboard), since my main foil is mounted there also. — Doug Lord (lorsail@webtv.net)

Planing Sailboard...

[10 Aug 01] I am from the University of Natal and need assistance on the theory of planing. I am doing a dissertation on the hydrodynamics of planing sailboards. If you have any information on this it would be greatly appreciated. Would a copy of the 1994 Shanghai Conference proceedings be of any use? — Gordon Cook (981189683@stu.und.ac.za)

Responses...

[10 Aug 01] Try the following two websites: http://naca.larc.nasa.gov/reports/1958/naca-report-1355/ http://personal.inet.fi/private/muu/plancat.htm Tom Speer (tspeer@tspeer.com) website: http://www.tspeer.com

[13 Aug 01] Planing theory has been covered in depth by many papers authored by Dan Savitsky at Stevens Institute. "High Speed Small Craft" by Peter Du Cane (Temple Press, London - 1964) is a good reference. The Heller-Jasper paper on this subject is a classic (SNAME, late 50s I believe). Joe Koelbel has also published some good basic small planing craft design guidance - in papers and magazine articles. —Ken Spaulding (secretary@foils.org)

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EXTRA FOR THE ELECTRONIC EDITION

LETTERS TO THE EDITOR

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Update on PHM Ex-ARIES

[31 Jul 01] We have been spending as much time as possible working on the PHM. We are having some difficulty figuring out the wire numbering. Thanks to a note book from John Monk, we were able to learn how all the equipment and compartments are numbered. We are having less luck with the wiring. I am going to be in Key West next week, I would like to talk to someone there that may have had experience with the PHM fleet operations, maybe even see what may still be around, like the hauling carts or other support equipment. If anyone could guide me in the right direction I would be very appreciative. The red tape involved with forming our non-profit organization is taking far longer than hoped but once established, we will be able to offer tax deductions for donations toward the restoration and preservation (technically "rehabilitation")

Elliot S. James
esjames@cvalley.net

Sportfoil Plans Wanted

[18 Jun 01] I am particularly interested in building my own SportFoil, but Michael Stevensen (Back Yard Yacht Club) is sold out with no intention to reprint. Is it possible to advertise for a used set of plans for SportFoil somewhere at your web site?

Dag Jahnsen
Dagjahns@online.no
Nesalleen 15, 3124
Tønsberg - Norway
Phone +47 3301 5005
Mobile +47 920 20 912

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NACA Reports of Interest to Hydrofoil Designers

The U.S. National Advisory Committee for Aeronautics (NACA) was chartered in 1915 and operational from 1917-1958. The National Aeronautics and Space Act of 1958 created the U.S. National Aeronautics and Space Administration (NASA) from NACA.According to the 1999 NASA Technical Manual NASA/TM-1999-209127 *A Digital Library for the National Advisory Committee for Aeronautics* by Michael L. Nelson of Langley Research Center, Hampton, Virginia, "The main product of NACA's research was its multi-tiered report series. Although the exact number of NACA reports published is unknown, most estimates place this number between 20,000 and 30,000. This collection of work remains in high demand even today, especially in the areas of general aviation and the basic fundamentals of flight.

"Unfortunately, although significant collections of NACA documents exist at a handful of NASA centers, universities and other government and industrial research laboratories, no single library contains a complete collection. Even what constitutes a complete NACA corpus is subject to debate. Furthermore, because of their age, high circulation, and acid-based paper, many of these reports are in poor condition and will cease being serviceable in the near future. Conversion to digital format and dissemination over the World Wide Web — begun in 1995 and ongoing — is necessary for preservation as well as for wider dissemination."

The NACA Technical Report Server (NACATRS), the digital library (DL) that serves the NACA collection can be accessed over the internet at http://naca.larc.nasa.gov/. NACATRS offers browsing and keyword searching of its holdings. The NACA publications are scanned, but... "Optical Character Recognition (OCR) is not being applied for the NACATRS, primarily because the format of the NACA publications are often pages of equations, tables, charts and figures, none of which are well suited for OCR. Instead, the report is converted into a combination of GIF and PDF files for easier WWW dissemination...

The first NACA Reports were issued in 1917, but TNs and TMs did not appear until 1920. The early publications were often either translations from European aeronautics works or authored by universities or other federal or military research laboratories. This is because NACA was initially truly a committee of aeronautically interested organizations rather than a federal agency in present context. As NACA acquired its own staff and developed its own research facilities, the number of publications authored by non-full-time NACA staff decreased. NACA published in a variety of internal report series. Currently [as of April 1999], the NACATRS holds the following NACA publications series:

- *Reports* - NACA reports were considered to be the final and complete documentation on a subject or project and they often superceded one or more other NACA publication types. NACA Reports are sometimes (erro-

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NACA
(Continued From Previous Page)

neously) referred to as 'NACA Technical Reports.'

- *Technical Notes (TNs)* - Technical Notes were the basic unit of the research report series. Some early TNs were translations of foreign works.

- *Technical Memorandums (TMs)* - TMs are translations of foreign works. The TM series probably replaced translations in the TN series.

- *'Wartime Reports'* - Reports produced specifically for World War II research, they were declassified after the conflict. Due to their urgent nature, they frequently received little editing when written, and no editing was done after they were declassified. The moniker 'Wartime Reports' was added when they were declassified; previously they were issued as Advance Confidential Reports (ACRs), Advance Restricted Reports (ARRs), Restricted Bulletins (RBs) and Confidential Bulletins (CBs).

- *Research Memorandums (RMs)* - RMs were initially restricted, and represented initial or limited scope results, and thus received less editing and preparation than other report series.

"NACATRS currently does not include:

- *Annual Reports* - Annual Reports were simply the concatenation of a single year's NACA Reports (i.e., excluding TNs, TMs, etc.). Inclusion of the NACA Reports in NACATRS implicitly includes the Annual Reports.

- *Aircraft Circulars* - Reports published in the 1920s-1930s that reviewed the design and performance of contemporary aircraft (one AC per vehicle).

- *Conference or Journal Preprints* - We are unaware of how many items this would include. However, their content would likely be covered in a Report or TN, so this exclusion is probably negligible.

- *Books* - No books by NACA authors are included."

Now the question is: in all this mass of technical data, which reports are of interest to hydrofoil designers? Submit your suggestions to Barney C. Black at IHS (email: webmaster@foils.org) See sample suggestion below.

Besides Report 1232 *A theoretical and experimental investigation of the lift and drag characteristics of hydrofoils at subcritical and supercritical speeds*, and Report 918 *Theoretical Motions of Hydrofoil Systems,* there's TN 4168 *A method for calculation of hydrodynamic lift for submerged and planing rectangular lifting surfaces*, which also deals with hydrofoils. Some of the reports dealing with lift and drag of biplanes can be used, since the linear approximation of the free surface effects gives the same solution for a hydrofoil as the lower wing of a biplane. There are also reports on planing surfaces, which can be useful for hydroskis and for predicting the drag of hulls at takeoff. See Report 1355 *A theoretical and experimental study of planing surfaces including effects of cross section and plan form*, and TN 4187 *High-speed hydrodynamic characteristics of a flat plate and 20 degrees dead-rise surface in unsymmetrical planing conditions*. In general, the NACA reports are a useful source of information on a lot of topics. — Submitted by: Tom Speer (me@tspeer.com) website: www.tspeer.com

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Russian Hydrofoil Documents in English Translation

[26 Jun 01] How does one get hold of NAVSEA (Naval Sea Systems Command) translations of Russian papers on hydrofoils etc. I have a number of references. I noticed in some IHS newsletters that Bill Buckley refers to the Naval Surface Warfare Center- Caderock Division Technical information service for such papers. Is this the correct place and do you have a contact address for them?

Gunther Migeotte
migeotte@ing.sun.ac.za

Responses...

[4 Jul 01]The NAVSEA Library is no more. Not sure where these translations may have gone. The Pentagon library is a possibility but I don't know what their policy is for access.

Mark Bebar
BebarMR@navsea.navy.mil

[4 Jul 01] In connection with the Advanced Ship Data Bank at the David Taylor Naval Research Center, to my knowledge there were never any Russian report translations entered into it, and I am quite familiar with the Data Bank contents.

John Meyer
president@foils.org

Whereabouts of DISCO VOLANTE Today...

[26 Jun 01] I've always wanted to know what became of the Thundeball hydrofoil DISCO VOLANTE. I read that a model of the boat was blown up high into the sky in the Bahamas. But who ended up purchasing the real hydrofoil,

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and does it exist today perhaps on display somewhere? (fmesfandiary@webtv.net)

DD-444 Website...

[28 Jun 01] Thank you for keeping the page on Mel Brown. As President of the USS INGRAHAM Association every week I receive some inquiry from some family member of the DD-444. The questions range from "How did they die " to "who were the survivors and what do they say about about the accident." Sadly the families were not told about the accident and what is known and what was not. Mel kept touch with several of the families and we include the relatives of DD-444 members at our reunion. Please direct family inquiries to our web site and let everyone know that they are welcome to attend our reunions. They are part of the USS INGRAHAM family and our experience tells us that such reunion attendance will help them finally deal with their loss in a caring manner. Every reunion includes a memorial service that honors those lost in this ship and those from the later DD -694 Our we site can be found at http://geocities.com/Pentagon/Quarters/4877/

Jerry King, President
USS INGRAHAM Association
Jandbking@earthlink.net

PHM-2 USS HERCULES Plankowner...

[1 Jul 01] I was the gunner's mate on the commissioning crew, but was discharged in 1983 shortly after going to Key West. Would appreciate any info on the ship's status, or on fellow plank owners.

GMG2 John Drozdowski
horndog114@hotmail.com

PLAINVIEW's End...

[4 Jul 01] I was stationed aboard the USS PLAINVIEW for 2 years from 1971-1972. I saw a picture of her on the net, and it was a sad picture. I think about her often. Do you know what her final days were like? I still have the picture of her during her glory, prior to my coming aboard. Thank you for any info you may be able to supply.

John Bass
jebass2@yahoo.com

Response...

[4 Jul 01] PLAINVIEW was fully operational and conducted some tests for the HYPAM (Hydrofoil pressure acoustic magnetic) trials up to the day that she was "decommissioned" and towed over to Inactive Ships. We had all the struts removed, the forward ones because of the gearboxes and the aft one because of the HY-130 steel construction. The aft strut was to be tested in the structures lab at DTNSRDC, and the gearboxes were saved for possible use in another project. Other than the diesels, I don't know what other equipment were stripped before putting the ship on the auction block. My understanding was the ship was bought to convert her to a fish cannery tender. We turned over all the drawings to a naval architect firm in Portland. [*See the IHS webpage dedicated to AGEH-1: www.foils.org/plainvw.htm. — Ed.]*

Sumi Arima
(Arimas1@juno.com

Piaggio P.7 Hydrofoil Seaplane

[6 Jul 01] This hydrofoil related website will likely be of interest: http://aeroweb.lucia.it/en/history/pegna2.htm.

Here is the background to my locating this site: I took trip North where I called in on the Fighter World aircraft museum alongside the RAAF Williamtown air force base in New South Wales, Australia. On display at the museum were numerous entirely hand made scale models at approximately 1:72 scale or smaller by Norm Forrester. These included a series of Schneider Trophy seaplane models. One such model which particularly caught my eye was the Piaggio P.7 of 1929. It was a sleek monoplane with a hydrofoil undercarriage rather than the usual bulky pair of floats. Here is the blurb by Norm Forrester placed alongside his model: "Piaggio P.7 (1929) — An ingenious (but unsuccessful) Italian design for a Schneider Trophy racer, it was proposed to use hydrofoils instead of floats. The driveshaft of the

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[Above] Jan Wennerström's restored Volga hydrofoil in the Stockholm Sweden area. See his letter on page 13

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970 HP engine first drove a water propeller until the P.7 rose on to the hydrofoils, the drive then being transferred to the airscrew. Alas, it didn't work!" Although I have read about various other similar attempts to use hydrofoils on seaplanes, I have never come across the Piaggio P.7 before. I was keen to find out more about the P.7 and its history which I have found on the cited webpage. Unfortunately my camera was not working so I couldn't take a photo of Norm's model, however I made a sketch from my video footage of it. The website also has three views and profile views of the P.7 on the link but they are not too crisp and much of the detail in those scans has been lost.

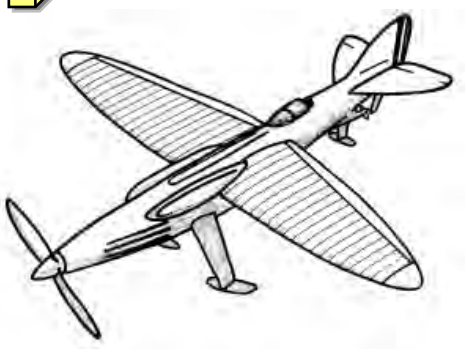
Martin Grimm
seaflite@alphalink.com.au

Volga 70 - Haul Out For Hull Preservation...

[30 Jul 01] I have a Volga 70 here in Australia. The craft was imported in 1985 and was built in the Keppel shipyards in Singapore. The craft has been in storage since arriving new in 1985, and we launched her this week for the first time. We have named her 'Beluga' (Russian and rare).

The craft performs extremely well and is raising a few eyebrows when she is out on the Derwent River, which Hobart is built around. I would like to know if the craft can be rested on the foils without any other support ... this would make it easy when slipping to antifoul. On the dashboard there is a plaque which reads as follows: 3 A B O N C K O N No. 38; r o n n o c t p o n k n; 1973; CAENAHOBCCCP. Could you translate this for me as the 1973 has me confused. Any information on Keppel shipyards would be appreciated.

David Powell
Powellds@optusnet.com.au



Sketch of Piaggio P.7

Responses...

[30 Jul 01] I rest mine on the foils. Another person I know built a trailer that rested the boat on the foils. I figure that the foils carry the weight of the boat and cargo at 28 knots, so it should not be a problem at rest on the hard ground.

Rick Jackson
Gabfire@home.com

[1 Aug 01] You may set the craft on foils but it is necessary to lay props under the foils near foil legs. The Russian text is translated as follows:

- Building number of the craft is 38
- The craft was built in 1973
- 'CAENAHOB' is not understood, but it may be 'CUDOIMPORT' which translates as SHIP-IMPORT
- 'CCCP' is USSR (Union of Soviet Socialist Republics).
- I do not know 'the Keppel shipyards in Singapore'

The Volga hydrofoils were being built at two shipyards in the former USSR. More details are on my web site.

Yury Garanov
P.O. Box 434
Nizhny Novgorod
603003, Russia
http://webcenter.ru/~garanov

Chinese Military Hydrofoil Info Needed For Model...

[31 Jul 01] As a hobby I make 1/700 plastic models of warships from various countries, and I am interested in hydrofoils of the modern Chinese Navy. Does anyone know of a book or website that has pictures of these warships? I have researched various internet search engines to no avail.

Chris King
chris_a_king@hotmail.com

Response...

[31 Jul 01] You can get some information from an old copy of Janes Surface Skimmers, say between 1979 and 1984, but not enough to make a model from. There were over a hundred hydrofoil torpedo boats of the Hu Chwan (White Swan) class active in that era, all built in Hutans Shipyard. Also, some were sold to Albania, Pakistan, Tanzania, and Romania. According to Janes, about 20 hulls of this design slightly modified were built in Romania. There was also a Hema class military hydrofoil about which I have no details. It may be worth the effort to inquire of the Naval Attache at the embassies of the various countries involved to see if they would provide any info... it's a small chance, but you have nothing to lose but the cost of the stamps.

Barney C. Black
webmaster@foils.org

Wants Copy of Keiper's Hydrofoil Voyager...

[3 Sep 01] I am interested in obtaining an electronic copy of Dave Keiper's book "Hydrofoil Voyager" about his ocean-going hydrofoil yacht *WILLIWAW*.

Jan Mantkowski
Jan.mantkowski@gmx.de

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WANTED TO SELL OR BUY

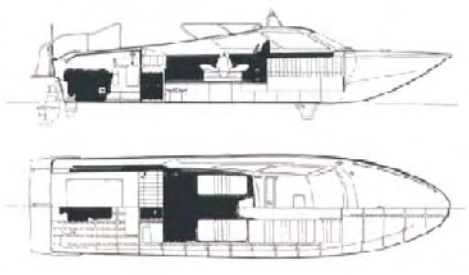
A Hydrofoil for 10-15 Persons

[9 Sep 01] I'm glad to inform you about the Russian DOLPHIN High-Speed Sea-Going Hydrofoil Boat. The DOLPHIN can be delivered as crew, pilot and passenger boat. Navigation area - coastal areas at a distance of up to 3 miles from shore and up to 20 miles from shelter bases in day time. The boat's hull is welded. Hull material is corrosion-resistant aluminium-magnesium alloy. The foil system consists of two carrying foils (bow foil and stern foil) and a stabilizer installed behind the bow foil. The foil system is made of stainless steel. The main engine is Volvo Penta AD41/DP sterndrive diesel engine.

Leonid Pomeranets
Marketing Manager
JSC High-Speed Ships
pik@peterlink.ru

DOLPHIN Specifications:

Length overall, m 10,0
Beam overall, m 2,5
Midships depth, m 1,1
Freeboard at full displacement, m 0,75
Height o/a with foils & mast, m 2,9
Overall hullborne draught, m 1,1
Foilborne draught, m 0,5
Light displacement, t 2,2
Full displacement, t 3,1
Max power, engine, kW (hp) 147 (200)
Speed, knots 35
Seaworthiness, sea state 3
Passenger capacity, persons 8
Crew, persons 1
Range, miles 200



The DOLPHIN can be delivered as crew, pilot, or passenger boat

Hydrofoil For Sale, Currently in Holland...

[14 Jun 01] For sale: This Voskhod-2 was built in 1978 (building number 320) in Morya Ukraine, and operated on the river Dneper in Kiev Ukraine. This ship arrived in Holland just recently and is in Russian condition. Due to changed plans in our company we have no use for this hydrofoil and so is offered for sale. Specs are: Length 27,60 mtr.; Breadth 6,40 mtr.; Draft hull borne 2,0 mtr.; Engine Zvesda M401 A; Passengers: 66; Ship lays in Holland IJmuiden. Price idea, about USD 100.000 For info, contact:

Erik de Wit
Info@dutchhydrofoils.com
Or
Mark van Rijzen
makkie.sannie@hetnet.nl

IHS neither sells nor recommends products and services, but as a service to the hydrofoil community, IHS does accept factual announcements of hydrofoils wanted to sell or to buy. A recent sampling is reprinted here, but the website is the most current source: www.foils.org

LETTERS TO THE EDITOR

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Response...

[3 Sep 01] IHS is willing to make an electronic copy of this book available on CD-ROM at cost, however it has not been possible to get agreement among the heirs to "give the copies away" because of hope that there may be someone interested in the future to reprint the book and generate a profit. That remains to be seen.

In the meantime, IHS will save emails from people interested in acquiring a copy of this book. If a new edition becomes available, whether hard copy or electronic, IHS will post a notice in the website announcements and will try to notify by email those who expressed interest in the past.

As for obtaining a used copy, we normally recommend that people search weekly for used books on www.eBay.com and on www.amazon.com Z-Shops until they find a copy. However, in several years of following these sites, I have never seen a copy of this book available.

Barney C. Black
webmaster@foils.org

Voshkod-2 for sale in the Netherlands. See notice on previous page.

WANTED TO BUY OR SELL...

(Continued From Previous Page)

For Sale, Egida Agency

[22 Sep 01] For Sale 1 hydrofoil "Meteor" type built 1988 USSR. For photo and complete details, see: www.egida.com/meteor/.

Also: Looking for partners/operators/travel agencies to establish joint venture to operate 2 our hydrofoils 'Meteor' type built 1986 / 1989 and 1 hydrofoil 'Voskhod-2' type, built 1989 USSR 71 PAX, 35 knots. Preferable trade areas: Danube river, Egypt . Owners are ready to provide full technical and crew management.

Vyacheslav Fyodorov
Shipping@egida.com
Egida Agency, Odessa, Ukraine
Tel: +380 482 21 00 95
Fax: +380 482 370372

RHS 70 Hydrofoils For Sale

Red Funnel SHEARWATER 5 & 6

[26 Jun 01] The very successful SHEARWATER 5 & 6 hydrofoil passenger vessels were withdrawn from service 1999 to be replaced by the three larger Red Jet high speed crafts. The vessels are laid up in Cowes, Isle of Wight. Assortments of MTU engine spares are available along with new spare propellers and tail shafts. All certifications presently expired, but full records and service history available. Consideration would be given for the vessels to be sold for MTU 331 engine spares. Specifications and more photos (Adobe Acrobat file, 510K) are on the internet at http://www.foils.org/sw-sale.pdf.

Steve Gillett
Sgillett@Redfunnel.co.uk
phone: Mobile 0044 7971 648832
Direct Line 0044 238072 4535

New Russian Meteor

[14 Jun 01] Zelenodolsk shipyard is producing a new version of Meteor, called Meteor-2000.

Specs are the following: Length overall 34.6 m; Beam overall 9.5 m; Draught: -hullborne 2.35 m, -foilborne 1.20 m; Displacement: -light 43.82 t, -fully-loaded 57.24 t; Main engines: DEUTZ AG (Germany) - 2 ´ TBD616V16. Each engine with the

power of continuous rating in tropical conditions about 936 kW (1272 h.p.) at 2165 r.p.m.; Diesel-generator - 1 ´ 44 kW; Passenger capacity 104-116 prs.; Crew 3 person.; DAIKIN Marine Type package air conditioners (warm/cool): 3; Cruising speed, calm water, at fully loaded displacement, not less, 75 km/h; Range without refueling 600 km.

Konstantin Matveev
Matveev_ski@hotmail.com

PT-50 Model Report

By Mark van Rijzen
Makkie.sannie@hetnet.nl

[14 Jun 01] Just want to let you know from the Netherlands that the Radio-Controlled PT-50 kit is real 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 the web: http://www2.glauco.it/rodriquez/crafts/crafts.html.

The NEWSLETTER

International Hydrofoil Society

P. O. Box 51, Cabin John MD 20818 USA

Editor: John R. Meyer | Winter 2001-2002 | Sailing Editor: Martin Grimm

RECENT APPLICATION OF HYDROFOIL SUPPORTED CATAMARANS

(From Fast Ferry International, September 2001)

This is an excerpt from an article written by Dr.-Ing K.G.W. Hoppe, Pr.-Ing, SAIMENA, Division of Marine Engineering, Department of Mechanical Engineering, University of Stellenbosch, South Africa & Managing Director, Foil-Assisted Ship Technologies cc.

Hydrofoil assistance on a catamaran model was tried 20 years ago and an unexpected resistance improvement initiated the creation of a research project to investigate the effect. Today the research project is still active in spite of designs and model tests resulting in the construction of over 200 HYSUCATs.

Theoretical efforts to determine the hydrodynamics of the HYSUCAT principle resulted in a numerical model for design analy-

Bell-Halter Catamaran, E-CAT, Retrofitted with Foils in 1999

See Hydrofoil Supported Catamarans, Page 3

WHERE ARE YOU IN CYBERSPACE?!

IHS relies on electronic communication with the membership to improve timeliness and reduce mailing costs. If you are a member with email, **let us know your email address!** Thank you.

2002 DUES ARE DUE

IHS Membership is still only US$20 per calendar year (US$2.50 for students). Your renewal or new membership is critical. Please remit 2002 dues as soon as possible. We regret that high bank fees make it impractical for IHS to accept payment by credit card or a check drawn on a non-US bank, or by other than US funds. Overseas members with no easy way to send US funds, are advised to send money order to IHS or US Dollars cash.

INSIDE THIS ISSUE

PRESIDENT'S COLUMN

I am very pleased to report that two of the Society's members volunteered to participate in the production of two hydrofoil related TV programs. There was an article in the Autumn 2001 NL (page 12) describing the project.

IHS Member Claus Plaass was one of two team leaders in the filming of "Scrapheap Challenge". He reported that as a participant in this "breathtaking, already-a-cult series", he outlined, developed and performed all the calculations for a weird hydrofoil "scrap-craft". Claus consulted for the British team "Catalysts" consisting of 3 Jaguar engineers (see: http://rotaryboy.screaming.net) in their battle against time and the mighty American team called "The Mulewrights". The program aired in Europe on Sunday, Nov 18th, 1800 British time. Channel 4 will air the 2001 Finals of their TV-series "Scrapheap Challenge" in the UK, or "Junkyard Wars" in the USA; see: http://www.channel4.com/scrapheap/scrapheap.html

IHS member, Captain Peter Squicciarini, participated as "Judge" in the filming of Junkyard Wars in October of 2001 featuring hydrofoil designs. He reported that as far as he knows the US version of JunkYard Wars episode of hydrofoils will air during the new season sometime in the Jan-Mar '02 time frame. It was a "fun" four days doing the "build" and show, but also hard work. Lots of the usual, predictable "hydrofoil" design and construction problems and challenges were evident. However, it was an "interesting," but not fully satisfying ending to the blood-sweat-tears of the two teams.

The IHS is very fortunate to have several members who, from time to time, lend their expertise to "those in need." I particularly want to mention, among others, Sumi Arima, Martin Grimm, Mark Bebar, Charlie Pieroth and Tom Speer. Of course our webmaster, Barney Black, continually (almost on a daily basis) offers help to requests for information – some hydrofoil related; some not.

Hats off to Steven Chorney who has been "manufacturing" and mailing AMV CDs to a host of individuals and Universities that have requested them. The IHS offers a copy to Naval Architecture departments at universities worldwide. Ken Spaulding has taken the time and trouble to unearth addresses of over 52 such Universities. They have received letters from me offering a free copy of the CD. To date, the IHS has provided a total of about 65 CDs. Orders and requests still come in from time to time.

2001 was another good year for acquiring new IHS members. Board Member, Sumi Arima, has agreed to be the Society's Membership Chairman and has been busy following up with those who contact the IHS one way or another. New Members for the year total 19. Besides the USA, our new members world-wide include: Italy, New Zealand, Netherlands, Greece, Japan and Canada.

John Meyer, President

IN MEMORIAM
John Martyn Lewis Reeves

John Martyn Lewis Reeves, 60, of Calvert County, Maryland, died October 30, 2001 at the Patuxent River Naval Air Station. He was born August 31, 1941, in Doncaster, England to the late John Sydney Reeves and Constance May Lewis Reeves. He lived in Calvert County six years, working as an aeronautical engineer at Patuxent Naval Air Station. His hobbies included radio-controlled model airplanes and sailing.

Survivors include his wife of 20 years, Rita Thompson Reeves; sons, John Edward "Ted", and John Robert "Bob" Reeves; and one sister, Sylvena Farrant.

Funeral services were held November 6, 2001, at Rausch Funeral Home. Interment was at Southern Memorial Gardens. Contributions may be made to Landmark Baptist Temple, P.O. Box 513, Huntingtown, MD 20639

John was a Life Member of the IHS, having joined the Society in its early years. After coming to the USA, he joined the Marine Dept. of the Grumman Aerospace Corporation where he was actively involved in their various hydrofoil projects. Later, at the Naval Air Development Center in Warminster, PA, he played a role in the Navy's Wing-In-Ground Effect (WIG) program.

He will be sorely missed by many of his friends and associates in the hydrofoil community who admired his technical abilities and sense of humor.

Hydrofoil Supported Catamarans
(Continued From Page 1)

sis of planing type HYSUCATs which allows further design optimization.

History

The treacherous seas around South Africa have inspired many small craft designers to develop unconventional craft. Several catamarans were designed and built in the last three decades as pleasure and game fishing craft, as well as navy and police patrol boats.

Some police craft for border control were tested in 1978 and the performance in rough water was found to be excellent but the propulsion power requirements were extremely high compared to deep vee monohulls.

The idea to use hydrofoil assistance for resistance reduction was tried on one of the existing police boat test models and showed a 40% resistance reduction instantly. This revolutionizing result was first thought to be a test error or correlation problem and larger models were used with more carefully designed hydrofoils. The prototype prediction again gave a 40% lower resistance at top speed. The result was better than for a comparative monohull of similar size.

The hybrid consisting of a catamaran with fully asymmetrical demi-hulls and a single hydrofoil spanning the tunnel between the two demi-hulls was named Hydrofoil Supported Catamaran or HYSUCAT in short. A research project was started to investigate and optimize the HYSUCAT principle (it is still running after 20 years!). A sea-going 5.3m manned model was designed and built and proved the excellent seakeeping and low propulsion power needed for the craft.

More than 40 vessels were sold as ski boats and pleasure craft during the next two years. Designs for 10m and 12m police patrol boats and 18m Navy patrol boats followed, some for overseas customers.

The early designs were optimized in model tests but strong efforts were made to develop the theory behind the HYSUCAT principle, which resulted in a numerical model later based on the principle of the Savitsky (IHS Member) formulations for planing craft and basic hydrofoil design.

Making use of the so-called hydrofoil free surface effect, the HYSUCAT has a built-in automatic trim stabilizing characteristic, which allows for larger LCG shifts. The design allows a stable craft with a fixed wing foil system in the full speed range. Propulsion power is down by 35% to 40% compared with similar deep vee monohulls.

Most of the catamaran demi-hulls in the HYSUCAT project are of the fully asymmetrical type with a straight walled tunnel which allows for reduced hull interference and which gives the ideal flow conditions for efficient hydrofoil operation. This type of demi-hull has been proven to give the most sea friendly high-speed behavior.

Recent HYSUCAT Applications

Stingray Mariney developed a 12m fast Interceptor as a naval patrol boat. The fully laden craft weighs 13.5 tonnes and is propelled by twin Caterpillar 320 kW diesel engines and Arneson surface drive systems with Teignbridge surface propellers. The contract speed was 35 knots, the prototype reached 42 knots fully laden in sea trials off Cape Town. Three units were delivered in 1998 to a foreign navy. The Interceptor has an 'Avion Hydrofoil' system designed by the author and contracted by Unistel Technologies, the University of Stellenbosch's technology transfer company.

The next HYSUCAT application in 1998, which was completed with successful trials in England, was the conversion of a Panther 64 by Prout Catamarans. The Panther 64 is a luxury yacht of nearly 20m and 35 tonne displacement. It has fully asymmetrical demi-hulls similar to deep vee planing hulls for good rough water performance. The straight tunnel between the hulls with nearly vertical sidewalls offers very favourable flow conditions for a hydrofoil system. The overall beam is 6.7m with 'a tunnel width of 2.85m, allowing a main foil with reasonable aspect ratio to be fitted.

The reader is referred to a previous article by the author, published in Fast Ferry International January/February 1991 and March 1991, in which a performance comparison method of ships was developed.

A hydrodynamic stabilizer system was developed for a 21 m yacht, Kingcat, built by Kingcat Shipyard in France on the basis of the HYSUCAT principle. This has symmetrical planing demi-hulls of wave piercing type with moderate deep vee and extremely fine bows for reduced pitching in rough water. The hydrofoil system consists of a mainfoil slightly

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Hydrofoil Supported Catamarans
(Continued From Page 3)

forward of the LCG position and a full beam stern foil with attack angle control spanning the tunnel width near the transom. With extensive mechanisation and computer control of all essential functions of the ship, it weighs about 72 tonnes and, therefore, has a very low slenderness ratio.

Kingcat 21m catamaran during initial trial runs off the French Atlantic coast

It was found in the Kingcat model tests at the University of Stellenbosch that the tandem foil system gives considerably improved resistance in the medium speed range, compared to the HYSUCAT foil system with two rear struts, especially if the rear foil attack angle can be adjusted for optimised resistance at the hump resistance speed. The helmsman has total control over the trim angle at speed and can choose the best trim for top speed. Four MAN D2842 880 kW diesel engines driving four Lips LJ 43DL waterjets give Kingcat a top speed of 46 knots and fully laden speed of 44 knots.

It was a design condition that the front foil was not to be connected to the hulls below the waterline and the lift at speed was transmitted by two vertical struts fixed to the tunnel ceiling. The rear foil is fixed on two shaft struts carried by the flange. The shaft struts do not penetrate the hulls and even in collision damage the watertight integrity of the ship is not affected.

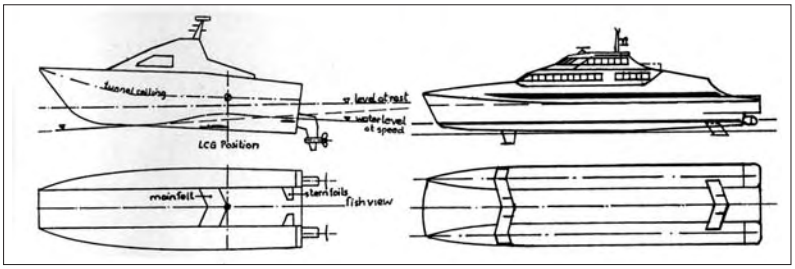
Halter Marine E-CAT

Increasing requests for foil assistance for larger high speed ferries initiated a research and development project about four years ago. Several semi - displacement catamaran hulls were developed at the Mechanical Engineering Department of the University of Stellenbosch and tested in model series with various foil systems.

At first it looked as if these large catamarans could not be improved with a standard hydrofoil system, only at very high Froude numbers were improvements recorded. The standard high speed semi- displacement catamaran operates most efficiently at a Froude Number of 2.1-2.3 and below the corresponding speeds the foil system gives no improvement, and sometimes even a resistance increase. For higher Froude Numbers, considerable improvements were possible, but the ships in operation usually did not have sufficient power reserves to reach the necessary high speeds for Froude Numbers above 2.1 or 2.3.

It was necessary to develop a foil system which would be better at the lower speeds, and especially at the hump resistance speed. A model of a 72m car ferry was tested with eight different foil systems and an improvement over most of the speed range, including Froude Number of 2.1, was only possible with a tandem foil assist system consisting of a high aspect ratio forward foil, positioned relatively far forward of the LCG position, and a full tunnel width rear foil connecting both demi-hulls near the transoms.

The foil system was arranged to minimize the foil interference between forward and rear foil and the interference between each foil and the demi-hulls. The hybrid with this foil system was named Hydrofoil Assisted Water- craft (HYSUWAC) as it is applicable in principle also to fast monohulls and trimarans. The subsequent model tests showed that resistance improvements on semi-displacement catamarans in the higher speed range of over 40% are possible without severe penalties in the lower speed range.



HYSUCAT (left) and HYSUWAC foil systems

The seakeeping quality and rough water performance are also improved with a considerable damping effect at speed. The model tests also indicated

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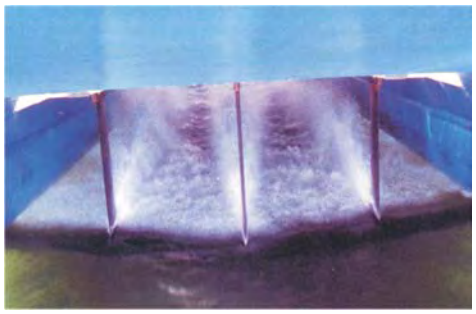
Hydrofoil Supported Catamarans
(Continued From Previous Page)

that the wake wash of these foil supported models was observed to be considerably lower than on the models without foils and on those models which had a standard HYSUCAT foil system.

With the experience gained in the HYSUWAC development project, a foil system was developed for the Halter Marine E-CAT, a 45m high speed semi-displacement catamaran developed for low wash operation. The E-CAT (see picture on page 1) has very fine bows with a beam-draught ratio of nearly unity. The wide tunnel between the demi-hulls gives an ideal situation for a high aspect ratio foil system allowing a forward foil spanning nearly 11 metres.



Halter Marine E-CAT foil at a speed of 44 knots

After initial calculations, a design, including a model test, was proposed. Halter Marine responded by saying that they had already a model with a "45m overall length" - the E-CAT demonstrator - in New Orleans, USA. The challenge was taken up, a design without model tests was produced. The foil system was built by Halter Marine.

Sea trials were run in September - October 1999 and proved the predicted enormous resistance reduction with the E-CAT, at 175 tonne load displacement, reaching 42-44 knots top speed and 46 knots at a lighter load. Propulsion is by twin Caterpillar 3516B 1,910 kW diesel engines and MJP/Bird-Johnson 650 waterjets.

NEW OWNER OF HIGH POINT

By Sumiyasu Arima, IHS Member

Negotiations have been completed between Janice Fraser, executor of the estate of CAPT. Ronald Fraser, and Ron Ihle for the change in ownership of the HIGH POINT. Ron Ihle is establishing The HIGH POINT Association as a non-profit group to restore the HIGH POINT to fully operational condition. Application is also being submitted to National Register of Historical Ships.

Initially, some work will be done at Astoria, and eventually towed or propelled to San Francisco Bay for the restoration work. Ron estimates the tow to SF Bay at $30K, and would rather put the money into making HIGH POINT operational hullborne if at all possible.

RENDEZVOUS ON THE POTOMAC RIVER - 2 NOVEMBER 2001

By Bill McFann (IHS Member)

Two advanced marine vehicle concepts - one lifted by hydrofoils and the other by pressurized air cushion - met on the lower Potomac River on Friday, November 2. Both of Norwegian design, the two vessels represent the state-of-the-art in their respective platform technologies. The staff of Island Engineering, Inc., Piney Point, MD, built and operate the hydrofoil vessel and participated in the design and construction of the air cushion vessel.

TechMan, a.s. MM56CX Monomaran

The 14-meter Monomaran was built as a 1/4-scale model of a 56-meter, 50-knot passenger/car ferry. The vessel, fabricated in aluminum with a composite superstructure, is propelled by twin waterjets and supported by two hydrofoils mounted under the trimaran hull. The steering and foil control are managed by a digital, fly-by-wire stabilization system. Top speed of the 6 metric-ton model is approximately 30 knots (35 mph).

Royal Norwegian Navy Missile Boat, KNM SKJOLD

KNM Skjold is the first in a series of stealthy, fast missile boats built by Umoe Mandal in Norway for the Norwegian Navy. The 47-meter vessel, constructed entirely using fiberglass

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Rendezvous on the Potomac River
(Continued From Previous Page)

reinforced foam sandwich, is propelled by two 8000-hp gas turbines turning large waterjets. Lift air pressure, captured between the two catamaran hulls and rubber bow and stern skirts, is provided by large diesel-driven centrifugal fans.

Operating side by side in 2-3 foot seas off Ragged Point Light

The pressure of the air in the cushion is dynamically stabilized by a computer system that operates inlet and vent air controls. The top speed of the 260 metric-ton vessel is nearly 60 knots (70 mph).

SOUTHERN CALIFORNIA FERRY

The latest information about this fast ferry initiative in Southern California reported in the Autumn 2000 NL (page 8) is from Stan Siegel (IHS Member).

Stan reminds us that the Westfoil was built circa 1987 and was outfitted with fore and aft fully submerged foils. Propulsion was with a pair of ducted airplane propellers (see picture). Although it wasn't a very successful project, the boat flew for awhile.

The modifications to turn it into a fast ferry for SCX, Inc. are pretty extensive. The foils and propulsors all go away. In their place, there is a new forward foil to lift the bow out of the water, fitted with incidence control at

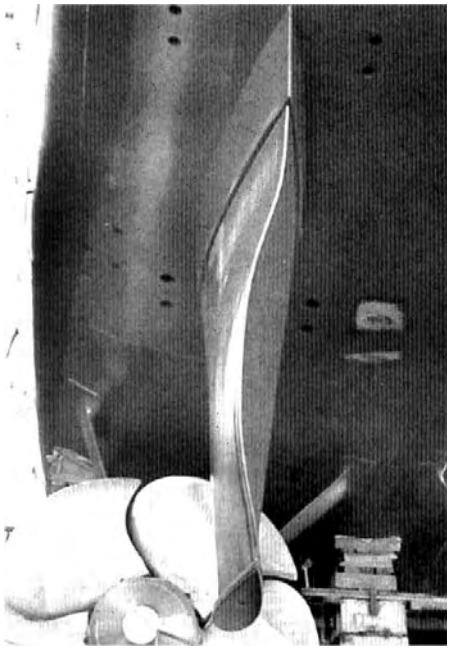
the top of the strut. The stern will stay close to the water (like was done with several Foilcat designs). The propulsion will be with a pair of MJP650 waterjets. An interceptor system will be installed on the stern to aid in ride control. Finally, a buoyant lifting body will be installed to partially raise the stern and to aid in damping motions. See the rendering of the boat (above) in its final configuration.

TWISTED RUDDER SIGNIFICANTLY REDUCES CAVITATION

By Kyle Krueger
(Excerpts from Wavelengths, September 2001, used by permission from Public Affairs, NSWCCD)

This June, the Combined Alpha/Bravo (COAB) builder's trial of USS *Bulkeley* (DDG 84) successfully capped NSWCCD's twisted rudder test and development program. Five years in the making, the twisted rudder program is the result of a joint effort by NAVSEA, Ingalls Shipbuilding, and NSWCCD to solve the problem of surface cavitation on the rudders of the DDG 51 *Arleigh Burke* Class destroyers.

Through the service life of the *Arleigh Burke* Class, it has become apparent that rudder cavitation is a serious problem. The flow following the propeller has a high degree of vorticity, which leads to severe surface cavitation on the outboard side of the rudders. Unfortunately, this cavity begins to form at speeds as low as 23 knots, which means it is present at most normal vessel operating conditions.



To alleviate this phenomenon, Dr. Young T. Shen (IHS Member) developed a rudder design that more closely matches the complex flow in the wake of the propeller. By "twisting" the rudder section around the stock, he was able to develop a rudder that would not

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TWISTED RUDDER
(Continued From Previous Page)

cavitate under normal loading conditions. In addition, by developing a tip plate for the end of the rudder, he was also able to greatly reduce the tip cavitation from the Fleet design. For his work, Shen was awarded U.S. patents on both the twisted rudder and tip plate innovations.

STRONG DEVELOPMENT THRUST ACROSS WATERJET SPECTRUM

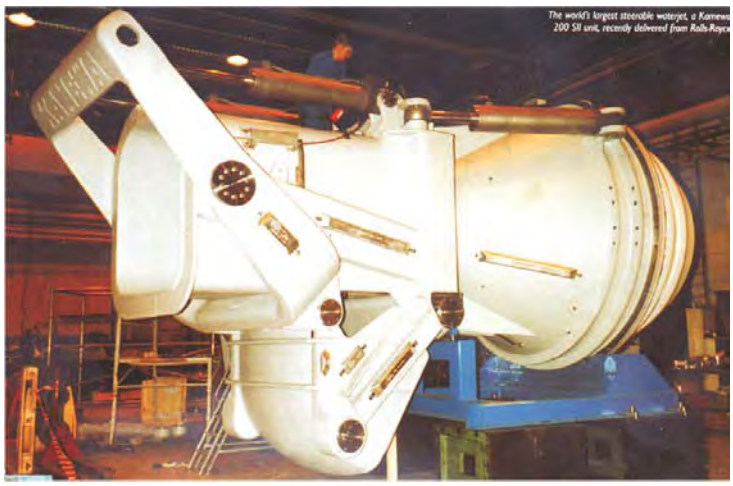
(*From Speed at Sea June 2001)*
by Doug Woodyard

This year saw the supply of the world's largest steerable waterjets for powering a 140m Corsaire 14000-class monohull fast ferry due for handover shortly by Alstom Leroux Naval to NEL Lines of Greece. The two Kamewa 200 SII units, with inlet diameters of 200cm, will be driven by GE Marine LM2500 gas turbines developing 25MW The pair will be partnered by two Kamewa 140 S11 units powered by diesel engines, the four jets together absorbing a total input of 66.2MW.

Insert: A steady rise in large waterjet ratings is being sustained to address current and anticipated propulsion demands, while continuing development of small-to-medium size jets is enhancing their performance, reliability and durability

Rolls-Royce's Kamewa FE A and SII series of waterjets currently meet the market's full spectrum of requirements, with power ratings ranging from 100kW to 24MW, but vessel projects now on the drawing board or seeking financial backing call for substantially larger units, capable of absorbing up to 50MW

Rolls-Royce has therefore been studying future market demands and technical solutions for ultra large waterjets. Work has been further focused by the design contract from FastShip Inc to develop waterjets suitable for propelling the US-based company's proposed high speed transatlantic cargo carriers (for which Rolls-Royce would also supply Marine Trent 50 gas turbines as prime movers).



[Editor's Note: To gain some appreciation for the size of this waterjet one can see a technician working on top of the unit!]

The stainless steel SII series units have proved efficient and reliable propulsors for fast ferries, but when the input power is doubled, and impeller diameters may exceed 2m, a different approach to waterjet construction is dictated. A new RollsRoyce waterjet family will exploit a modular configuration rather than the existing plug-in assembly of components.

Initially representing the largest unit in this family will be the 325 model, five of which are specified to propel each FastShip freight liner; the waterjet shipset - with inlet diameters of 3.25m - would absorb some 49MW at 200 rpm. (Anyone fascinated by analogies should be impressed by the fact that the combined water throughput will almost equate to the average flow of water over the Niagara Falls.)

Smaller units in the new program, with inlet diameters from 2.2m but applying the same technology, will satisfy lower power demands and extend the existing SII range.

Developing the new waterjets involves a combination of studies, calculations and simulations, model testing and full-scale testing of critical components. Much of the work is underway at the Rolls-Royce Hydrodynamic facility in Kristinehamn, Sweden.

FastShip, with its dynamically supported hullform, imposes severe de-

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Interested in hydrofoil history, pioneers, photographs? Visit the history and photo gallery pages of the IHS website.
http://www.foils.org

WATERJETS
(Continued From Previous Page)

mands on the waterjets, Rolls-Royce explains. Maintaining nearly 40 knots across the Atlantic calls for the units to operate at full power for around 90 per cent of the voyage time. Under certain sea conditions air will enter the wing waterjets, or the inlets may be lifted right out of the water. The units are therefore being designed to accept a large number of input torque cycles between zero and full load.

Short turnaround times in port dictate another focus by the project team - waterjet reliability and maintainability - and a key aim is to ensure that all the main components are easily accessible.

Reflecting the modular construction, the new waterjet comprises an inlet duct, a pump unit, a shaft system and, where relevant, a steering and reversing bucket with actuators. (The bucket assembly is not required for booster jets.)

Exploiting experience from the latest SII waterlets, an impeller with seven skewed blades will be used. The impeller chamber is an integral part of the inlet duct, the pump journal bearing will be of the water-lubricated type, and the Michell thrust bearings will be located inboard.

In designing and selecting a waterjet propulsion system for a given application, John Crane-Lips takes account of the following key factors: overall propulsion efficiency; weight and dimensions; cavitation margins; any special installation requirements of the yard; adjustments to the required operational profile of the vessel; safety, redundancy and comfort levels; and operational and maintenance costs.

[Editor's Note: This very long and comprehensive article continues with elaboration on several waterjet developments at various power levels.]

BUGATTI YACHTS SUBLIME

By John F. Rodrigues, IHS Member

New to the signed order book of the prestigious BUGATTI YACHTS is the sleek all-aluminum 300ft *Sublime*. Construction of this wide body, 60ft beam, engineering marvel is scheduled to start on early 2002 in an undisclosed military European shipyard. Four custom BUGATTI Marine turbines driving twin proprietary high-efficiency ventilated water jets will catapult this giant to speeds exceeding 40 knots in a blink of an eye with unmatched fuel efficiency and seakeeping.

Sublime's super-light aluminum magnesium alloy hull uses Air Cavity technology for dynamic support, creating a thick cushion of air underneath that reduces the wet area and drag in 35%. Yet it increases riding comfort which is enhanced by an aerospace derived T-Foil motion control system, thus reducing pitch, heave and roll by over 75%.

The innovative open interior with twelve extra spacious suites featuring wide windows for breath-taking ocean views will remain a secret to the owners and their lucky guests. The yacht also incorporates a new garage concept, which can be directly accessed from the aft lower salon. It accommodates three large 40ft custom tenders, a submarine in addition to six cars distributed in two separate garages – all conveniently deployed from either port or starboard sides.

BUGATTI Marine's electric equipment, as well as it's monitoring and alarm systems are approved by the US Navy. When completed, the 300ft *Sublime* will be the largest and the fastest all-aluminum yacht ever built, truly inaugurating a new era in high speed Superyacht cruising with total comfort in adverse sea conditions.

Contact: Since BUGATTI Yachts does not participate in Boat Shows, those interested should contact Yacht Boutique at (561) 330-0490 or, get a limited amount of invitations for their upcoming "Rendez-Vous". Web address: www.YachtBoutique.com

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PROJECT PEGASUS UPDATE

By Eliot James, IHS Member

[This is a portion of the message received from Eliot James describing progress on restoring PHM-5.]

We have been doing quite a bit of work on the ship lately. The following is both an update of those efforts, as well as a request for input.

Most notable has been the replacing of the two temporary deck mounted diesel gen-sets, (one 60 cycle, one 400 cycle) with a single 60 cycle, 150 KW John Deere powered Kohler set in the location once occupied by the very fuel hungry turbine powered generator in the aft most compartment of the platform deck, Aux. Machinery room No.3. Future plans are to install a much smaller genset in Aux. Machinery No.1 for low load times.

The 400-cycle power is being supplied from 3 variable frequency drives (VFD). One of which drives the panel powering all ventilation fans forward of the diesel/pump machinery room so that they can be slowed down independent of the rest of the 400-cycle system.

We have mounted, and are in the process of installing a 10hp 60cycle seawater pump. Originally, seawater which is restricted with orifices at each piece of machinery to control flow, was left pumping overboard. With the closed loop control maintaining the pressure, when we shut the overboarding valves at the engines, or other coolers that are not being used, the pump will run at a lower speed, reducing power requirements.

An advantage of VFDs is that the current to start each motor can be reduced to no more than it's full load amps instead of the usual 5 times that much. We will be able to start any load with the exception of the 60-hp hydraulic pump, with a 30kw genset. I expect that we will be able to reduce fuel consumption when moored to about 2.5 gal. per hour, underway, at 12 knots consumption will be approximately 52 gph.

We also mounted a hydraulic crane where the starboard set of Harpoons was mounted. We have used this crane to remove the old gensets, and install the new one. It will be very useful in off loading the launch.

The galley is operational, as is the head. We don't have much fresh water capacity, but will be adding some tanks until we put the desalinator back on line. We have bought a new computer and 4 screens, one a LCD touchscreen for the pilot interface, a second LCD for the co-pilot spot as well as two down in CIC for the navigation station. This is basically our IBS (Integrated Bridge System). Now we have a lot of programming to do.

The original hydraulic system was powered when foilborne by four pumps mounted on the foilborne gearbox, and hullborne by four pumps mounted on the SSPUs. Modifications we are making will complete the hydraulic system to sufficient degree that we can raise and lower the foils as well as operate all other systems hullborne as well as all systems when we are able to go foilborne.

Diana and I went to Wilmington NC to the Historic Naval Ship Association conference which was held in conjunction with the Maritime Heritage Association conference this year and came away with a bit better idea of what would be necessary to start a non profit organization that would help with the restoration or rehabilitation of our ship. We have a few ideas that we would like some feedback on.

It is our intention to form the PHM Memorial, a not for profit, 501c-3 tax exempt, organization. This is an organization dedicated to preserving the history of the only military hydrofoil fleet. As well as the history, technology, and related artifacts of hydrofoils, both military and civilian that pushed forward the development of the technology that made these ships possible.

The focal point of the PHM Memorial will be the USS Aries, PHM-5. It is the intention of this organization to restore and rehabilitate the PHM to a state that will allow her to cruise hullborne, and eventually foilborne. This will allow the Memorial to travel and display the history, technology, and artifacts in locations that would not normally be able to support a permanent display.

Can anyone help and give reasons why, the marine industry, naval history, the general public, or anyone else would benefit, from the formation of this organization? How might such an organization be useful in the education of our country's youth or "At Risk Youth"?

[Editor's Note: All readers are invited to comment and and make suggestions to Eliot. Please contact him directly at: customcomposites@cvalley.net]

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SAILOR'S PAGE

THE WINDRIDER RAVE, PART II)

By Martin Grimm , IHS Member

Sailing the Rave

The Rave can be rigged while on its trailer, the set-up time being around 20 minutes and can be done single handed, though hoisting the mast is probably the hardest part. There is an optional "EZ Up" system developed by Eric Arens that uses a winch to greatly reduce the effort required here. It can be launching either off the trailer or using a beach dolly. With the foils fully retracted, the draft is only one foot.

The forward-facing crew seating is located in the main hull. The passenger sits in the forward seat and does not handle any of the controls, these all being run to the pilot in the aft cockpit. The rudder is operated via foot pedals such that the pilot's hand are free to control the sheets and lines for the sails. The self-levelling foils do not require running adjustments though the pilot, if desired, can control them. The mainsail sheet runs to a jam cleat on the port-side of the cockpit while the jib sheet runs to the starboard side. A bungee chord runs from either side of the cockpit to adjust the foils and finally a handle is provided on each side to unlock the foils.

Once in sufficient water depth, the pilot lowers the combined rear rudder and foil then unlocks and lowers the two side foils. The foils can be lowered to either a 'half latch' position or completely.

The ideal relative heading for take-off is on a beam reach. At a speed of around 10-11 knots the boat rises up for lift-off and accelerates quickly to reaches its maximum speed in the prevailing winds. With main and jib sails only the Rave is able to become foilborne in as little as 7-9 knots of true wind with one crewman or 10-12 knots of wind with two aboard. Sustained foilborne sailing is possible in a steady 12-14 knot breeze.

When fully foilborne, all three hulls fly about 0.6 metres above the water while the foils stay submerged about 0.45 metres. The surface sensors keep the craft flying at a steady altitude on the foils. The pilot manages sail trim and may need to adjust either of the outrigger foil flaps using the elastic bungee trim lines when in gusty conditions. Manual control of the foil flaps is particularly useful in moderate 9-14 knot winds but in stronger winds automatic levelling with the surface sensing wands works best. Abeam the wind, a Rave will comfortably sail at around 20 knots in true wind speeds of only 11-12 knots, even in choppy seas.

When the boat encounters a wave, the foils cut though it and the boat remains level. In choppy conditions with swells of 5-6 feet and winds of around 13-18 knots Rave sailors report the craft sails well while similar sized catamarans are near to a standstill and having difficulty in those conditions.

Tacking is straightforward. With a slight foot pressure on the tiller the boat turns quickly however looses speed in the process. The self tacking jib re-sets and the Rave takes up speed again on the new heading. As the boat accelerates to foiling speed the windward float will tend to lift out first. The main and jib are progressively sheeted in and tension is applied to the foil flap bungee trim lines as the boat again climb out of the water.

In displacement mode, the Rave will achieve best Velocity Made Good (VMG), the component of boat speed to windward, at about 37 to 40 degrees from the true wind. When foilborne that increases to about 50 to 55 degrees. Experience while racing on a windward leg will reveal when it makes more sense to try to fly foilborne at higher speed versus staying hullborne and pointing higher into the wind. If the objective is purely to maximise boat speed it is best to sail on a beam reach (a course perpendicular to the true wind). WindRider recommends that the Rave be sailed no faster than 30 knots though speeds as high as 37 knots have been achieved, even on the earlier prototypes.

Rave Racing:

With a significant number of production Rave boats now operating, it seemed inevitable that Rave sailboats would compete in multi-class races and that dedicated Rave race meets would be organised. Indeed, in the US, there now appears to be somewhat of a cult following of the WindRider 16' Tri and WindRider Rave and a number of races have been organised with participation steadily growing.

One-design rules for the Rave have been prepared (http://www.windnwater.com/rules.htm) for the stan-

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Continued from the Autumn 2001 Newsletter.

THE WINDRIDER RAVE (PART II)

Continued from previous page

dard Rave but for those who want to experiment with obtaining further performance from their craft, a more unlimited Formula Rave class is being developed which will be described in a forthcoming newsletter. In the meantime, for more information see the section of the 'Rave Page.'

The US Sailing Association's Portsmouth Rating Committee had included all WindRider models including the new FORMULA Rave Racing Class in its official list of handicap numbers. The Portsmouth handicap is a well established, time on time rating system and is used by most racing organizations throughout North America. For more information on U.S.S.A.'s Portsmouth rating system see: http://www.ussailing.org/multihull/mhportsmouth.htm

Mike McGarry, the U.S. National Champion demonstrates how easy it is to fly in light air. Note the calm water and lack of any white caps in the photo. The sails from forward to aft are referred to as the 'Screacher', 'Blade Jib' and 'Mainsail'.

Eric Aren's WindRider Rave named 'Rave One' (It has the class sail number 1) fitted with the FORMULA sail rig.

As the Rave sailing community expands in the US, Raves are appearing in race events as a class of their own. The first dedicated WindRider National Championship was held at Ft. Walton Beach, FL in October 1999. Even at that time, thirteen WindRider Rave hydrofoils participated.

Want One?

If you would like further details of the RAVE, one option is to contact Eric Arens from WindRider of the Treasure Coast, P.O. Box 2457, Jupiter, FL 33468-2457 (street address: 2581 Jupiter Park Dr., Jupiter FL, 33458). phone: 561-776-9045, fax: 561-799-9854, e-mail: windrider@adelphia.net

WELCOME NEW MEMBERS

Vladimir Algin -Vladimir is enrolled at the MacNaughton school of Yacht design. His intention is to make a design based on Plainview. He has chosen the Plainview as it is the only style that exists in nature as well, two fins in front one in back. "Five billion years of development must say something." So while doing that, he is studying everything about dynamics, fluid and aerodynamics, hull design, wave impact problems, etc.

Lorenzo Bonasero - Lorenzo is from Messina, Italy where the Rodriquez hydrofoils took off for the first time. At that time he was a boat scale modeler. From the time of the first flight of "Freccia Del Sole" he has collected all the information and pictures of hydrofoils from all around the world. He spent a long period in France, working with Aerospatiale (now EADS), in the "ATR" aircraft product support. He returned to Alenia, Italy, where he is involved in cost control for several different production programs. His personal dream: The Rodriquez top management decision to get the "Freccia Del Sole" preserved and on display as gate-guardian in the harbor of Messina.

Nicolaas de Waal – Nic heads Teknicraft Design, a design company specializing in hydrofoil supported catamarans in the 10-30m range. They are based in New Zealand, but deal with various yards around the world. So far they have concentrated on "high-speed" vessels with Froude number over 2.5, but are currently working on hydrofoil systems for semi displacement craft in the 15-20 knot range. Teknicraft's designs utilize hydrofoils to reduce drag and therefore power requirements. We use very soft riding semi round-bilge shapes whereby we manage to combine good rough water seakeeping characteristics with low drag.

Ron Drynan – Ron became fascinated with human-powered boats (HPBs) when he bought a house on a lake in which no motorized craft were allowed. Because he was an avid mountain-biker, he began building pedal/propeller boats, working to gain the experience and knowledge necessary to begin a human-powered hydrofoil project. He's the VP of Watercraft for the HPVA (Human Powered Vehicle Association at: www.IHPVA.org/hpva/), member of both the ACA (American Canoe Association at www.ACANet.org) and IWCA (International Water Cycling Association at http://www.WaterCycling.org), and maintains his personal hobby site on the web at http://www.HumanPoweredBoats.com.

Kataro Horuichi - Kataro graduated from Tokyo University 1950 and worked at the Yokohama Yacht Works. Here he designed patrol boats and sight seeing boats mainly, but also snow boats propelled by air propeller and hydrofoils with 3 struts and 2 struts with submerged foils. In1960 he transferred to Yamaha Motor Ltd. and worked 36 years working on pleasure boats, fishing boats, 5 hydrofoil boats, remote controlled helicopter for agricultural use and a light airplane. He retired from Yamaha Motor in1996, and now developing hydrofoil sail boat and very slender (9") sea kayak with parasol type sail. He is president of Japan Solar & Human Powered Boat Association (JSHA).

Victor Mijon – Victor is involved in building a 1/15th scale model of a 46 foot catamaran. This model has several purposes. He would appreciate any information on a sailing cat with hydrofoils.

John Slattebo – John, of Pescadero, California has had a life time interest in sailing and a proa sailor since living in the Marshall Islands. He has built several outriggers and foil stabilized outriggers. From the first one it was plain to see that manual controlled full foilers was the way to go to generate performance all around the course. Sailing is just too dynamic not to have manual controls. He wrote an article in the Mar/Apr 2000 issue of Multihulls Magazine: Slatts 16. The 16', car-toppable, foil-stabilized, sailing outrigger is made of foam sandwich epoxy and weighs only 96 lbs.

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NEW BENEFIT

IHS provides a free link from the IHS website to members' personal and/or corporate site. To request your link, contact Barney C. Black, IHS Home Page Editor at webmaster@foils.com.

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LETTERS TO THE EDITOR

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)

Ferry Venture in Tropics Proposed

[30 Dec 01] I am based in UK and following exploratory visits am looking to put together a consortium to run a hydrofoil/fast ferry service between certain tropical islands. Would welcome all discussions on a mutually confidential basis. — David Jacobs (david.projects@btopenworld.com)

Update on PT-50 Model Progress

[30 Dec 01] Just touching base again on the PT50 scratch-build. I've settled on the FAIRLIGHT and am doing it in a (static) 1:72 scale. It will be for static display only. Here are a couple of shots of the model in progress. I will be mounting it foilborne on some modelled water, which you can see in one of the photos. I have made good progress with the basic hull (ex foils) now complete and have just commenced on the superstructure. I predict I'll have it finished by end Jan or beginning Feb 02. And I'm using plans Martin Grimm sent me (although have had to re-draw the superstructure to match the Oz ones). A query: Is there any info on the deck finish on the Oz PT50s? I'm not clear if they would have been wood, or a painted finish. — Ian Wrenford (iansharyn@bigpond.com)

Response... [30 Dec 01] The decks of the PT 50's, like the rest of the hull and the superstructure are fabricated from aluminium alloy which is riveted together. The foils, due to the need for strength are steel as are deck fittings such as bollards (stainless), hand rails etc. The Sydney foils has a rough anti-slip coating applied to the decks and this had a light matte grey finish (see aerial shot of DEE WHY or close-up of forward deck of LONG REEF below). The only significant external wood items were aft cabin doors and bench seat (as seen on CURL CURL photo). Given you will probably soon be starting on the foils, I take the opportunity to send you views of the bow and stern foil units of LONG REEF while on cradles at Balmain in the late 1980s. It is only when a hydrofoil is out of the water that it is possible to really appreciate the foil configuration. On the bow foils you should be able to see flaps on port and starboard side. Also, the thin strakes on the foils are called 'fences' and they help to stop air from being drawn down on the low pressure side of the foil. Likewise the pair of rudders on the aft foils (slightly inboard of the propeller shafts) each have four fences clearly visible with a further fence placed on the foils below each strut connection point. The rudder tiller assembly is visible just above the aft foil supporting cross structure which is bolted to the transom. If you need any other details or views to clarify any aspect of these hydrofoils during construction of the model, let me know and I may be able to find a photo that helps. — Martin Grimm (seaflite@alphalink.com.au)

TUCUMCARI vs. CYCLONE

[22 Dec 01] I have been researching today's US Navy Patrol Craft. Specifically the PC-1 CYCLONE Class. I feel that it is time to resurrect the old PGH-2 TUCUMCARI designs. When comparing the CYCLONE spec to the TUCUMCARI spec, I find that as a Special Warfare vessel, TUCUMCARI far exceeds CYCLONE in most respects. It appears that if the TUCUMCARI drawings and engineering data were available, the timing is right for some US shipyard to make an Unsolicited Proposal to the USN to build a prototype using all the modern bells and whistles. The basic TUCUMCARI was 100% successful. The vessel either met or exceeded the mission requirements of the Navy. I have always asked the question, "Why did the USCG and the USN have to go to Vosper Thornycroft, a British company for a high speed vessel design"? Do we not have capable engineers in the United States? — Ken Plyler (Kfppfk@aol.com)

PHM Height Sensor

[16 Dec 01] I have a question on the height sensor that is actually used on the PHM. Can you tell me what the sensor is called and who made it? I am curious as to what physical principle is the basis for the height sensor. I think that filtering was done to in essence compute the average wave height. Is anybody doing any redesign of the control laws or the redundancy managment in the flight control system? Perhaps newer computers are being used. This might be of interest to me as I do consulting in the area of guidance, naviagation and control for mostly aerospace applications. I used to work for Doug Fosth in the Flight Controls Group that he headed in the mid-1970s. I did my EE Master's thesis on analytic sensor fault detection via observer theory for dissimilar sensors. I only considered the lateral/directional dynamic model. The roll gyro is the most important sensor. The objective was to save money by reducing the triple redundant system to double redundant and synthesizing the missing data through the magic of Luenberger Observers or Kalman filters. The technical paper was written on the topic in Aerospace and Electronic Systems of IEEE in about 1975. The authors were Fosth, Clark and Walton. This paper was one of the first in the area of analytic redundancy and now finds application in a similar form onboard the Boeing 777 air data inertial reference system angle of attack sensors. I still work for Boeing in Flight Controls Research in the commercial division. When I was going to college in the late 60's and early 70s both the Lockheed and Boeing hydrofoils were stationed at Puget

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Letters To The Editor
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Sound Naval Shipyard. As an engineer trainee I had an engineering assignment on the Lockheed boat. — Vince Walton, VMW Systems Dynamics (vwalton@sprynet.com)

Responses... [16 Dec 01] I am not a controls type, so I will try to answer your question to the best of my knowledge. The height sensors used on PHM were originally designed and built by Boeing. Basically, the output was 10 mv/ft. On the HIGH POINT, we tested various altimeters from different manufacturers, and concluded that the TRT radio altimeter (modified for the 10 mv/ft output) was the least susceptible to outside interference, and thus was installed on the PHMs. The Automatic Control System (ACS) had the filtering network for all the sensors, including the height sensor. The height signal was primarily compared to the height set, and input into the forward foil. Pitch and roll controlled by the aft foils primarily followed the forward foil with the vertical gyro, accelerations, and rate gyros tempering the signal. All Boeing-built hydrofoils used essentially the same principle but the filtering network was different in each class due to ship responses because of longitudinal positioning of the fore and aft foils, hydraulic control response time, sensor positioning, etc. all which were simulated in a computer to optimize the gains and filtering schemes. One of the modifications we made was to relax the control loop since the hydraulic system was being shaken to early failure. The modification was also noted in the ride, where vibration was considerably reduced and yet, no detrimental effect of control was noticed. As for the actual filtering network and gains for the PHM, the ACS drawings will provide the information. As for new designs, many hybrids are using control systems for ride control. I am not familiar with the designs, thus cannot comment on them. HIGH POINT did fly using an IBM 8086 computer with a program compiled from BASIC as the ACS computer. Analog to Digital and Digital to Analog devices were used to tie into the existing ACS to demonstrate that a digital control system could be used successfully. I hope I have answered your question. — Sumiyasu Arima (arimas1@juno.com)

[17 Dec 01] Just a tidbit that might be useful to you: The PHM actually had dual height sensors, radar and sonic. Both signals were interpolated by ACS simultaneously. I have experienced foilborne ops with sonic sensor only, and the ride was noticeably rougher, but effective. — Rob DeSendi, USS AQUILA PHM-4 (RDesendi@nsmayport.spear.navy.mil)

[26 Dec 01] I believe the radar and sonic height sensors were independent of each other. There was a switch on the bridge to select "radar" or "sonic" not both. The ride on the radar sensors was better in most sea states, but the sonic sensors were much more reliable—Chuck Shannon, ET1 MLSG (ChuckE68@aol.com)

HIGH POINT

[27 Dec 01] I am Ken Plyler, Master Chief Engineman USN ret, ex-High Point, ex Tucumcari, ex SeaFlite Hawaii, ex- Turismo Margarita de Venezuela. Was a plank owner on all these boats. Chief Engineer, HIGH POINT and TUCUMCARI, Director of Maintenance, JetFoils Hawaii and Venezuela.

I know quite a bit about HIGH POINT during the first 3.5 years of her active/inactive life. I admire what you are trying to accomplish with HIGH POINT. If I can be of technical help in any way, please give me a shout. — Ken Plyler (Markskidmark@aol.com)

SNAV Fleet

[16 Dec 01] I want to get more details about the current fleet of SNAV Aliscafi.S.p.A. Does anybody knows which hydrofoils are in service and their routes? Which cats does SNAV have? — Felix Marsteller (marsteller.honnef@t-online.de)

Response... [16 Dec 01] I have no current information on this. Fast Ferry International (FFI) magazine is the premier source of such information if you cannot get it directly from Aliscafi SNAV. You can also get the information from a recent edition of Janes High Speed Marine Craft. At one time FFI sold a database of all fast ferries and their operators, but that seems to have been discontinued in 1995, which is the latest version I have. The latest version of Janes that I have is the 93-94 edition. For SNAV Aliscafi, that book lists 33 hydrofoils of various types from PT-20 to RHS-200, one Westamarin cat, and one monohull. I will be glad to mail or fax you a printout from the database and/or the old edition of Janes if it will help you, but obviously I can't be sure which of the vessels that operated then are still operating today. — Barney C. Black (webmaster@foils.org)

[17 Dec 01] I was stationed in Naples, Italy from 1996-99, and rode the aliscafi (Italian word for hydrofoil) SNAV numerous times hopping between islands of the Bay of Naples. There is a map at the docks of all the routes there. Hope this helps. — Rob DeSendi, USS AQUILA PHM-4 (RDesendi@nsmayport.spear.navy.mil)

AMV CD-ROM Testimonial

[16 Dec 01] We are so impressed with the information that the AMV CD contains - both the volume of data and the quality. It must have been a monumental job to get it all together; many thanks. — Jim Stewart (jbstwrt@n46.com)

PHM Veteran Remembers

[16 Dec 01] Just wanted to know that, although I haven't read everything on PHMs listed on the site, very good information here! I was stationed onboard the USS PEGASUS from 1989-93 when we decommissioned the

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Letters To The Editor
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six of them. That was my all time favorite duty station. It's nice to know that there are a lot of people out there that still have a high interest in the PHMs. Thank You for helping to keep them alive. — Tony Larson (tlarson@newulmtel.net)

Response... [16 Dec 01] Great to hear from you Tony. I worked on the PHM program from the early studies in 1971 through the lead ship OT&E and also on the follow-ship specifications and design reviews with Boeing. Got to ride on PEGASUS several times and it was fantastic, including a drag race with a Boeing commercial JETFOIL on Puget Sound. I was there for thr decommissioning, and it was a sad day indeed. — Mark Bebar, Naval Sea Systems Command, Total Ship System Concepts Division, Washington Navy Yard, DC (BebarMR@navsea.navy.mil)

Website Statistics

[16 Dec 01] Here are some of the highlights from an analysis of IHS website activity for the six days 12/5/01 to 12/11/01 to give an idea of visitor habits: The site received total 2,382 visits during that time period, an average off 340 visits per day. The average time per visit is 7 minutes; median is 3 minutes. Of course some people (such as myself!) visited more than once. It is possible to identify many visitors through cookies and other techniques, but not all. The analysis was able to identify the visitor in 1,628 out of the 2,382 total visits. Of these, 1,309 visited once;319 visited more than once. The most popular pages, not counting the main page are the links page (232 views), the posted messages main page (231 views), and the radio-controlled models page (144 views). The most popular files downloaded were the sample newsletter (157 downloads), the information on sale of SHEARWATER 5 and 6 (76 downloads), the overview of the Catri foiler (61 downloads), the history of IHS (53 downloads), the Table of Contents for the Advanced Marine Vehicle (AMV) CD-ROM (48 downloads), and the review of David Keiper's book Hydrofoil Voyager about his ocean-going yacht WILLIWAW (45 downloads). — Barney C. Black (webmaster@foils.org)

Have Vessel, Propose Joint Venture For Caribbean Tours

[9 Dec 01] I am the owner of a 1989 Meteor Hydrofoil. I am interested in a joint venture with a partner who might offer the management side of the operation within the Caribbean or southern Pacific. The vessel has had only 4 years of service and is in excellent shape. Seating capacity of 123; LOA - 114 ft; service speed of 32 to 34 knts; dry lease arrangement available or joint venture of overall business. Short term leases available as well. Serious enquiries only please. — Robin Todd (amti_hydrofoils@hotmail.com)

Market For Sailing Hydrofoil?

[3 Dec 01] I'm interested in building a hydrofoil 33' long with a 12' beam based on a cat-style boat made out of aluminium. What do you think? Could it be sold to the general public? — Tom Sundling (CHGOJX@aol.com)

WILLIWAW Successor

[26 Nov 01] See the following link to read all about Tom Speer's planned successor to the ocean-going hydrofoil yacht WILLIWAW: http://www.basiliscus.com/CSYSpaper.pdf. — Barney C. Black (webmaster@foils.org)

Turning Circle Explanation...

[25 Nov 01] Please, I need a brief explanation about measuring the turning cycle of a ship (HSLC). — Yuksel UNAL (yunal@ssm.gov.tr)

Responses... [25 Nov 01] The answer to the question can be found in Vol. III of SNAME's Principles of Naval Architecture, pp.316 and Fig.157. — Bill Buckley (wbuckley@erols.com)

[25 Nov 01] You have asked about the measurement of the 'turning cycle of a ship' and I presume this is a reference to the Turning Circle performance. A ship's turning performance is defined by parameters such as the advance, transfer, tactical diameter and steady turning diameter and speed. These are defined in naval architecture text books. For any particular ship, they are a function of the initial speed and the angle of the rudders (or waterjet) that is applied. The distances are often defined relative to the length of the ship itself, so for instance a ship may have a tactical diameter of 5 ship lengths after applying full rudder angle while at maximum speed. In the past, such parameters were measured by taking position fixes to nearby stationary objects or by the use of radio ranging equipment. It is more common practice these days to measure such maneuvering parameters on trials by using Differencial GPS equipment reconnected to a data logger. More information on the conduct of maneuvering trials is available in such documents as the "Guide for Sea Trials" that can be purchased from the Society of Naval Architects and Marine Engineers (SNAME) who's website is at www.sname.org. Details of that publication extracted from their website are as follows: Guide for Sea Trials: Covers sea trials of self-propelled surface ships displacing 300 tons or more, powered by fossil fuel and

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Letters To the Editor allows hydrofoilers to ask for or provide information, to exchange ideas, and to inform the readership of interesting developments. **More correspondence is published in the Posted Messages and Frequently Asked Questions (FAQ) section of the IHS internet web site at http://www.foils.org.** All are invited to participate. Opinions expressed are those of the authors, not of IHS.

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driven by steam turbine, gas turbine, diesel engine or electric motors. It does not cover dock trials or tests or demonstrations which can be conducted dockside, which are covered in T&R Bulletin 3-39, Guide for Shop and Installation Tests. [3-47] 1989, 95 pp. List Price: $38.00; Member Price: $19.00. Available by photo reproduction only. — Martin Grimm(seaflite@alphalink.com.au)

[26 Nov 01] Are you talking about "tactical diameter", "advance and transfer" as explained in any seamanship textbook like Crenshaw's (or Principle of Naval Architecture) — CAPT Peter Squicciarini (squicciarini@ttgl.navy.mil)

Student Project - Foil History...

[21 Nov 01] I`m a student in Spain, and I'm making my final project. I need information about: (1) History of Eppler foils and his geometry, (2) History of H105 foil, and (3) History of keels of windsurfer boats. Could you help me, please? — Beatriz Marco Burguete (beatrizmarco@hotmail.com)

Response... [25 Nov 01] Richard Eppler was a professor at University of Stuttgart, along with Wortmann and Althaus. You might say that Eppler was the theoretician, Althaus was the experimentalist, and Wortmann the applied designer. Wortmann designed many successful sections using Eppler's computer code, and Althaus did the wind tunnel testing published in the Stuttgarter Profilkatalog. However, Eppler was more than just a theoretician, having designed the world's first fiberglass sailplane, the PHOENIX. Try the site http:// amber.aae.uiuc.edu/~m-selig/ads/airfoil_references.html for additional information. Together, the three of them revolutionized modern airfoil design and established the practice of using an inverse computer code to calculate the shape of an airfoil from its required aerodynamic characteristics, so as to create an airfoil precisely tailored for each specific aircaft design. The H105 section is my own design (data and coordinates at http://www.nasg.com/afdb/index-e.phtml). It started with correspondence between the late David Keiper and myself. I offered to design a section for Keiper and pay for the die if he would have extrusions made for use in his catamaran hydrofoil kits. I was looking to get some experimental feedback on the design. I intend to build an ocean-going sailing hydrofoil loosely based on Keiper's WILLIWAW (For details, see my paper on the site: http://www.basiliscus.com /CSYSpaper.pdf), and I will probably use the H105 for my hydrofoils. The requirements for the H105 were: to be able to operate at low Reynolds numbers (300,000 and above) to be resistant to caviation operate over a wider range of lift coefficients than the Eppler hydrofoil sections to have minimum drag comparable to the Eppler sections My first designs put too much emphasis on high lift. High lift is not as important to a surface-piercing hydrofoil because the craft can operate with a much smaller angle of attack range, changing wetted area to vary the lift instead of angle of attack. The H105 design specifically traded off some high lift performance for better cavitation performance. The good low Reynolds number performance was obtained by using a convex velocity distribution on the upper surface. This was tailored to control the movement of the laminar separation bubble. The result was transition from laminar to turbulent flow in the boundary layer via a short laminar separation bubble that moved smoothly to the leading edge as the angle of attack increased. This allowed long runs of laminar flow at low lift coefficients, but ensured that the boundary layer was turbulent at high lift coefficients, and eliminated the laminar separation which caused the sharp stall in the Eppler hydrofoil sections at low Reynolds numbers. Compared with Eppler's hydrofoils, my section is slightly more prone to cavitation at medium lift coefficients, but has better high lift and low Reynolds number performance. At low lift coefficients and high speeds the performance is nearly equal between the two. See the CSYS paper for a more detailed comparison. The emphasis on low Reynolds numbers was so that I could build a subscale model of the cruising hydrofoil and still obtain valid data. A section that is designed for low Reynolds numbers will generally work well at high Reynolds numbers, but one can rarely operate a section much below its design Reynolds number range. So by designing a section that would be suitable for the model, I created a good all-round section is not as critical as the Eppler hydrofoil sections. — Tom Speer (me@tspeer.com) website: www.tspeer.com

Joint Venture Sought in Caribbean...

[16 Nov 01] We intend to operate a hydrofoil to serve the transportation of passengers between two points on an island located at the Caribbean/Atlantic. Our idea is to enter in a joint venture/partnership with a hydrofoil owner being the operation/management/manning from our side.

From the service/market needs point of view, we are ready to start right now. The market is just there, and it is being served with very low speed vessels.There is an association of vessels owners, and we have done several negotiations with them to allow us to enter to that business.

Our intention is to put faster vessels into service. Some important points to take into account: Passengers capacity: between 50 and 115 , Calm water at the area (suitable for hydrofoil navigation); Speed: no less than 35 knots; Distance: 12 miles one way / 24 miles round trip. 4 to 6 round trips per day / 7 days per week. Note: there are hydrofoils operating at the southeast part of the island, where the sea is heavier. I will appreciate any information you could give me in this respect. ASAP — Ildefonso Guemez (ilgumer@hotmail.com)

Continued on Next Page (Electronic Edition Only!)

EXTRA FOR THE ELECTRONIC EDITION

Letters To The Editor

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Hydrofoil Pontoon Boat Project

[11 Nov 01] I'm working full-time adapting a 28' aluminum pontoon boat with a fully-submerged hydrofoil system. I'm estimating an empty weight of 3300# plus a 10 (1500#) passenger load (max). I am to power it with a 150-220hp extended-foot outdrive. I am looking for 15-20 mph lift-offs and smooth operation in 2 - 2.5 ft chop with a 45+ mph cruise. The foils are to be located fully fore & aft on the craft, with weight ratio 40-60%, changing with the passenger loading. The rear foils will be mounted to and pivoting with the outdrive (for manual pitch adjustment) and have opposite operating trim tabs for roll control. The front foil will be steerable and use foil (and strut) incidence control to adjust the craft's height. It will use a homebrew electronic/ hydraulic automatic flight controller.

I've poured through every word on this site and am working my way through the CD, but still questions remain. What would be good target wing loadings? If I approximate an NACA-6 series foil, does anyone have experience "hand" machining it from alum bar stock? Is another foil shape "good enough" but significantly easier to build? (I've been unable to find manufactured foils.) What angle of attack pitch range would I likely need for each foil?

Is there anyone out there who might occasionally offer me some "shoot from the hip" guidance as this project progresses? I'll gladly assemble a photo essay for others who like myself, might also follow in Harry Larsen's footsteps.

Barry Steele
barry_steele@yahoo.com

Responses...

[11 Nov 01] During the summer of 1960 while still in college, I worked for Dynamic Development Inc., which was the hydrofoil development partner with Grumman. At the time Grumman provided financial backing, and DDI provided the know-how. Grumman teamed with DDI had won the MARAD (Maritime Administration) contract for the *DENISON*, and in the summer of 1960 DDI was building a 1/5.5 scale open water test model of the future *DENISON*.

The model was called *GREAT EXPECTATIONS*. The foils were hand machined from thick aluminum plate using an in house fabricated rig which used a router with a straight bit as the major cutting tool. The face plate of the router was attached to a 1/4" aluminum "runner" plate, which ran on two lengths of aluminum tube guides. The two outer edges of the runner plate each had an 8" to 10" length of larger diameter tube attached by brazing. The inner diameter of these short tubes matched the outer diameter of the guides. If I remember correctly these short tubes were sliced longitudinally to allow for adjustment of the diameter by squeezing. The router could them run back and forth on the guide tubes.

At each end of the guide tubes were inserted into 1/4" plates perpendicular to the tubes. At one end they were brazed. At the other end they simply passed through holes matching the outer diameter of the guide tubes. In each of these plates were drilled two holes for bolts. These bolts supported the rig and router between two foil section flat plate templates. The foil templates were positioned beyond the ends of the foil section being machined. Each template had a series of drilled holes with a maximum spacing not exceeding the diameter of the cutter. The hole locations were calculated using the geometry of the router rig, and the desired contour of the foil. The foil section was rough machined by manually moving the router with the cutter at a constant fixed depth along the guide tubes, and repositioning the end plates after each cut. Each pass would provide a flat cut; the center of which was on the foil final contour. Following the rough machining, the final contour between the router cuts was achieved by hand filing and sanding.

The *DENISON* / *GREAT EXPECTATIONS* main foils were surface piercing, and using this method each section was independently produced and joined together. The method described obviously can only be used for straight or tapered constant section/ variable chord foils of easily machined material. If I were to design a rig today, I would try to eliminate or modify the bolt attachment method between the end plates and the templates. On tapered foils there was a limit to how close the hole patent could be on the template for the narrow end. This resulted in a large of hand filing on the wider end of the foil.

I had thought at the time of using two series of "high/low" holes to double up on the number of router passes to next time. But this method was used on only one set of foils. Everything subsequent was NC machined. One alternative may be to use "male/female" templates, with one template attached to the end plate and the other template attached to the working surface. If the two templates were clamped in some fashion, this could provide infinitely variable spacing between router cuts, and eliminate most of the hand finishing. Hope this helpful and not too confusing. Let me know if it is, and I can send a sketch.

Charlie Pieroth
SoundTM@ix.netcom.com

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Letters to the Editor

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[11 Nov 01] The plan seems almost identical to *TALARIA III*. Just the hull is different. Planned top speed is considerably higher (I am making some improvements to *TALARIA III* that should increase its top speed somewhat).

Some thoughts: Make sure the design has enough roll authority at takeoff. It depends on foil span, weight distribution, and control surfaces. Use gold connectors for the electronics. Work the corrosion problem.

I believe the takeoff speed you have specified will dictate the foil loading to be low. Konstantin Matveev's lift mathematics (in MS EXCEL) is on *TALARIA III*'s web site, which is at http://home1.gte.net/hlarsen0/. You can check what load is required for take off with the program.

TALARIA III's aft foil was "hand" machined out of a 1" x 8" aluminum bar by rotating the milling machine's head and taking several passes. It was a long time ago, but I think it took about a half a day to do the machining. I am investigating the shape for a new aft foil and would be interested in your conclusions.

Harry Larsen
Hlarsen0@gte.net

Kart Engine Utility

[11 Nov 01] I am considering building a hydrofoil as a university project and I've already been looking into some of the practicalities. Today I have mostly been considering how to power a small hydrofoil and looking at lots of engine and propeller websites. One option I've been looking at is the widespread availability of Kart engines. Do you think a 28HP Kart engine could be geared down to provide propulsion for a lightweight hydrofoil say 12-15ft in length? It just got me thinking because kart engines are very lightweight and also surprisingly cheap.

Mark Landers
mark.landers@baesystems.com

Analysis Software Release

[11 Nov 01] New Wave Systems, Inc. announces a major new version of ProSurf, its trimmed NURB surface program for the design and analysis of boats and ships. ProSurf 3 is twice as large as ProSurf 2 and costs only $795, less than half the price of the previous version. In addition, ProSurf 3 contains capabilities not found in any other program at any price. Use ProSurf 3 as your primary hull design and analysis tool or use it as an add-on to your existing suite of CAD programs. See www.newavesys.com for complete details and a limited use, full working demo.

Stephen M. Hollister
shollist@home.com

St Lucia Venture

[11 Nov 01] I am trying to find a listing of investors that deal with off shore high speed ferry transportation.I am proposing to set up a ferry service on the island of St.Lucia, to this end my partner and I are contributing a vessel to the service it is a" turbo cat 27" with a top speed of 50 kt and a seating capacity of 180. I am looking for an investment company that would finance the shipping,insurance,and working capital cost of US$500,000.If you could recomend such please contact me.

Lynton Popo
Lyntonpopo@hotmail.com

Response...

[16 Nov 01] Just some thoughts on your project: First of all it is important to ensure that the vessel that you are contributing to the High Speed Company is regulated for passenger use. Additionally, the value of the vessel can be put up for collateral for the project. If I can assist, please contact me.

Tom Schneider
lmg@one.net
Phone: 812 537 0609
Web Site: www.intermar-group.com

Wave Phenomena Source

[11 Nov 01] I am interested to become a member of the International Hydrofoil Society. My research interests include wave phenomena (especially computational issues), wake wash, dispersive waves. My educational background is academic training in applied mathematics, M.S. , 1983, University of Iowa. Business: CEO, 21st Century Data Analysis. I am in the Portland OR area. Languages other than English: German, French, (some) Russian. I am also interested in assisting with language issues, like your society website.

Axel Mainzer Koenig
DSPACE21@aol.com

Personal Hydrofoil Project

[11 Nov 01] I am a final year Industrial Product Design student at Coventry University, West Midlands, England. I have begun my final year individual design project which is to design a new breed of water jet-powered Personal Watercraft (PWC). My intention is to design a sports-recreational product to be used by hobbyists and enthusiasts, with a view to possible competition use.

Having looked at the existing PWC market which is largely dominated by stand-up and runabout Jet Skis, one of the ideas that I have come up with is to use hydrofoil technology incorporated with jet power to create a new high speed, highly manouverable single (possibly two) seater watercraft. Currently in the early stages of research for the project, I have yet to determine whether such a proposal would be feasible - whether or

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not the two technologies could be combined in a craft at all.

I discovered an article on personal hydrofoils on the IHS website - and then found that I wasn't the first person to have the personal hydrofoil-jet drive idea! It seems that many people/ companys have carried out some jet-drive hydrofoil PWC product design and development but haven't been able to, or haven't chosen to, put their crafts into production. I'm particularly interested in finding out about the Yamaha OU-32 project. I would be grateful if you could send me, or point me in the direction of, any sources of info on hydrofoil PWC design. Comments and suggestions would also be welcome. As an undergraduate Product Designer with little marine experience I would be very grateful for anything received.

Richard Yates
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richyates@breathe.com
44 Bedford Street; Earlsdon; Coventry;
West Midlands CV1 3EW
England

Yawl Leeboard Foil Design

[9 Nov 01] I have a 28 ft Shearwater yawl build by Edey & Duff in 1987. It is designed to have a pair of pivoting leeboards suspended outboard on each side instead of a centerboard or fixed keel. The standard leeboards measure about five ft long and 32 inches across the lower end. they are flat in section with a rounded leading edge and a tapering trailing edge.

One of my leeboards fractured rolling in big seas on Lake Michigan, and instead of purchasing a replacement I want to make a new pair exhibiting improved performance. Both the designer and builder favor simple, low-tech, short and flat leeboards for sailboats, claiming that foil sections are not worth the bother. But, another owner of a boat like mine did construct a pair of custom leeboards for his boat, and their performance is remarkable. His boat is considerably faster than mine, and makes much less leeway sailing to windward. Proof enough! Of course he is also a very good sailor.

Rather than copy his work line for line, I am trying to search out as much about underwater foils as I can, and am finding this a daunting task. I know, for instance that a few of today's high performance scow sailboats and catamarans are using foil bilge boards for lift to windward by virtue of the fact that only the leeward board in in the water while the windward has lifted above the water due to heel. Two specific questions:

- What NACA foil section would be appropriate?
- What angle-of-attack would be most effective for that section?

Top speed of a Shearwater in a fresh breeze over smooth water is about 7 or 8 kt on a reach, and 5 kt to windward, which is slower than high-performance scows and catamarans. I have found advice recommending the NACA-0012 foil as being very good for symetrical foils with zero angle-of- attack. I have also found information indicating that when a foil that thick has its pitch increased, that trailing portion of the windward side might exhibit flow separation.

I know that my friend has thinner foils than a NACA-0012, measuring 1 1/2 inches thick with an 18 inch chord and that they are assymetric, with a chord ratio of 60%/40%. I do not know what positive angle-of-attack he has used (only the leeward board is used on these boats, while the windward one is drawn up out of the water), only that there is a small amount of "toe-in". I would appreciate any guidance.

Nichilas "Moby Nick" Scheuer
Rockford IL USA
Mobynick@juno.com

Trampofoil Substitute

[9 Nov 01] One year ago, I saw the Trampofoil's page. Do you have anything about this?

Eduardo Arias García
eariasg@cranchile.com

Response...

[9 Nov 01] Trampofoil went out of business. For details, look for the Trampofoil-related correspondence on the IHS website in the Human Powered Hydrofoils section of the Posted Messages/ FAQs down near the bottom of the page. There is a similar product available from Engineering Café; see http://www.engcafe.co.za. This website is provided for your information only. IHS does not recommend or endorse products and services.

Barney C. Black
Webmaster@foils.org

Foil-Assisted Take Off, Flying Boat

[1 Nov 01] I am student at the University of Southampton studying Aerospace Engineering. We have a group project to design an amphibious flying boat. Our initial intentions were to design a 767-sized cargo plane. We then thought of adding a hydrofoil to reduce the takeoff distance. We were wondering if you could provide us or direct us to where we could find some more detailed info such as different designs of hydrofoils and typical takeoff speeds of hydrofoils.

Andy Fidler
fidler81@hotmail.com

Responses...

[3 Nov 01] The most recent example of hydrofoil-assisted takeoff for aircraft that I know of can be found in *Air Progress Magazine* of Feb 1968. There is a cover photo of the magazine and an ab-

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stract of the article on Popular Magazines page. The article has some good photos and technical info. You may be able to find some additional info about other experiments of this type on the NACA website, http://naca.larc.nasa.gov/. They have archived hundreds of technical reports, searchable by key word.

Barney C. Black
Webmaster@foils.org

[11 Nov 01] I recall reading of a USAF or USN research project of the 1960s to 70s looking at what I believe were called 'Sea Loiter Aircraft'. This was aimed at developing maritime patrol aircraft that could remain on station (including landing on water if necessary) for a long time. One option was to incorporate hydrofoils to assist in takeoff and landing. The proposals were fairly large. A paper on this subject may have appeared in one of the early 'Hovering Craft, Hydrofoils and Advanced Transit Systems' conference proceedings but I can't find a copy now. Sorry to be so vague; Does this jog anyone's memory?

Martin Grimm
Seaflite@alphalink.com.au

Hull Drag at Take-Off

[22 Oct 01] I am presently dealing with the design of a hydrofoil boat with fully submerged hydrofoils. The foil section design as well as the strut design are already well established but the hull design is still under development. Since the craft will be powered by a water jet system very similar to the Jetfoil propulsion system, the hull resistance near take-off speed seems to be critical for the overall power requirements according to my calculations (hump speed power). I have not found any reliable literature information regarding the hull resistance characteristics from standing to take-off speed. Of special interest is the hull resistance decrease when lifting the hull off the water near take-off speed. An article by Charles G. Pieroth/Grumman Aerospace Corp. dealing with 'hydrofoil hullform selection' published in *Hovering Craft & Hydrofoil* in 1977 does just give general recommendations. Also on the IHS website I could not find further useful info. Can anyone provide me with more detailed information?

Sebastian Muschelknautz
Sebastian.Muschelknautz@Linde-VA.de

Responses...

[22 Oct 01] You may like to look at these papers:

- Sakic, Prof Dr Vinko (Maritime Institute, Split); 'Approximate determination of the propulsive power of small hydrofoil craft', *High-Speed Surface Craft*, March 1982. (Discusses resistance in hullborne mode and transfer into foilborne mode but only over about two pages).

- Latorre, Dr Robert; 'Hydrofoil Craft Performance Calculation', Naval Engineers Journal, March 1990 (this addresses performance on take off).

Finally, the Maritime Research Institute Netherlands (MARIN) once offered for sale a program for the hydrodynamic design and analysis of hydrofoil craft in calm water called 'HYDRES'. This included "the calculation of the resistance for hullborne, take-off and foilborne speeds". It was apparently based on the use of Series 65 hard chine planing hullforms. Further details may be available via the MARIN website but I have not checked that.

Martin Grimm
seaflite@alphalink.com.au

PHM Gunner Checks In

[30 Oct 01] I was the Gunner on AQUILA when she was decommissioned. I saw your picture of the *USS ARIES*, and I still can't believe they are all gone. Let me know if you need info on the gun or harpoons.

"Gunz"
GMC(SW) Mark A. Vogelmeier
Vogelmeierma@thirdncb.navy.mil
R-75 Armory Chief; 31ST NCR
Port Hueneme CA

Russian Shipbuilding Point of Contact

[22 Oct 01] I would like to give you contact info about the Shipbuilding faculty of the Nizhny Novgorod State Technical University (NNSTU). General e-mail: nntu@adm.nntu.sci-nnov.ru. The postal address is: dom 24, ulitsa Minina, Nizhny Novgorod, GSP-41, 603600, Russian Federation. If you want your message or letter to go to the Shipbuilding faculty, then you have to specify: "For Mr. Naloev V. G., Dean of the Shipbuilding Faculty". I don't know Dean Naloev's present personal e-mail, but I can give you his phone number: ++7 8312 367 309 or 325 904. It's the phone of the Dean's office of the shipbuilding faculty. The Dean's full name is Naloyev Valery Georgiyevich. Also, I can give you the fax of the NNSTU Rector's office: ++7 8312 360 569. Again you will have to specify the recipient of your fax: "For Mr. Naloev V. G., Dean of the Shipbuilding Faculty"

Ms. Irina Andreeva
Head, International Relations Dept
Nizhny Novgorod State Tech. Univ.
Andreeva@adm.nntu.sci-nnov.ru

LITTLE SQUIRT's Gas Turbine Engine

[20 Oct 01] In the article on Boeing's LITTLE SQUIRT it mentions Boeing 425 hp gas turbine engine. Do you know any more about this engine or who might. Are these available or something comparable?

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Matt Kirk
Matric39@gte.net

Response...

[21 Oct 01] Boeing built the small gas turbine for about 20 years primarily for the air start carts used to start jet engines at the airports. I believe some may have been used as Auxiliary Power Units (APUs) as well. The jet planes have the APU usually near the tail to provide hydraulics, electricity, and starting air so they can be independent of ground services. Due to the age, I don't know if they are still in service. Other gas turbines of this horsepower range that I am aware of were built by Solar (I believe the parent organization was International Harvester) and Airesearch. I know Aireasearch was bought out by Garrett who was bought but again, but I don't remember the name of the current owner. Current versions of the gas turbines in this category are about half the size of the previous units.

Sumi Arima
arimas1@juno.com

***USS HIGH POINT* (PCH-1)**
Veteran

[16 Oct 01] I was promoted to Boatswain Mate 1st Class in the High Point at Bremerten WA going on to a career of 22 years. I retired in 1995 as a BMC and think back from time to time of the days in *HIGH POINT*. LCDR Daniel Mulhall was my Skipper, the XO QMC P. Henderson, CHANG, ENC James Mustoe. BM1 Barney and BM1 Huffman were there as were ET2 Ragzetts? SM3Christain MS1 Ray Shoquist, ET1 Turner, OS1 Tucker and others. I have a great picture of *HIGH POINT* that is showing its age any way to get another?

Stephen Heald, BMC(SW) USN (Ret)
Bosnusn@starfishnet.com
107 Heron CT
Newport, NC 28570

Need PT-50 Plans for Model

[16 Oct 01] I live in Sydney and in my childhood we had PT50 Hydrofoils operating in Sydney Harbour. I am scratchbuilding a (static) model of one and was wondering if you had any possible sources for scale plans.

Ian Wrenford
lansharyn@bigpond.com

Responses...

[30 Dec 01] Note that Ian Wrenford's many impressive models are on static display at the website of the Australian Plastic Modelers Association. Go to: http://apma.org.au/membersmodels/ian_wrenford/wrenford.html.

Barney C. Black
webmaster@foils.org

[20 Oct 01] I have a model PT.50. You can see it at: http:// home.wanadoo.nl/~hydrofoils1/tiesten.htm.

Mark van Rijzen
info@dutchhydrofoils.com
www.dutchhydrofoils.com

[20 Oct 01] The radio controlled model I have (still unfinished) is of a Rodriquez RHS 140 rather than the Supramar / Rodriquez PT 50. The RHS 140 was essentially a somewhat modernised version of the PT 50. It is a fairly similar size with similar passenger capacity and engines, but had a slightly different hull and superstructure. My model represents *CURL CURL* which you may still recall. *CURL CURL* was the only RHS 140 that was operated on Sydney Harbour. Most of the other Sydney hydrofoils were of the PT 50 type you mentioned, though the first one *MANLY* was a smaller PT 20, and the last two that were introduced, the *MANLY [2]* and *SYDNEY* were both larger Rodriquez RHS 160F types. More on the Sydney hydrofoils is in issue 5 of *Classic Fast Ferries* by Tim Timoleon at http://classicfast-f.homepage.dk.

I built my 1:20 scale *CURL CURL* model from plans I drew up (also to a scale of 1:20) from a combination of arrangement drawings in journals and my own set of photos of that hydrofoil. Those plans are also not complete, but were enough to be able to build the model from. The question now is, do you want to specifically build a PT 50 model or would the RHS 140 also be suitable? Also, how accurate do you want be? I don't have accurate drawings of either the PT 50 or RHS 140 from which to build a model, but the principal characteristics and general arrangement are posted up on the IHS website at http://www.foils.org/pt50.pdf. See also *Janes Surface Skimmers* 1967-68, which shows section views through the PT 50.

Note that the PT 50 hydrofoils that operated on Sydney Harbour had various superstructure configurations. Some, like *DEE WHY*, had a raised wheelhouse top, and others like *FAIRLIGHT* and *LONG REEF* had the *wheelhouse* at the same level as the rest of the superstructure. The PT 50 plans I provided to IHS are of an older style of superstructure with less internal passenger capacity than those operated on Sydney Harbour.

I can send you a selection of scanned photos of mainly either *CURL CURL* or *LONG REEF* once you indicate whether you have a preference for building any particular one of the Sydney hydrofoils. I assume you would be building the model to around 1:72 scale? I look forward to hearing more about your plans to build the model. There is a page on the IHS website under the photo gallery where photos of various hydrofoil models are included. Two other modellers in Australia have built PT 50 models, but neither are complete as far as I am aware. They are larger scale models

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HYDROFOIL ANNOUNCEMENTS

Meetings, Conferences, Workshops, Seminars, Telecasts

Junkyard Wars

[08 Jan 02] On Feb.13, 2002 a show called Junkyard Wars will be broadcast on The Learning Channel. This is the USA version of Scrapheap Challenge, broadcast in Britain on Nov 18, 2001 by Channel 4. See www.Channel4.com/ scrapheap/ scrapheap.html. As a participant in this breathtaking, already-a-cult series, (I outlined, developed and calculated a weird "scrap-craft") I consulted to the British team "Catalysts" (3 Jaguar engineers) http://rotaryboy.screaming.net/ in their battle against time and to the mighty American team "The Mulewrights". — Claus-C. Plaass, (plaass@gmx.net), USA showtime provided by Matt Kirk (matric39@gte.net)

HIPER 2002

[16 Dec 01] The next High-Performance Marine Vehicles conference (HIPER 2002) will be held in Bergen on 14-17 September 2002. For details: www.ifs.tu-harburg.de/HIPER/HIPER_02.html. I welcome all hydrofoil activists. We have special funds to waive the fees for young participants (up to 35 years) of EC citizenship or those who have lived the past 5 years in the EC. — Volker Bertram (Bertram@hsva.de)

HPB Race Results

[8 Oct 01] Ron Drynan has posted racing results and photos from the Buffalo HydroFest. For the racing results for this Human Powered Boat (HPB) event, go to http://www.humanpoweredboats.com/HydroFest/2001/HydroFest2001Results.htm and for a series of photos, http://www.humanpoweredboats.com/ HydroFest/2001/HydroFest2001Pictures.shtml.

Also, the Photo Gallery has been given an entirely new look, with thumbnail images for quick loading, and larger photos available as desired: http://www.HumanPoweredBoats.com/Photos.shtml to see the gallery, which is now separated into seven categories and includes over 280 pictures If you don't see your HPB in there... send Ron a photo! Ron's email is: Ron@HumanPoweredBoats.com.

Fast Ferry Conference

4Midalble announces the 18th Fast Ferry Conference & Exhibition in Nice France, 26-28 February 2002. Go to http://www.foils.org/FF-papers.pdf for info.

People in the News

John Martyn Lewis Reeves

[18 Nov 01] John Martyn Lewis Reeves passed away at the end of October 2001. See page 2 of this newsletter for more information.

CAPT Ron Berning

[1 Nov 01] Captain Ronald C. Berning, USN (Ret.) died on 2 Aug 01 at his home in Norfolk VA following a courageous battle with cancer. He was buried with military honors at Arlington Cemetery on 23 August 2001. He graduated from the US Naval Academy in 1968. Following graduation, Ron began a long and distinguished career as a surface warrior that was to include four commands, including command of Patrol Hydrofoil Missile (PHM) Squadron 2 (COMPHMRON TWO) in Key West FL. A donation in Ron's name can be made to Children's Hospital of the King's Daughters; P.O. Box 2156; Norfolk, VA 23501

Al Rand

[19 Oct 01] Sumi Arima reports that Al Rand died 17 Oct 01 of a heart attack. Al was 79. Sumi came to know him in 1960 when he worked on the *HIGH POINT* foilborne transmission design. He subsequently worked up to becoming the HYSTU Support Program Manager, the position he held when he retired from Boeing. On behalf of the IHS, John Meyer, president expressed his remembrance that "All of us who were associated with the Boeing organization hydrofoil program held Al in the highest regard. He was a great engineer, leader and a strong proponent of hydrofoils."

Lost Members

IHS has lost touch with the following members and would like to reestablish contact. Each name is followed by the last known email address. If you see your name here, please contact us at webmaster@foils.org. If you see the name of someone you know, please let us know the current address or otherwise let the person know that we are trying to get in contact! Meanwhile, if you yourself have moved or changed email address, please inform us of the change!

- John Avis (kmmu2@aol.com)
- John Belchez (Jbelchez@antares-corp.com jbelchez@isat.com)
- Derek Chandler (S1178082@cedarnet.cedarville.edu)
- Christopher Edgar; 20 Cliff Street, Kensington; Liverpool L7 2PX England (etmcedg1@livjm.ac.uk)

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Missing Members
(Continued From Previous Page)

- Bradford Gatenby (b.gatenby@net0.net)
- Georges Kokkinos (Athens, Greece)
- Mike Koronaios (GA803800@ntu.ac.uk)
- Leflar, James (jlefla@acxion.com)
- C. Makohon (edupti@mindspring.com)
- Erin Ozsu (erozsu@hotmail.com)
- Stanislav Pavlov (mtd.sp@bcltele.com)
- Johs Presthus (life member); Ostre Nestttunvei 16 POB 113; N5051 Nesttun, Bergen, Norway
- Roy G. Shults; 1345 Macbeth Street; McLean, VA 22102
- Calvin Stringer (calvinstringer@maritimedynamics.com)

Misc. News Blurbs

New PHM Model Kit

[13 Jan 02] White Ensign Models (WEM) offers a new 1:350 scale model kit for PHM 1 *USS PEGASUS*. See the details and photo on the web at http://dspace.dial.pipex.com/white.ensign.models/350peg/350peg.htm. The company ships orders worldwide. Felix Bustelo has created a webpage about this model with photos, hints, and a review: http://warship.simplenet.com/wem_pegasus.htm. Thanks to Steve Novell (steve.novell@av.com) for bringing this item to us. He says, "The model is close enough to the real thing that you can make just minor adjustments (adding H bits to the main deck, relocating the radar to the mast, etc.)"

New Hydrofoil Video Page

[13 Jan 02] Films and Videos about or featuring hydrofoils are the subject of a new page on the IHS website. We need more references, so all members and visitors are urged to visit or contribute to http://www.foils.org/popvideo.htm.

High Speed Happenings

[9 Dec 01] There is so much happening these days with high speed ships and craft, and there is some recognition now that some transportation modes are fast approaching gridlock; examples: the interstate highways in major metropolitan areas, the advice now to seek other modes of transport for trips of 500 miles or less due to the airline issues. On the government side, we have:

- Naval Transformation push from Congress and OSD and now N76 in OPNAV starting an initiative on Littoral Combat Ship (LCS) under the re-structuring of DD 21
- Recent business relationships put into place by Bollinger and Bender to build Incat and Austal designs in the US
- Army plans for near-term procurement of Theatre Logistics Vessel (40 knot catamarans)
- Joint lease of Incat, and the III MEF lease of Austal

It is incumbent on all of us to promote advanced naval vehicle technology and get the word out to the general public. By looking at the briefing on Norwegian surface Effect Ship (SES) Fast Patrol Boat (FPB) *KNM SKJOLD*, you can see that the PHM-3 series ships met or exceeded all SKJOLD operational capabilities in the 1970s/80s (See http://www.dillon.deltron.net/foiler/skjold%20brief.pdf.) So there is a good story to tell on the successes of the PHM program. — Mark Bebar (BebarMR@navsea.navy.mil)

Speed Sail Record Attempt Planned

[4 Nov 01] *SAILROCKET* is a new British design to challenge the outright world speed sailing record. The current record of 46.5 knots was set in 1993 by the Australian boat *YELLOW PAGES ENDEAVOUR* . The *SAILROCKET* team is looking for sponsors to finance full scale construction, trials, and subsequent record attempts within an 18-month to 2 year program. An interesting video of model trials is available on the website: http://www.sailrocket.fsnet.co.uk/. The point of contact is Malcom Barnsley, Designer and Project Leader, email address: (mjb@sailrocket.fsnet.co.uk)

HPB Photos Posted

[11 Sep 01] On a webpage, http://www.humanpoweredboats.com/ Photos/ HydrofoilHPBs/ HydrofoilHPBs.htm. Ron Drynan has gathered a collection of action photos that show the diversity of design in human powered hydrofoils. The craft pictured include *af CHAPMAN II* (Chalmers University of Technology), *AIR AMERICA* (Jim Gilmartin), *COGITO 00* (Team Cogito), *DECAVITATOR* (Massachusetts Institute of Technology), *FLYING FISH I* and the very different *FLYING FISH II* (Allan Abbott, Alec Brooks), *HYDROPED* (Sid Shutt), *NEW FISICS* (Jake Free), *SCAFO* (Philipp Müller and Claus Abt), *SUPER PHOENIX* (Polcolosso Kinosaki), and WET WING (Jochen Ewert). Ron has also added a page to feature "other" hydrofoil craft that he has seen, i.e. sailboats and solar powered craft. Note also that the Japanese Solar and Human Powered Boat Association has created a webpage at www.orange.ne.jp/~jsha/ with interesting photos (not exclusively hydrofoils).

Commercial Pages

[13 Jan 02] As a service to IHS members and other visitors to the website, IHS posts notices of Hydrofoil Vessels for Sale, Hydrofoils — Wanted To Buy, and Joint Venture Proposals. See the Announcements page on the site for the latest notices.

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Commercial Pages
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Deepwater Jobs

[11 Dec 01] Civilian Job Opportunities at U.S. Coast Guard: Proposals are in for the next big phase of the Deepwater Project, and USCG is staffing up with civilians. This should be of special interest to people with experience on the US Navy's LCAC or PHM programs... who better to know about integrating surface and air practices and procedures for the improvement of all (Boeing heads one of the three teams competing for the Deepwater Phase 2 contract). Visit the website http://www.uscg.mil/deepwater/ now and periodically in the future, because hiring will be going on through the first half of 2002. Look for the "Exciting Jobs" button on the website.

Here is some descriptive text from the site: "As the Coast Guard embarks on a major, multi-year recapitalization effort to replace ships, aircraft, C4ISR and logistics systems, we are looking for a talented crew to help us realize the long-term success of our program. The Integrated Deepwater System Program will shape the future of a military service dedicated to America's maritime safety and security needs. We aspire to build the world's most effective and efficient integrated system of personnel, technology and hardware, and we need the best and brightest to answer the call. Today's aging surface and air assets are driving operational costs higher each year and threatening operational readiness. Our mission is clear, and the time is now. We must successfully develop, acquire, deploy, and sustain an affordable Integrated Deepwater System. You can be part of the Deepwater team in one of the many positions coming available in the near future. This website was designed to give talented people the information needed to find the right opportunity to contribute to the Deepwater goal. We currently have civilian position vacancies listed on the CG Personnel Command "Job Openings" website http://www.uscg.mil/hq/cgpc/cpm/jobs/vacancy.htm, and we will soon add information on numerous additional civilian positions."

New Publications

Alternative Hullforms

[13 Jan 02] A SNAME technical report *Alternative Hullforms for High-Performance Ferries* examines the hullforms available for high-performance ferries, including planing monohulls, catamarans and other multihull vessels, small- waterplane vessels, hydrofoils, hovercraft, air-cushion vehicles, surface-effect ships, WIGs, and channel-flow-wing craft. For each type, attributes and issues are cited, and tables of principal characteristics and photographs of examples are provided. This Technical and Research Report R-51, may be ordered from cpujols@sname.org. The 35-page report, with 22 illustrations, is being issued as a compact disk, priced at $30 ($15 for SNAME members).

Blade and Foil Section Design

[08 Jan 02] The Society of Naval Architects and Marine Engineers (SNAME) has published the technical bulletin *Blade and Hydrofoil Section Design*. This bulletin includes the Blade and Hydrofoil Section Design Codes with a 29-page Owner's Guide, and a 184-page Technical Report. It updates and complements T&R Bulletin 1-17. The Design Codes and Owner's Guide provide tools for the design and performance evaluation of blade and hydrofoil sections. The programs are provided in both DOS and Mac formats and will run on most personal computers. The Technical Report provides analytical background information and is of interest primarily to those who wish to adapt or enhance the programs. This new publication is identified as Technical and Research Bulletin 1-45. It is being issued as a CD, and may be ordered by contacting cpujols@sname.org or by calling 201-798-4800. It is priced at $50 ($25 for SNAME members).

Classic Fast Ferries

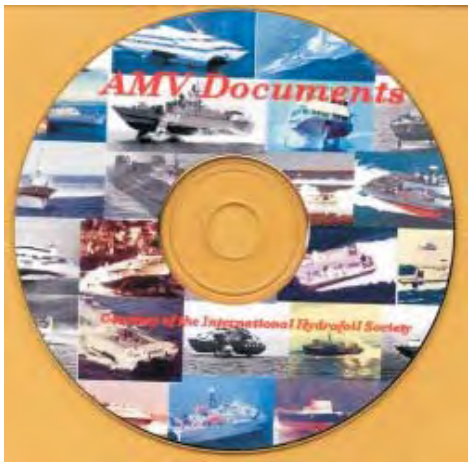
[30 Dec 01] The Dec 2001 issue of Classic Fast Ferries has gone up on line and is free to the public. See: http://classicfast-f.homepage.dk/.

Spring Newsletter

[13 Jan 02] The Spring 2002 IHS Newsletter is in preparation. IHS members and others interested in hydrofoils are invited to submit material of interest to the hydrofoil community for publication (and/or posting on the website)... an article, photos, a news clipping, a web page URL, a letter to the editor. Submit by mail or by e-mail. The newsletter focuses on recent events, current issues, and new projects, but we also publish first person accounts of interesting past events and important contributors in the history of hydrofoil development.

AMV CD-ROM

[15 Sep 01] IHS is making available a CD-ROM collection of technical information on Advanced Marine Vehi-



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New Publications
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cles (AMVs). These documents have been generally unavailable, as they were in private or government files and archives. You will need the free Adobe Acrobat Reader to view the files on the CD-ROM. See the IHS website to view a list of the contents. The price is US$5.00 (five dollars), regardless of destination. The CD-ROM is shipping now to all destinations worldwide. Orders must be pre-paid. See the IHS website for instructions how to order: http://www.foils.org.

HPB Videos

[16 Mar 01] Ron Drynan reports that the "WaterCycling 2000 - The State of the Art" videos are now available: There are eight hours of edited footage on four volumes, with sections on most of the famous hydrofoil HPBs. Altogether there are over 200 boats on these tapes. A discounted introductory price is available for a short period directly from Ron. A detailed segments listing is found at http://www.HumanPoweredBoats.com/Forms/F_HH2000_VideoOrder.htm, and all proceeds will be donated to the HPVA (Human-Powered Vehicle Association). email: Ron@HumanPoweredBoats.com; website: http://www.IHPVA.org/hpva/

Hydrofoils in the USCG

IHS is planning a future article with photos about *USCGC FLAGSTAFF* (WPGH-1) and *USCGC HIGH POINT* (WPBH-1). Yes, these two pioneering vessels were briefly part of the US Coast Guard's cutter fleet in the mid-1970s for a hydrofoil evaluation project run by the Research and Development Center. We have photos and press releases from the time but are interested to receive anyone's personal recollections of that hydrofoil evaluation on the part of the US Coast Guard. Contact Barney C. Black at webmaster@foils.org

Letters to the Editor
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made of wood and one is radio controlled. They were built from plans provided by Rodriquez but I was told that the plans may have in fact been for a mix of PT 50 and RHS 140 types, so that made it a bit confusing to build the models.

Martin Grimm
Seaflite@alphalink.com.au

Need Copy of 1968 Report

[4 Oct 01] I am looking for the following report: "The skin friction of a hydrofoil near a free surface" John C. Gebhardt. October 1968. Do you know anybody who has a copy of this report?

Günther Migeotte
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Dept. of Mechanical Engineering
University of Stellenbosch
Banghoek Rd
Stellenbosch 7600; South Africa

USCGC FLAGSTAFF (above)
USCGC HIGH POINT (below)

Web Traffic Analysis

The webmaster analyzed visitor activity at the IHS website for the six days 5 Dec 01 to 11 Dec 01 to get an idea of visitor habits. Here are some of the highlights: The site received total 2,382 visits during that time period, an average of 340 visits per day. The average duration of a visit was 7 minutes; median was 3 minutes.

Of course some people (such as the webmaster!) visited more than once. It is possible to identify many, but not all, visitors through cookies and other techniques. The analysis was able to identify the visitor in 1,628 out of the 2,382 total visits. Of these, 1,309 visited once;319 visited more than once.

The most popular pages, not counting the main page are the links page (232 views), the posted messages main page (231 views), and the radio-controlled models page (144 views).

The most popular files downloaded were the sample newsletter (157 downloads), the information on sale of Shearwater 5 and 6 hydrofoil ferries (76 downloads), the overview of the Catri foiler sailboats (61 downloads), the history of IHS (53 downloads), the table of contents for the Advanced Marine Vehicles (AMV) CD-ROM (48 downloads), and the review of David Keiper's excellent, but out-of-print book on his hydrofoil sailing yacht *WILLIWAW* (45 downloads).

The website has evolved into a tremendous resource for hydrofoilers thanks to the contributions of many volunteers and visitors to the site and to the dues-paying members!