The NEWSLETTER

International Hydrofoil Society

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

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HIGH SPEED VESSELS LEAD INTERNATIONAL FERRY INDUSTRY GROWTH

Reprinted From *Marine Log*, Jan 1997

High speed vehicle-and passenger-carrying ferries are now the fastest growing segment of the international ferry market. Though high speed passenger craft have been around for thirty years, the spur to the sector's growth has been recent technological advances that have improved the economics of this type of vessel operation. This has opened up a wide sphere of potential deployment.

"With technology still developing rapidly," predicts Ocean Shipping Consultants of Chertsey, England, "the period to 2005 is likely to witness considerable advances in both vessel design and in the acceptance and adoption of the fast ferry concept in ferry markets throughout the world."

At *Marine Log*'s Ferries '96 conference in Fort Lauderdale, Ocean Shipping's director Stephen Hanrahan further predicted that while the scale of growth of passenger-only fast ferries might slacken, the fast car/passenger sector would continue "to display a high level of dynamism."

The underlying economics of fast ferries, noted Hanrahan, are case-specific. For example, it is often claimed that, generally, fast ferries do not suit sailing times of over approximately three hours, because of the passenger comfort factor. However, the sailing distance must be sufficient for the fast ferry to yield a significant time savings compared with a conventional ferry, justifying its higher operating costs and higher fares. Other factors noted by Hanrahan: frequency of sailing; assured high level of traffic; and suitable infrastructure at both ends of the ferry leg (fast passenger embarkation/disembarkation; sufficient road/ rail links).

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NEW IHS HOME PAGE NEW

The IHS home page on the World Wide Web has moved. The new URL is:
http://www.erols.com/foiler

HELP A STUDENT

"I have been unable to find any practicing hydrofoil specialists, leaving most of my research in dusty books printed in the 1940's!" So writes Owen Morris, a student at University of Newcastle. Every month, IHS receives two or three calls for help from students and hobbyists working on hydrofoil projects. If you can help occasionally with advice, design criticism, and ideas, please contact IHS. We promise not to overload you!

NEW IHS E-MAIL ADDRESS NEW

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INSIDE...

PRESIDENT'S COLUMN

REPORT ON THE 1997 MEETING OF THE TRANSPORTATION RESEARCH BOARD

William Hockberger

[IHS President John Meyer yields his space in this issue to IHS Board Member William Hockberger for this report]

The Transportation Research Board (TRB), which is a part of the National Research Council (under the National Academy of Sciences), held its annual meeting in Washington DC in Jan. 1997. Over 7,000 people attended, and the meetings filled the Shoreham, Sheraton Washington, and Washington Hilton hotels. There were some 450 technical sessions and panel discussions, plus meetings of over 200 standing committees specializing in various areas related to transportation. I joined the TRB as an affiliate and attended a full slate of sessions over three days.

The TRB's Ferry Committee met one evening that week, and John Meyer *[IHS President]*, Allan Ford (of the US Hovercraft Society), and I attended as guests. The Ferry Committee is chaired by Martha Reardon, who has been a consultant in the ferry business for about 20 years. It has 25 members, including ferry owners and operators, government transportation planners, consultants in the ferry business, and at least one university professor – but apparently no designers (they are content to use ferries designed elsewhere but built in the USA, and designers are not missed, at this point). I was allowed time to give a short briefing on the Advanced Marine Vehicle (AMV) workshop we have been planning.

The TRB also has other committees that deal at least partly with marine topics, but they are a distinct minority. Those concerned with highways and their supporting technologies and industries are the most prevalent by far – perhaps 90% of what the TRB is involved in. Nevertheless I came away with a clear awareness that the TRB is the focus of a great deal of activity of interest to marine industry people, including AMV specialists.

Here are a few pertinent items that were discussed in sessions I attended:

- Five high speed catamarans were acquired by a company to ferry workers and supplies from shore to Deer Island, in Boston harbor, where a large industrial project has been underway. It's a genuine fast ferry service, though obviously for a select clientele.

- General Dynamics has formed a subsidiary to operate two catamaran ferries from its old Fore River shipyard in Quincy MA to downtown Boston and to Logan Airport. The craft were built in Massachusetts by Gladding-Hearn and began operation in Nov. 96. It's an InCat design carrying 149 passengers, has a max. speed of 35 knots but normally cruises at 30, is propelled by two Bird-Johnson waterjets, has a GRP hull and aluminum superstructure, and costs about $1.5M each.

- Arthur Imperatore, the big New York City ferry operator, gave an interesting presentation on his routes into Manhattan, two of which carry 2-1/2 million passengers a year each. They are not *fast* ferries, but what was of in-

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WELCOME NEW MEMBERS

Evan Riddle is from Mobile AL and has an interest in small hydrofoils as opposed to planing boats which pound too much and sailboats, which are too slow. See his "Letter to the Editor" on pages 9-10 of this Newsletter for info on this enthusiastic new hydrofoiler.

Stephen J. Duich, a veteran hydrofoiler, now resides in Burke VA. He reports that his best recollections of the "good old days" aboard PLAINVIEW include sea trials in Elliot Bay which included the ship becoming *airborne,* his first foilborne flight at the helm, the tie-snipping ceremony honoring Dr. Frosh's (ASN-R&D) foilborne flight at the helm, failure of the starboard strut up-link during the INSURV Final Contract Trial, and all the great "Plankowners" who worked so hard to advance the hydrofoil concept.

Ken Cook heads up Hydrofoil Inc. in Lake Worth FL. Visit his home page to see his R/C models: www.gate.net/ ~caseyc/ hydrofoil .html**. Ken is marketing his design for an ultra-high speed commuter hydrofoil that can be configured for any combo of passengers and freight.**

B. J. Meinhardt of New Cambria MO is owner/operator of BJ Co., whose holdings include real estate, petroleum reserves, heavy equipment and machine tool sales, crane service operation, machine shop services, as well as partner of Dive Works, a water rescue and recovery service. He is co-owner of PHM-2, as reported in the Winter 96-97 IHS Newsletter.

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NEW MEMBERS
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Eliot James is President of Custom Composites Company and its sister company, Advanced Composite Technologies in Salisbury, Missouri. The company manufactures tooling and parts for aviation, marine and heavy truck industries. He is a partner with BJ Meinhardt in Dive Works. Eliot is a partner with BJ in ownership of PHM-2.

Matthew DeLaney joins us from Broken Arrow OK. He is currently building an experimental radio-controlled hydrofoil model for a proof-of-concept design that will some day enable him to obtain a patent. We wish him much success.

Malin Dixon - We welcome a new member from the UK. Malin attended the University of Cambridge 1978-82, where he majored in engineering, specializing in electronics. He then worked as an instrumentation engineer for about six years. Since then he has been Director of OnSpec Oscillators, established in 1988 to meet the need for fast delivery crystal oscillators, and is now selling a wide range of crystal oscillators. His home page: http://www.onspec.co.uk

K. I. Matveev is a student at the Acoustical Institute, Shvernika, Moscow, Russia. He is currently our only member in Russia or the former Soviet Republics.

IHS OFFICERS 1996 - 1997

John Meyer	President
Mark Bebar	Vice President
George Jenkins	Treasurer

HIGH SPEED LEADS
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According to Hanrahan "whilst the sailing time, and therefore voyage length, is effectively limited by the nature of passenger accommodations, the sailing part of the overall transport leg needs to be sufficiently large within the overall transport chain... to generate a valuable time savings." While passengers may be ready to pay a premium for speed, "this premium may vary directly with the overall time savings involved in their total transport leg." A 2-hour savings will be more significant on a relatively short journey than in a total journey time of over 12 hours.

Fast Ferry Option

While the switch to fast ferries has often been made at the expense of conventional ferry tonnage on existing runs, the speedy new vessels have also enabled new ferry routes to be opened up. What's more with their sleek modern lines and promise of comfort – often in aircraft type seating – fast ferries have re-awoken a consumer interest in ferry transportation that was previously slumbering. Ferry operators making the switch to high speed face a seeming confusion of choices. No one type of vessel has emerged as the "standard" fast ferry. Hanrahan notes five main vessel types within the world fast ferry fleet: catamarans, monohulls, hydrofoils, hovercraft, and surface effect vessels. *[We would add SWATH (small waterplane area, twin hull) vessels to the choices thanks to their ability to maintain a reasonable service speed in challenging sea conditions -Ed.]*

Exponential Growth

Since 1990 fast ferry design and engineering technology have grown exponentially. Between 1990 and 1995 the number of catamaran ferries in operation around the world grew by more than 60%.

"Catamarans are now the largest *[quantity, not size]* vessel type in the fast ferry profile with high volumes of deliveries in recent years displacing hydrofoils as the leading fast ferry. The current total of 543 catamaran vessels represents approximately 43% of all fast ferries worldwide, with this easily the fastest growing type," Hanrahan adds. Designed basically with two narrow aluminum hulls bridged by a wide deck, the catamaran offers larger passenger capacity than a similar length monohull ferry, and is able to support multiple passenger decks. It is generally faster than conventional monohulls, with a new generation of catamarans ("wave-piercers") developed in recent years to offer a smoother ride through the piercing of waves rather than riding over them.

Catamarans are the most significant vessel type in fast ferry markets in Scandinavia, Europe, Hong Kong, Australia ,and the Americas.

The hydrofoil is the next leading fast ferry type, making up 32% of the market at the beginning of 1996. "There are two types of hydrofoil: surface piercing foils and fully-submerged foils. Hull shape is a deep 'V' and made from aluminum. Foils are arranged in tandem, are of a 'V' configuration, hollow, constructed from high tensile steel, and fitted with controllable flaps. The vessels are driven by two high performance diesel engines turning screw propellers. Because of the very nature of the vessels, hydrofoils require relatively deep water in case of power failure in which case they become hullborne. This vessel type *[surface-piercing hydrofoil]* strongly favors good sea conditions, with poor seakeeping in adverse weather tending to restrict operational suitability," Hanrahan explains.

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[Modern surface piercing hydrofoil design, coupled with automatic control systems have improved rough weather seakeeping ability of this vessel type. -Ed.]

Fully-submerged foils "employ fully retractable, fully-submerged stainless steel foils and are propelled by two water jet pumps driven by gas turbines. The vessels are relatively expensive in terms of running costs however, they are able to run 45 knots in rough waters."

Monohulls are cheapest in terms of newbuilding, operating, and maintenance costs. Distances of over 20 miles favor the use of single-ended ferries. At the start of 1995, monohull fast ferries totaled 178 vessels, 14% of the market, yet they are the most important fast ferry type in the growing Japanese market.

SES design is based on a lightweight aluminum or fiberglass catamaran hull with a flexible skirt seal at bow and stern. This traps an air cushion which is pressurized by diesel or gas turbine driven fans, and the vessel is propelled by diesel or gas turbine driven screw propellers. SES ferries represented 6.5% of the total number of fast ferries at the start of 1996, half of this number operates in the Asia/Pacific markets, according to the Ocean Shipping Consultant's report.

Hovercraft, popular in Hong Kong, are driven by aircraft-style propellers and can reach up to 50 knots or more. "There are 53 vessels operational worldwide, sharing 4.2% of the ferry market," Hanrahan explains.

Among the most recent deliveries noted by *Marine Log* is a SCAT SF2000 Eagle hovercraft, built by SCAT Int'l, that was recently delivered to LKN Group Singapore. The vessel will operate a regular schedule from Singapore Changi Ferry Terminal to Nongsa Point Terminal at Batam. Traveling at 38 mph top speed with a passenger load of 20 and two crew members, the hovercraft can complete its journey in 15 minutes.

Booms and Slumps

Fast ferry deliveries between 1988 and 1995 have seen various booms and slumps. The current European market has lulled. "The shift in importance from Europe to the Far East is to the fore. In 1988, 55% of all fast ferry newbuildings were destined for European markets; by 1995 this figure had reduced to 16%," Hanrahan reports. The Asian market, however, seems to have taken up the slack with "newbuildings aimed at China and Hong Kong increasing from under 24% in 1988 to almost 55% in 1995. This serves to emphasize the scale and pace of fast ferry market growth in Asia-a feature which, together with continued penetration by ferry craft of new and existing conventional ferry markets, is set to fund continued and rapid overall sector growth," he forecasts.

North American Market Potential

In the North American fast ferry market, Hanrahan comments that there exists a "substantial potential... in the USA for [fast] ferry penetration of new and existing passenger trades. The main ferry operators in the country are planning to introduce fast ferry tonnage to their fleets, and numerous other plans exist for similar developments. The continuing development of fast ferry technology is likely to see further penetration of USA passenger trades."

An interesting example of one North American operator's reasons for introducing a fast ferry service is provided by British Columbia Ferry Corporation's Horseshoe Bay, West Vancouver, to Nanaimo, Vancouver Island route. Last year, it carried 3.5 million passengers and 1.4 million vehicles. Traffic on routes serving Nanaimo is forecast to grow by more than 17% over the next ten years, Michael Martin, director of special projects at B.C. Ferries told the Ferries '96 conference.

"If we were to maintain the status quo on these routes," Martin explained, "we would need to invest more than $40 million in terminal expansion at Horseshoe Bay to accommodate vehicle traffic [and] at least $70 million to improve roadworks at Nanaimo, probably a lot more." What's more "there is no room, no land, no space to expand either of these terminals."

B.C. Ferries took a two-pronged solution to the problem, It decided to remove all heavy commercial truck traffic from the route and redirect it to a new terminal south of Nanaimo. That frees up badly needed terminal space, but still left B.C. Ferries with "too many vehicles needing to sail at the same time." The answer: a fast ferry solution. The relatively benign sea-states on this route, noted Martin, and its length – 28 miles – made it ideal for high speed ferries.

As a result, under the management of a new B.C. Ferries subsidiary, Catamaran Ferries International (CFI), a group of British Columbia yards, is currently building a large high speed catamaran that matches environmental requirements so that the vessel will have low wake and wash characteristics, and acceptable exhaust emission levels. Based on technology developed by Incat of Australia, the vessel is designed to carry 250 vehicles and 1,000 passengers at a 37 knot cruising speed. The 122.5 m ship is powered by four MTU 20 V 1163 diesel engines coupled with KaMeWa type 112 waterjets. It is planned to be completed and in operation by the mid-

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summer. Martin adds "It has become something of a cliche to speak of 'win-win' solutions. But if ever there was such a thing, fast ferry technology is it. A win for passengers, a win for the economy, a win for the shareholder, and a win for the shipowner."

Like B.C. Ferries, US operators of fast ferries seem to have preferred to look outside the USA for proven foreign designs that can be built in the US under license. Though Incat designs have long dominated the US scene, there are now other challengers in the picture. Examples include the decision of the Mashantucket Pequots to build the FBM Tricat at their Pequot River Shipworks in New London CT, and the growing success of Dakota Creek Industries, Anacortes, WA, with AMV designs. Meanwhile, New York Fast Ferries has looked to Nigel Gee & Assoc. of the UK for the design of its new 35 knot boats built at Derecktor Shipyards, Mamaroneck NY.

E-Cat

An attractive US design described at Ferries '96 is the Halter E-Cat – a low wake concept for transit areas that are wake-sensitive and close to housing concentrations. The Halter E-Cat produces a low wake throughout its speed range, and maintains high speed with modest power

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IHS chooses articles and photos for potential interest to IHS members, but does not endorse products or necessarily agree with the authors' opinions or claims.

THE LAUNCHING OF FLAGSTAFF (PGH-l)

By Robert J. Johnston

Your editor has asked me if I could provide some material for the 1997 Spring issue of the IHS NEWSLETTER. When wondering what might be of interest, I looked at a piece of hardware in my possession which was cut from an extrusion of the main deck material for the FLAGSTAFF. On this extrusion are etched the following words:

"Bob Johnston"
Plank Owner
FLAGSTAFF (PGH-1)
Launched: January 7th, 8th, and 9th! 1968 (We cut this from the strength deck - and the damn boat is still too strong!!!!)
From your friends at the
Grumman II Iron works

This etched extrusion was given to me when I departed Grumman to work for Bill Ellsworth on the US Navy's Advanced Hydrofoil Program at the David Taylor Research Center. Looking at those words defining the launch dates brings back memories of a time of much apprehension, but also in retrospect a time with a touch of humor.

The story really begins a couple of years earlier when contracts were awarded to Grumman and Boeing to build two hydrofoil gunboats for the US Navy, the FLAGSTAFF and TUCUMCARI, respectively. At Grumman this award immediately led to the decision as to where to build the gunboat. Grumman had built the DENISON a few years earlier in an aircraft assembly area. A lesson was learned at that time that to control the cost of constructing a hydrofoil, it should not be built in the same area as aircraft or need the strict discipline of specialized mechanics. A failure of a hydraulic system in an aircraft can be disastrous; however in the case of a hydrofoil the ship may fall four or five feet before making a landing. Such a landing is quite tolerable, and in fact a loss of hydraulic power demonstration while foilborne is a requirement of the US Coast Guard upon certifying a passenger hydrofoil.

So Grumman selected an area in Stuart, Florida where the construction of the hydrofoil could be kept completely separate from the aircraft work. A team of mechanics were selected who were versatile in at least two trades with the objective of working as a group without concern for trade cognizance.

Having selected the location and the personnel to construct the vessel, attention was directed to the logistics of the decisions. Among the issues were the questions of launching, how and where. The Grumman Stuart facility was an airport, across a road from the Inland Waterway. The Inland Waterway is a protected route which a boat can use to make a sheltered transit from New York to the Florida Keys.

The section of the Waterway near Stuart is called the Indian River. The question of moving the boat from the building site to the edge of the River was no problem. The ISSUE became how to launch the boat. Grumman owned the property on the River, so modification of the site was not a problem. The issue was the launch method. The Marine Division proposed strengthening the property's bulkhead and lifting the boat in by cranes. The design of the craft required that the gunboat be capable of being lifted on to a ship for transit purposes. The facility manager, who owned a fishing boat that he trailered and ramp launched, favored using that method for launching the gunboat. He convinced the management of a cost saving, and against the best arguments of the Marine Division, won the decision. And so a launch

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ramp, large enough to handle the FLAGSTAFF was constructed.

By early January 1968 the FLAGSTAFF was ready to be moved and launched. Arrangements were made for a set of house-moving dollies to transport the craft to the launch site and for its trip down the ramp and into the water. The house movers who were furnishing the dollies were also hired to assist in the launch. An early-morning move time was established to complete the move before the start of work hours so as not interfere with the activities of the airfield and plant. So before eight o'clock on the morning of January 7th, FLAGSTAFF had reached the launch ramp and was in position to roll down the ramp into the River. High tide was at ten o'clock which was the appointed time for the christening and launch ceremonies. Mrs. Towl, wife of Grumman's Chairman of the Board, was to do the related honors. As an aside the Chairman, Clint Towl, had made the final decision as to the method of launch. He owned a winter home nearby and was very much interested in what went on at the Stuart plant. The ramp went down onto a sandy bottom and had some distance to navigate before the hydrofoil was completely afloat.

The big concern of the Marine Division had been the worry that an onshore breeze would pile up sand around the dollies and prevent the launch vehicle from completing its trip into the water. As the morning dawned a strong onshore breeze was apparent. Therefore extra divers were brought in to keep the sand from building up around the dollies. A tug was ordered to help pull the craft into deep enough water for floatation. All was in readiness at ten o'clock. Mrs. Towl did a most proper job of naming the FLAGSTAFF and breaking the champagne bottle over the bow. The ceremonies completed, the music started and the craft started its trip into the water of Indian River. It rolled about 20 feet and stopped. The tug went to full power and pulled and nothing moved. Divers quickly discovered that from the time they had come out from the ramp until the rig started to move, sand had built up on the ramp and prevented further movement.

Now came decision time. The next high tide was at about 10:15 PM. The decision was to bring another tug, make another effort of clearing sand from the ramp, and attempt another launch at high tide in the evening. As it was going to be dark, lighting was needed for the workmen. A carnival had its winter quarters nearby, and night lighting was obtained from them. The lights were quite garish with multi-colors, but they did an excellent job of lighting the work area. They also attracted people in the Stuart area as word spread of the Navy ship stuck on the launch ways. As the crowd began to gather, bringing their beach chairs to watch the proceedings, enterprising food dispensers brought in their trucks to sell their wares. So the whole scene began to look like a carnival with the FLAGSTAFF the main attraction.

As ten o'clock approached the divers went to work removing the sand from around the wheels of the dollies and the two tugs were readied for their pulling effort. The divers kept reporting that we were going to have to move quickly because the sand kept coming in as fast as they could move it. The divers were cleared and the tugs were signaled to pull, and again nothing happened. The lights were turned off and the crowd dispersed. It was back to the drawing board.

It was decided to use winch power to assist in moving the launch rig. The game plan was to obtain a Diesel powered winch, sink pilings for a purchase, holding a pulley, and secure a line to the deck of the hydrofoil. Both the winch and the piling were going to have to be well anchored for the effort to succeed. The moving crew were concerned that any side pull would damage the dollies. We convinced them that we would minimize any side pull. Their only comment was that they were glad their boss was not there. The effort was scheduled to resume at daylight on 8 January.

As daylight came and we arrived at the launch site, we were surprised to see that the food vendors were already there and expecting a crowd as the day wore on. They were not disappointed. Pilings were driven as deep and secure as possible. A powered winch was brought in and secured to some large trees on the property. By late afternoon the tugs were brought back, divers had performed their tasks and we were ready to make another attempt in spite of a steady on-shore breeze. The GO! signal was given, and

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the launch rig started to move with a great cheer from the crowd. Eyes were on the piling: as the rig moved, the piling slowly started to come out of its location. After the craft had moved another seven or eight feet, the piling pulled loose.

We were stuck again!

And so we assembled around that fateful drawing board again. We had all noticed a small tree at the far end of the property, making it closer to deep water than the piling we had driven. The tree was about eight inches in diameter and had been discussed as a holding point. It was problematical whether its roots were deep enough to give us a secure point. The decision was made to give it a shot. Our meteorologist informed us that a wind shift could be expected during the next morning hours. So the decision was made to drive the piling as deep as possible and to use the tree to help hold the piling in place. We would work into the evening hours of the 8th and have all hands and facilities ready for a try late in the morning of the 9th. So we returned to work with our beautiful lights and with our interested crowd present. Oh how I wished for that stronger bulkhead and those two cranes to lift FLAGSTAFF into a floating position!

The morning of the 9th came, along with our crowd of rooters and the accompanying food vendors. As our crew assembled and the tugs were positioned our divers reported some relief from the sand due to a now seaward wind. It was well into the afternoon before everything was in position for the next try. And so again the GO! signal was given and all eyes focused on that little tree. The launch rig started to move and the little tree began to bend and bend it did, but the roots held fast keeping the piling in place. Slowly but surely the rig moved into deeper water and the FLAGSTAFF launch was completed. The crowd cheered, and then quietly dispersed. The food vendors offered hot dogs and coffee to all the crew and the show was over. The house movers even got their dollies on shore before their boss showed up that evening. The FLAGSTAFF crew started the onboard Diesel generators and hull drives and under her own power went to spend the night securely tied up at Evenrude's experimental marina.

From her birthplace, the FLAGSTAFF went to Palm Beach, Florida where it passed extensive sea trials for the US Navy. After acceptance, the craft was deck loaded for transit to San Diego for additional Navy evaluation and readied for assignment to Vietnam where she performed rapid sea patrols. Upon return to the United States the FLAGSTAFF was assigned to the Coast Guard for evaluation of the hydrofoil in their missions. It was ultimately sold to fellow IHS member, John Altoonian of New Jersey,

DISCOUNT FOR IHS MEMBERS

Ken Cook of Hydrofoils, Inc. was so pleased to discover (and join) IHS that he has offered a LARGE discount to IHS members. Ken designs and manufactures super fast radio controlled hydrofoil models in kit form or ready to fly. There are gas, electric, and nitro-methane powered models. For info, contact Ken at (561) 964-6399, or you canlink to the Hydrofoil Incorporated web site from the IHS home page (http://www.erols.com/foiler). Note that IHS does not endorse products or services, so Ken's products will have to stand as their own recommendation. ***[We would like to hear details from anyone who buys and operates one of these R/C racers.***

PLANNING THE WORKSHOP ON ADVANCED MARINE VEHICLES

William Hockberger

A committee of members of the US Hovercraft Society, the International Hydrofoil Society, and the Society of Naval Architects and Marine Engineers (SNAME) panels on advanced marine vehicles and maritime economics has been planning an AMV workshop in Washington this year. Because of the attention and interest they receive, fast ferries were chosen as a focus for our AMV discussions. Initially there appeared to be a clear agenda of topics to be covered, but progress slowed when it became apparent that there are wide-ranging opinions as to who needs what information.

Discussions with ferry industry people reveal that, while interested in AMVs, they do not see AMVs as relevant to their own requirements. Several believe that the performance of a modern 30 knot catamaran is near the upper edge of what their riders would be willing to pay for. Most do not perceive any actual problems a workshop should address, nor do they think they are missing information our workshop might provide. For example, Martha Reardon, TRB Ferry Committee chairman, expressed her belief that there are no legislative changes needed, no new or improved ferry designs they can't already obtain, and no new methodology needed for analyzing a ferry system to determine what is required. She supports the idea of a workshop on the basis that any discussion of ferries is helpful, but there is no specific benefit she would expect from it. We of course disagree and think we may be able to convince ferry industry skeptics that in the right situations, AMVs can be more profitable than conventional ferries.

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LETTERS TO THE EDITOR

Pride of Ownership

I have noticed that misinformation in letters and articles propagate to become facts if they are not corrected by editorial comment. One correction is that Capt. Ron Fraser of Astoria, Oregon owns HIGH POINT, not Diversified Marine. He is slowly refurbishing the HIGH POINT to someday cruise on the hull toward Alaska. Another correction is that the owner of FRESH-1 is Dave Symington of Seattle, Washington. He also has the struts, the demonstration foils, and the transit foils stored at Silverdale. He has asked for suggestions on the use of FRESH-1.

Sumi Arima
colarima@msn.com

IHS Home Page

I am impressed by the IHS home page. I'm downloading it to study at my leisure (local phone calls aren't free here!). However, the pictures are much more detailed, and take much longer to download, than they need to.

Malin Dixon
malin@onspec.co.uk

[The home page has progressed to the point that it has moved from the editor's personal Compuserve account to its own account. See page 1 of this issue for the new address. IHS members are asked to visit the home page from time to time and help answer the posted requests for information. -Ed]

Where To Buy

Please provide me the names of the people or manufacturers of Hydrofoils, their position, telephone, fax and email address. I would like to get in touch with them as I want to buy a Commuter Hydrofoil that can accommodate 50 to 150 passengers for use in the Philippines.

Jowie D. Witongco, III, President
PROSPEC USA
909-428-2028 voice
909-428-8200 fax
PROSPEC-USA@webtv.net

[Fast Ferry International in England is the premier source of the information you asked for (they publish an annual directory issue of their magazine, and they also sell a computer database of the same information but with more detail). You may be able to find the FFI directory in a library such as at a university with marine-related programs. The database covers operators, builders, and individual vessels. FFI's internet address is info@fastferry.co.uk. *Their phone is +44 1580 766960. Their mailing address is FFI, Milrose House, Sayers Lane; Tenterden, Kent TN30 6BW; UK. Their home page on the World Wide Web is http://www.fastferry.co.uk (you can order the database on line using a credit card). -Ed]*

I am looking for a source of information on commercial hydrofoil craft (manufacturers, operators, etc.) I would like to know whether craft the size of ferries are available, and whether they can be used for short trips (100 miles or less) down the Atlantic seaboard line.

D. Lerman
DLermanW@aol.com

[See info on FFI above -Ed.]

Mechanical Stabilizer

I've come across an interesting mechanical device for stabilizing submerged foils on small craft. It consists of a weighted pendulum that, of course, swings on a pendulum and turns a bell crank to kick foils up and down. Any knowledge of such a thing? I'd appreciate a reply from any who could even speculate on this.

Evan Riddle
ERiddle229@aol.com

The concept of using a pendulum to control port and starboard foils to make a coordinated turn was tried when mechanical control systems were being studied. I think the experimenter was Gordon Baker. The whole concept of mechanically controlled foil systems was in due course overtaken by the use of electronic systems. I don't know of any attempt to control foils longitudinally in a seaway with a pendulum.

Bob Johnston

Whither the Hydrofoil Market?

I'm personally a bit pessimistic for hydrofoils in government or commercial fields. It seems as though various competing transportation technologies have diminished the advantages of the foilborne crowd. USS PEGASUS (PHM-1) was a wonderful ship, but the acquisition and maintenance costs would have scaled very badly in comparison to RO-RO and SWATH ships... or chunnels. SESs offered some advantages over hydrofoils, and they too have fallen to the same factors. This isn't to say that I feel hydrofoils are doomed, merely searching for the wrong market.

There was one pleasure craft manufacturer in Newport Beach, Ca. that produced the DynaFoil (from the company of the same name) and I remember sitting of the back of one and zipping across Mission Bay passing up the Glaspar ski boats in 1976. For $2,700 it was hard to beat, but Kawasaki had a better sales machine for the Jet Skis.

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LETTERS TO THE EDITOR
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Yamaha demonstrated an OU-32, which was a fully enclosed, two-man hydrofoil and it appeared on, I believe, "Beyond 2000" *[a television series on the Discovery channel]*. That was the epitome of the personal hydrofoil, lacking only automated height control. This is the market where hydrofoils might best be pushed for adoption Price/performance in this area are more nearly comparable with other personal water craft vs. military vessels and large fast transports. I just wish that Yamaha had really released the OU-32. There were rumors out of Australia, then silence. I still have a video clip of it.

Carl Allison
Carl.Allison@quickmail.llnl.gov

I am quite certain that Yamaha never put a hydrofoil into production. Several Japanese companies evaluated the use of hydrofoils along with other high speed marine vehicles. Hitachi, who built Supramar designs PT.20 and PT.50, and Kawasaki, who built their version of the Boeing-designed Jetfoil, were the only major Japanese companies building in production quantities. Mitsubishi and Mitsui seriously considered building production hydrofoils. Sumitome Heavy Industries Ltd did build three Italian-designed Sparvieros for the Japanese Maritime Self Defense Agency.

Bob Johnston

Do It Yourself

I am currently thinking of building a small 2 man craft capable of traveling through the afternoon chop of Peconic Bay on Long Island. I work with aluminum, and have access to CNC Router and many other shop tools. Please contact me if you could help.

Chris Marotta
WCREEK@msn.com

[If you are thinking of an engine-powered hydrofoil, you can get plans and components for this project from Hydrofoils, Inc. PO Box 6006; Lake Worth FL 33466; 561-964-6399 voice or fax. If a sail boat is what you have in mind, you may want to contact David A Keiper of Williwaw *fame: DAK Hydrofoils; 123 South Pacific Street; Cape Girardeau MO 63703 USA, phone: 573-651-6582, email: dvpw98e@prodigy.com, web page: http://www.igateway.net/~dakh. If anyone in Europe desires this info, your point of contact is Claus-Christian Plaass (plaass@ki.comcity.de) -Ed]*

Please Send a Check

I am glad to have found your site and will be applying for membership. I have for several years, been very interested in designing, discussing, and building a prototype. I am looking forward to meeting your members and learning more about the organization.

Bill Hodge
bill.hodge@daytonoh.ncr.com

Joining From England

I am interested in joining. Do you take credit cards? Have you any members in England?

Malin Dixon
malin@onspec.co.uk

[At last count we had an even dozen members in England, not that many when you consider that the IHS began there over 25 years ago through the efforts of a retired Royal Navy officer CDR Mark Thornton and a transplanted South African, Countess Juanita Kalerghi. IHS headquarters moved to the United States in 1987. As for how to pay for membership, which costs $20 annually in US currency, that occasionally presents inconveniences. Unlike many other, more commercially organized (and more expensive) professional societies, we are not set up to accept credit card orders or checks in currency other than US dollars. In either case, bank fees and surcharges would eat up a large part of the $20. Like his predecessor, our current treasurer shows no inclination to change to a more customer friendly policy... and it is hard to argue with his economics. Many overseas members simply obtain a US$20 bill (cash) from their bank and mail it in. So far none has been lost in the PO. Other people have friends or associates in the US who pay for them and are later reimbursed. Still others have business in the US and pay when they are here, sometimes for a couple of years at a time. If none of these methods suits you, then by all means go ahead and send a check for the equivalent of $US20 with perhaps a bit extra to feed the voracious banking system. -Ed.]

Nigg *Flying Fish*

My interest in hydrofoils began with a number of pounding rides on the Mobile Bay, Gulf of Mexico, and estuaries. Like my grandfather's mutterings: "...there's gotta be a better way than this"..., as he trudged rutted roads in a mule-drawn buck-board wagon, I pleaded for relief from the pitfalls of water travel: rough ride, slow speed, and high fuel consumption. My rediscovery of hydrofoiling, (we thought they were hot back in Junior High), has taken hold and has not yet let go.

Powered craft were my first experience. Planing boats were too rough and displacement hulls too slow. Both required constant attention to fuel levels. Sailing vessels seemed an answer.

I didn't mind the light airs, as these vessels will move until better winds are found. I did not care for maximum hull speeds of only six knots on ballasted keels or the tendency for center-boarders to fall over. Budget constraints would not allow large fast boats of sail or power. Then I saw the Ketterman Tri-foiler on "Beyond 2000."

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LETTERS TO THE EDITOR
(Continued From Previous Page)

I frantically sought this and other sailing foilers out from every corner of the globe, but I've found surprisingly little. What I did find is the *Flying Fish*. The designer, Mr. Nigg sent me blueprints on the sailing canard hydrofoil. It has no moving parts for incidence control save for the pilot's weight shift to keep the canard rudder-foil in trim. Mr. Nigg assures me that the craft is well designed for its purpose and offers a platform on which to develop further.

Many aerospace concerns have a wealth of information on wings in ground effect and pivoted airfoils that vary in incidence but maintain a constant angle of attack. Hang glider wings have been attached to small sailboats. Rigid wing designers have made inroads towards safe and efficient service. Computers allow for more advanced, automatic control systems that more aptly could be called 'hydronics' (a derivation of 'avionics'). As always, the marine and aerospace communities can use information gleaned from experimentation and experience to the advantage of both. The coming century begs for fast, fuel efficient means of travel. With naval architects still wrestling with a centuries old concept of sailing yacht, it would be refreshing to see a turn to foil-stabilized platforms. Comments are welcome.

Evan Riddle
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Mobile AL 36606
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Volga 70

I own a Russian-built 1974 Volga 70 hydrofoil. I'm looking for info on this boat if anyone can help. The old girl was imported from Russia (so the story goes) by some businessmen who were doing some engineering work (?) over there, but didn't want to be paid in rubles. They took stuff like these hydrofoils, tractors etc. instead. They are really an amazing machine. About 28 ft long by just over 6 ft. wide, it has a riveted magnesium /aluminum alloy hull with stainless steel foils. The front foil has two levels of blade, and the rear has a single level. The hull has steps to reduce drag. It has an open passenger area with 6 removable seats, and there are watertight bulkheads between the bow section /passenger section /and engine compartment. It is powered by a 6 cyl. 106 hp Volvo diesel driving through a Volvo leg with an 8 inch extension in it. Once she's flying, fuel consumption drops way down (because the hull isn't pushing water) to about 2-3 gallons/hour @ 28 knots. Try that with a Bayliner!

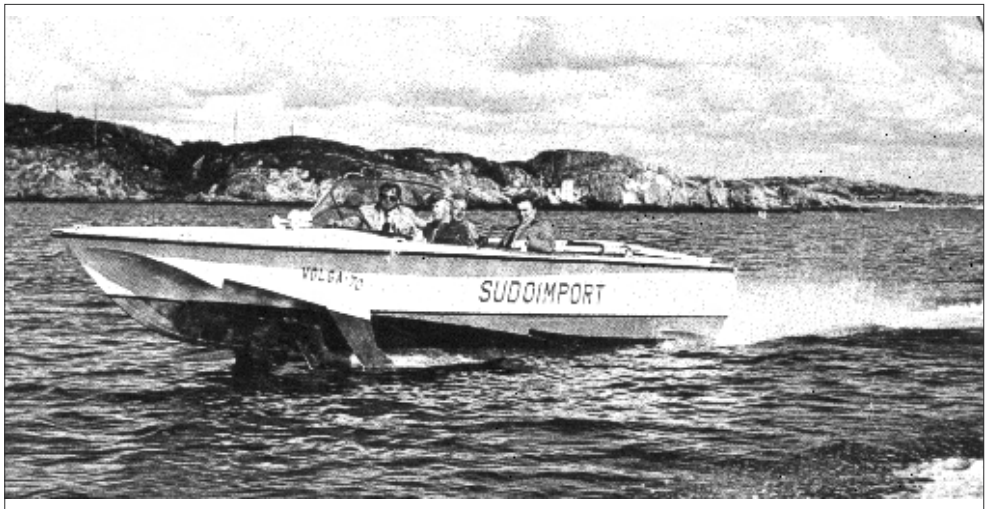

Photo From Volga 70 Promotional Brochure — "Amazingly Stable"

She weighs about 3,500 lbs., and I think the payload is around 1,500 lbs. I have estimated the weight / payload / fuel consumption ratio to be about the same as an old chevy 1/2 ton pickup. While it was built as a river boat, it was also advertised as being seaworthy in about a force 2 sea, which doesn't sound all that seaworthy on the ocean. I've had it out in some pretty big seas and, although it won't "fly" in anything over a 2 ft. sea, its amazingly stable even in the short 5 ft. waves, due to the foils acting as keels.

Rick Jackson
Box 111
Gabriola, B.C., Canada, VOR-IXO
gabfire@mail.island.net

Nizhnyi Novgorod Shipyards

You asked about the Gorki Shipyard, builder of *Meteor* class hydrofoil ferries. *Meteors* were created at "TSentral'noe konstruktorskoe byuro po sudam na podvodnykh kryl'yakh im. R. E. Alekseeva" (and maybe other structures around "Krasnoye Sormovo" plant) and produced at Zelenodol'skiy Shipyard and probably at "Volga" Shipyard.

I think production of Meteors is suspended. Other hydrofoil ships ("ships on the underwater wings" = "suda na podvodnykh kryl'yakh") and "air-cavern" vessels are made (business-class boats mainly). Web page is: http:// www.inforis.nnov.su/n-nov/yarmarka/nnregion/prom.html.e (The Industrial Potential of Nizhny Novgorod Region). The page is in Russian, but suffix ".e" dynamically transliterates it to English alphabet. See also "Krasnoye Sormovo" and AO "SOKOL" there and also at http:// www.unn.runnet.ru/nn/industry/sokol/main.htm. You can grab phone numbers for the various shipbuilding enterprises in Nizhny at http://black.inforis.nnov.su/infobase/yellow/yellow.w(Russian). To search further, use the Russian search engine at http://www.rambler.ru.

Michael Poliakov
polk@inforis.nnov.su

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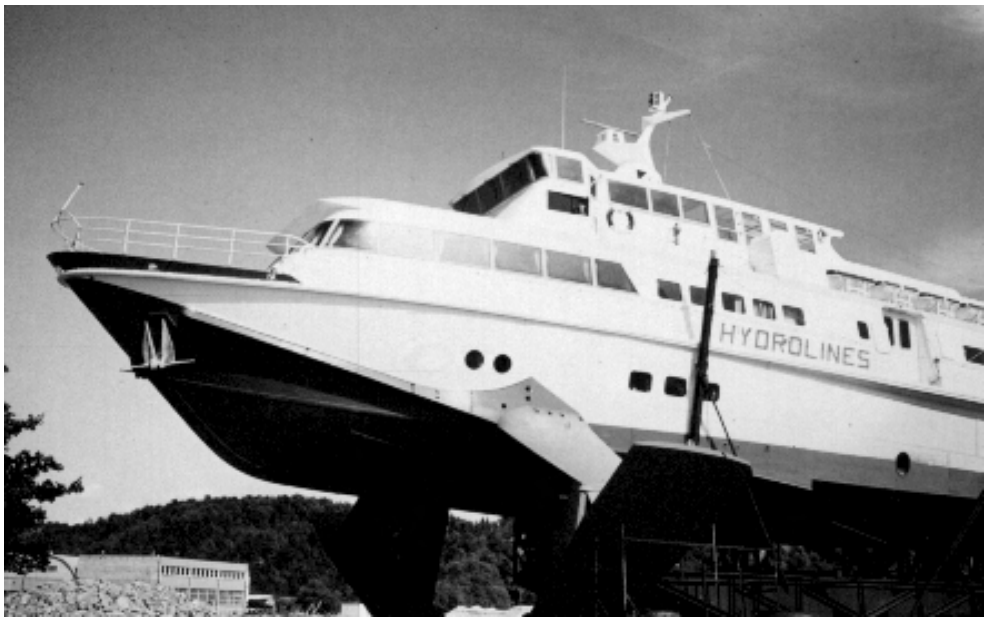
LETTERS TO THE EDITOR
(Continued From Previous Page)

PT 150 Lives

Here is a photo of a phantom! By this, I refer to "Back to the Future" in the IHS Newsletter *[Winter 96 - 97, p. 15]*. I was a little disappointed to read such a mistake as "the PT 150 was never built" in such a fine paper. As you can see by the photos, the vessel was fully materialized, and this as a car carrying vessel! (Note the movable ramps in the aft end of the superstructure). However it is correct, that the vessel never did carry cars on any ordinary trip, as the aft compartment of the superstructure was convertible from car space to passenger saloon and vice versa, and that from the first day of sailing this compartment was in passenger layout. Due to the big weight increase of the vessel as built compared to the design weight, it never became realistic to carry cars, and the aft ramps were removed. This conversion was carried out before the summer of 1971.

The maiden voyage of the vessel, *Expressan* (later renamed *Prince of the Waves*) took place the June 24, 1968, and the vessel was running the Göteborg - Frederikshavn route that summer. You can find a description of the vessel and the maiden voyage in *Hovering Craft and Hydrofoil* (a forerunner for *Fast Ferry International*) Sep 1968 and *FFI* July-Aug 1993.

The car loading ramps shown in the photo above were later removed. The greater than planned as-built weight of the PT 150 DC made it impractical to carry vehicles in addition to passengers.



The PT 150 DC *Expressan* by Westermoen Hydrofoil in Mandal Norway 1971.

Two more PT 150 DC's were delivered in passenger-only layout for 250 passengers, *Queen of the Waves* delivered Oct 1970 and *Princess of the Waves* delivered in the spring of 1971 (I am building a model of *Queen of the Waves* in scale 1:40). Like the *Expressan*, the two additional vessels were built by Westermoen Hydrofoil A/S in Norway.

The vessels had a vagrant life (please see the above mentioned FFI July-Aug 93), and were all three put in service on the Copenhagen-Malmö route in the period 1972-76. I can tell you, that it was a very impressive view, when these vessels passed foilborne through the outer harbor of Copenhagen!

If you want more information on the PT 150 DC hydrofoils (or other high speed vessels in this area), please contact me, and I will try to help you the best I can. We really have a lot of experience concerning high speed passenger vessels in this corner of the world, with more than 100 vessels set in service in Scandinavia (especially in Norway and Denmark) since 1960, when the first hydrofoil, a PT 50 *Sirena*, was put in service between Sweden and Finland.

Sren Struntze
Frederiksdalsvej 128
DK 2830 Virum
DENMARK

[We meant to say that the PT 150 as actually built and put into service did not carry cars, but that is not how it came out in print... ouch! -Ed..]

Fast Food

The first Poti-built *Kometa* hydrofoil has been turned into a cafeteria in downtown Poti on the Black Sea close to the Turkish border (per letter from Tim Timoleon in May 95).

Martin Grimm

The Letters To the Editor section allows hydrofoilers to ask for or provide information, to exchange ideas, and to inform the readership of interesting developments. All are invited to participate.

MEMBER NEWS

Karl Duff of Port Orchard, WA wrote a note: In February 1997, after a long delay, the Washington State Ferries were protected by a decision by the State Transportation Department in prohibiting private fast-ferry competition from the Horluck Ferry Service. They had requested a license to operate to Seattle from three west Puget Sound terminals.

Roger Gallington of Des Moines WA, recently reported: On February 16th, Philip Chesley and I took turns operating our 15-foot hybrid hydrofoil test craft on Lake Washington. The fully submerged foil supported 95% of the weight. Along with John W. Ward, we have formed a 3-person "sweat equity" corporation (GAL, Inc.) to develop this hybrid which combines a fully-submerged hydrofoil with a stepped planing monohull. The craft is naturally stable, very strong, and has no underwater hinges or other mechanisms. Over the next months we plan to maneuver the craft at heavier weights and higher speeds in rougher water.

Bob Johnston recently (April) reported that he had returned from the hospital after an operation followed by a week of recovery. He is doing well and after several weeks of taking it easy, he promises that he will be back on the golf course ready to challenge Tiger Woods! We all wish him well, and a speedy, full recovery.

NEW **IHS HOME PAGE** *NEW*

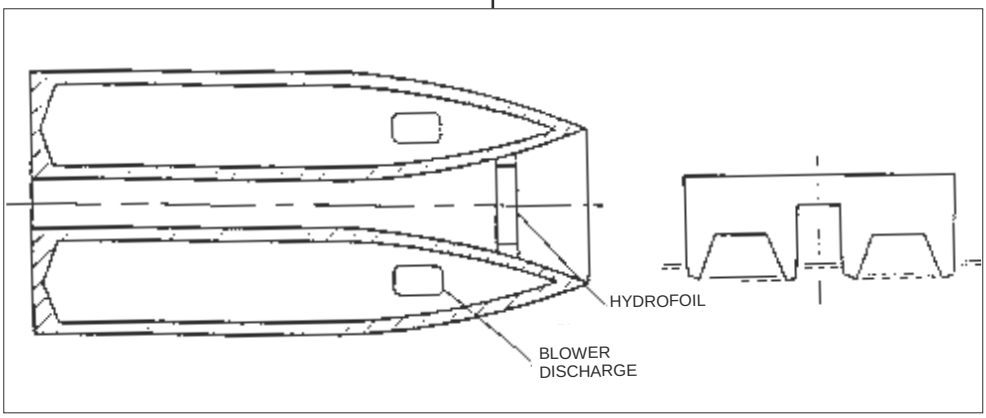
The IHS home page on the Web has moved. The new URL is: http://www.erols.com/foiler

MEMBER PROJECTS

IHS member Don Burg, president of Air Ride Craft, Inc.,Miami FL brought us up to date on his project to build a 52 foot demonstrator of his patented *Seacoaster.* Don's design promises improved ride characteristics in rough water compared to a standard Surface Effect Ship.

Model of proposed 55 knot, 600 passenger *Seacoaster* ferry

Don explains that, "the standard SES consists basically of a catamaran hull with fore and aft flexible seals, each seal running between the side hulls. Blowers generate pressurized air into the cavity thus formed. The air cushion within the cavity supports 80 to 90% of displacement. Efficiencies and load carrying capabilities of the SES at moderate to high speeds are outstanding compared to conventional hulls and catamarans. Unfortunately, the forward cushion is severely affected by waves, causing degradation in ride qualities and a notable increase in resistance in moderate to heavy seas."



The *Seacoaster* air cushions are molded into the twin hulls as shown

As shown in the sketch above, the *Seacoaster* is a pure catamaran, non-flexible seal SES design, which Don has patented internationally. The air cushion cavities are molded into the hulls and are relatively unaffected by rough water. A small hydrofoil between the side hulls forward insures good pitch damping to improve the ride even further, but at a cost of increased drag. Bob reports that he has recently model tested and is satisfied with a retractable hydrofoils located within the air cushion areas. This will replace the fixed foil shown in the sketch. The retractable foils reduced pitch motion in rough water by about half, with an increase in drag of about 8%.

Don reports that the demonstrator's hull is finished, and he is moving ahead to obtain and install the engines. He plans to have the craft in the water for sea trials in about three months. He is marketing his craft as suitable for passenger ferries and offshore gambling boats in lengths up to 150 ft. Looking to the future, he can envision a 180 ft version open ocean ferry operating between Miami and Havana, and even a 700+ ft trans-oceanic *Seacoaster* freighter!

Don may be reached by email at seacoast23@aol.com or by land mail at

AUSTRALIAN YARDS CONTINUE TO DOMINATE WORLD MARKET

Fast Ferry Int'l, Jan-Feb 1997)

If there was doubt lingering in anyone's mind about just how important the fast ferry industry is to Australia in general, and Western Australia in particular, they should consider figures produced for the Western Australian Shipbuilders Association in the middle of 1996. According to these, in 1995 light weight shipbuilding in Australia produced 30% by value of the world market, with Western Australia claiming 60% of the country's share and Tasmania taking 35%. The remainder is accounted for by Queensland (3%) and South Australia (2%). In stark contrast, Australia's contribution to shipbuilding in general was minimal; the country produced a mere 0.5% of the world's vessels by value and 0.025% by gross registered tonnage.

The prize is well worth having. During the 12 months to June 30 1996 light weight shipbuilding was worth A$196 million to Western Australian yards, and the total is continuing to grow. Forecasts, based on secured contracts, anticipate that the figure will nearly double, to A$381 million, in the corresponding period of 1996-1997 while employment will rise 40% to just over 2,000 workers. By June 1999, the yards anticipate that total production will be worth A$619 million, and they will have over 2,500 employees and contractors. The 1,433 employed in June 1996 represents an increase of 385 over June 1995. Of these, 35% were on direct contracts with the yard and 65% were contractors.

The report notes, "The industry suffers from shortage of skilled labor, reflected in the high number of apprentices and trainees – almost 20% of the work force. 93% of all apprentices and trainees are engaged in trade areas of hull construction, engineering and fit out.

"The industry utilizes a predominantly contract labor force. This allows shipbuilders the flexibility required to maintain productivity in a highly competitive international industry."

Ferries and cargo vessels accounted for 86% of total production. Work/charter vessels and luxury motor yachts accounted for 5% each and fishing vessels for just 4%.

In the 12 months to June 96, 84% of the Western Australian light weight shipbuilding industry's production was for export, 13% was for WA customers and 3% was for customers elsewhere in Australia. Even the figure of 13%, the report points out, was "abnormally high due to the construction of two large ferries for the Fremantle to Rottnest Island tourist trade and a large river cruise vessel to operate on Swan River."

Growth, which has been taking place over an extended period, has been helped immeasurably by both state and federal government support. Despite recent hiccups with the bounty, this continues to be the case. Active involvement, not just through direct subsidies or price support mechanisms, has created a thriving and expanding center of excellence. This is particularly noticeable in the development of infrastructure and the creation of a dedicated shipbuilding zone in Henderson by the state government.

This has made both waterfront and industrial land available on a commercial cost recovery basis and has, in partnership with industry, produced basic communal facilities. Moreover, it has, again in consultation with the shipbuilders, created a master plan for the future development of the Henderson area to accommodate the expected growth of the industry. The plan includes:

- The diversion of major arterial roads around the estate to provide a more efficient working environment and improved waterfront access for the transport of vessels.
- The extension of breakwaters providing additional protected waterfront land to industry members.
- The creation of large flooded working bays to accommodate vessels of up to 300 meters in length.

Continued on Next Page

Relative Value of Western Australian Shipbuilding By Vessel Type

	% of Production By Value		
Vessel Type	**1994**	**1996**	**1999**
Ferry & Cargo	69	86	93
Fishing	3	4	1
Work/Charter	6	6	1
Luxury Motor Yachts	22	4	5

Source: Western Australia Light Weight Shipbuilding - July 1996

AUSSIES DOMINATE

(Continued From Previous Page)

- The allocation of land for a Marine Industry Technology Park adjacent to the main shipbuilding precinct.

The first stage of the plan, the construction of a northern breakwater, is now underway, following the approval of A$7.6 million funding by the State Parliament, and is due for completion by the end of summer 1997.

In the financial year to June 30 1996, A$3.64 million was invested in employee training, A$11.8 million in land and buildings, A$7.0 million in new plant and equipment, and A$740,000 in research and development. Investment of a further A$23.6 million is committed for the 1997 financial year and over A$58 million is programmed for 1997-1999.

4th INTERNATIONAL CONFERENCE ON FAST SEA TRANSPORTATION

FAST '97 will take place in Sydney, New South Wales, Australia 21-23 July 1997. FAST '97 aims to contribute to the design, construction, and safe and economical operation of high speed marine craft. Every aspect of such craft and their operations will be examined and discussed. There will be approximately 110 technical papers presented across four concurrent sessions. For information, contact Baird Publications – FAST '97 Conference Secretariat, P.O. Box 460, South Yarra, VIC 3141, Australia; phone: 61(0)3 9826 8741, fax: 61 (0)3 9827 0704. Send internet email to: marinfo@baird.com.au.

NEW IHS HOME PAGE *NEW*

The IHS home page on the World Wide Web has moved. The new URL is: http://www.erols.com/foiler

JAPANESE OPERATOR ADDS SECOND JETFOIL TO FLEET

(Fast Ferry Int'l, Jan-Feb 1997)

Kyushu Shosen has introduced a second Kawasaki Heavy Industries Jetfoil 929-117, acquired from another Japanese operator, on its Nagasaki-Fukue-Narao route linking Kyushu and the Goto Islands. The fully submerged hydrofoil, delivered in 1990 to the Higashi-Nihon Ferry Company as *Unicorn,* has been renamed *Pegasus 2*. Kyushu Shosen introduced Jetfoil 929-117 *Pegasus* in the same year. For the past seven summers, *Unicorn* has been in service between Hokkaido and Honshu on Higashi-Nihon's Hakodate Aomon route. It is to be replaced this year by a Mitsubishi Heavy Industries 100m passenger/vehicle monohull that is due to be delivered in June.

MARINE LOG PROVIDES NEWS OF INTEREST TO HYDROFOILERS

The lead story in this newsletter was reprinted from *Marine Log.* This magazine is available free to qualified members of the maritime community. To qualify, you need to buy, use, or recommend the types of products and services offered by *Marine Log*'s advertisers. For more information, contact *Marine Log,* 345 Hudson St., New York NY 10014, phone: 212-620-7200.

For users of the internet, the *Marine Log* home page on the World Wide Web is http://www.marinelog.com. Here you can find information on such topics as News Updates, US Shipbuilding Con-

IHS Membership for full time students is only US$2.50 per year. If you know people interested and eligible, please encourage them to join now!

BELLA CENTER, COPENHAGEN 24th-26th FEBRUARY 1998

CALL FOR PAPERS

We are delighted to issue a Call for Papers for the l4th Fast Ferry International Conference which will take place in Copenhagen on 24th - 26th February 1998. We have already received offers of abstracts of proposed papers from several authors, and we are now issuing a general call for papers to give the maximum notice for everyone wishing to submit a title and abstract.

While papers covering all aspects of the industry will, of course, be welcome we are particularly interested in those covering the topics of vessel operating experience, new designs and developments, and safety.

Authors are invited to submit their titles and abstracts for presentation at the Conference and are requested to limit them to 500 words. Abstracts should reach the organizers no later than July 31st. All authors selected will be informed by September 30th, and completed papers will be required by November 30th. In all cases the work should be original and not have been published, or offered for publication, previously.

Abstracts and titles should be sent to: Giles Clark, Fast Ferry International, Milroy House, Sayers Lane, Tenterden, Kent TN30 6BW, UK or email to: info@fastferry.co.uk.

IHS 25th Anniversary Celebration/Conference Proceedings

To order a copy of the *Proceedings* containing a complete collection of papers presented, send US$18.50 for shipment within the US or $25 for international shipment to George Jenkins, Treasurer; 713 S. Overlook Drive; Alexandria VA 22305 USA.

1996 DELIVERIES AND ORDERS

Fast Ferry Int'l, Jan-Feb 97

Vessel Design	Delivered	Ordered	Total
Catamarans	46	50	96
Foil-Assisted Catamarans	0	2	2
Hovercraft	0	0	0
Hydrofoils	1	0	1
Hydrofoil Catamarans	0	0	0
Monohulls	22	24	46
Surface Effect Ships	0	0	0
SWATHs	0	1	1
Wave-Piercing Catamarans	5	1	6
Totals:	**74**	**78**	**152**
Passenger Ferries	**Delivered**	**Ordered**	**Total**
50-99 seats	2	4	6
100-149 seats	4	1	5
150-199 seats	7	7	14
200-249 seats	9	8	17
250-299 seats	1	4	5
300-349 seats	14	12	26
350-399 seats	5	7	12
400-449 seats	5	5	10
450+ seats	3	10	13
Totals:	**50**	**58**	**108**
Passenger/Vehicle Ferries	**Delivered**	**Ordered**	**Total**
10-49 cars	2	1	3
50-99 cars	2	0	2
100-149 cars	4	4	8
150-199 cars	13	7	20
200-249 cars	1	2	3
250-299 cars	0	3	3
300-349 cars	0	0	0
350-399 cars	2	1	3
400-449 cars	0	0	0
450-499 cars	0	2	2
Totals:	**24**	**20**	**44**

1997 TRB MEETING

(Continued From Page 2)

terest here was the overall process and the fact that Imperatore has done all the right things to produce a viable, profitable ferry service.

- A great deal was said about "intermodalism" and the need to make intermodal connections simple/efficient. Most examples cited involved freight movement, but the principles apply equally to passengers. Any developments that make intermodal transfers faster and easier favor fast marine vehicles because the benefits of greater speed on the water will be less likely to be lost through inefficiencies in port.

- A representative from Washington State Ferries gave an excellent presentation on their new methodology for modeling the demand for ferry services in the Puget Sound area.

- A Maritime Administration representative spoke on the USA's inland waterways as a greatly underused transportation resource: more than just barges should be moving on them.

- A currently-ongoing project was described to develop fast ferry service on Narragansett Bay, connecting Providence and Newport, RI and other points in the area.

I spoke with people who participated in panel discussions touching on marine issues, some of them senior Department of Transportation officials and House and Senate staff members. They all professed interest in ferries and AMVs and gave some thoughts on how to promote their consideration, and our AMV workshop committee has been following up on those ideas.

Overall, the Transportation Research Board meetings were interesting

AMV WORKSHOP...

(Continued From Page 7)

A major reason for planning the workshop this spring was the knowledge that the Intermodal Surface Transportation Efficiency Act (ISTEA) is up for reauthorization this year, and it was thought we could provide useful information to legislators and staffs involved in that process. The original 1991 ISTEA bill provided US$100M for ferry projects and had other useful features. AMV ferries might get a boost if the legislators knew more about them.

But discussions with House and Senate staff members involved with ISTEA have indicated that it is very late for any new information to influence the course of that bill. Work began on it a year ago, and the companies, industry groups, and states that have a stake in the outcome have long since acted through their representatives to try to affect the parts they care about. In a meeting with a very active marine industry union lobbyist who meets regularly with those involved with the ISTEA bill, a group of us gained a good impression that the new ISTEA legislation will at least be reasonably good for ferries, even if it does not deal with AMVs specifically.

A major point made by the congressional staffers was that we should focus on their industry constituents to influence legislators and the ultimate legislation. So we have come back around almost to where we began, but with a clearer picture of what should be done and how, and who should be involved in the workshop. The workshop has now been scheduled for June 4, 1997 in a Maritime Administration conference room, and it will focus primarily on the industry: the operators and builders, and the companies supporting them. We hope to show those in the industry where AMV technology stands and where it is headed, what alternatives are now available for use and how they perform, and how they can approach the problem of

HOW HYDROFOILERS KEEP FIT

TRAMPOFOIL® is a human-powered hydrofoil with flapping wing propulsion. This water bike is propelled without any engine, sails, or oars. The TRAMPOFOIL® gets its supporting and propelling force completely from the hydrodynamic lift on its hydrofoils. The waterbiker jumps with both feet together and pushes the hydrofoil alternately up and down. The waterbike is started and landed on a jetty (or a boat). To start, the waterbiker has to reach 2.5 m/s (5 kn) by pushing out from the jetty. According to the manufacturer, it is easy to learn, and after some practice the waterbiker can land safely on the jetty. The trained athlete can race in distances up to 6 km. The speed achieved in calm conditions over longer distances is around 3.5 m/s (7 kn). The max speed over 50 m is around 5.5 m/s (11 kn).

For more information, contact TRAMPOFOIL AB, Box 5341, 102 47 Stockholm, Sweden, phone: +46-8-665 10 07, E-mail:staff@trampofoil.se

IHS Membership for full time students is only US$2.50 per year. If you know people interested and eligible, please encourage them to join now!

AMATEUR YACHT RESEARCH SOCIETY

[Hydrofoil sailors may be interested to contact AYRS. The following information is drawn from their web site: http://ourworld.compuserve.com/homepages/Fishwick/ayrs.htm -Ed.]

The AYRS is a UK registered Educational Charity dedicated to finding out how to make yachting better (faster, more fun, whatever you want it to be). Our members run from sober sided professional yacht designers and builders to bearded eccentrics full of ideas that they cannot make work. From our members have come the modern sailing multihulls, self-steering gear, sailboards, a flock of successful sailing hydrofoils, the World Speed Sailing Record system, etc. Now people are taking off with kiteboats and autogyro-sails, and the first amphibious bicycle!

Membership is open to anyone interested in the improvement of yachts and equipment through research and development. The Society publishes a quarterly newsletter (worth the price of subscription in itself, IMHO), plus 2-4 single subject (*very* cutting-edge) booklets per year. Subjects range from "Natural Aerodynamics" (birds' wings and vortex generation/reduction), to "Self Steering," to "21st Century Multihulls." Subjects generally run about 3:1, high tech:cruising subjects. We hold 4-6 meetings each winter in the UK (usually West London), and an annual meeting in the NE United States. Associated with the AYRS is a free email discussion group, open to non-members as well as members, but non-members will not be sent the new publications.

[For membership info visit the AYRS home page or contact Michael Ellison, AYRS, Pengelly House, Wilcove, Torpoint, Cornwall PL11 2PG England, phone: +44 (1752) 812 003, email: 100341.3637@compuserve.com. -Ed.]

The NEWSLETTER

International Hydrofoil Society

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

Editor: Barney C. Black | **SUMMER 1997** | Co-Editor: John R. Meyer

Special IHS Report...

ADVANCED MARINE VEHICLE WORKSHOP TARGETS USA

By John R. Meyer

Why Not More High-Speed Ferries in the USA?

The Society of Naval Architects and Marine Engineers (SNAME) Panels on Advanced Marine Vehicles and Maritime Economics, The International Hydrofoil Society, and The United States Hovercraft Society held a workshop *Advanced Marine Vehicles (AMVs) For The United States Intermodal Transportation System* on June 4, 1997 at the US Department of Transportation, Washington DC. There were 55 attendees. The objectives were to present the AMV state-of-the-art; to foster interest from shipbuilders, owners/operators, and investors in fast ferries; and to contribute to the creation of a national strategy for developing fast ferries as a component of the USA's intermodal transportation system.

AMVs include fast monohulls, catamarans (including wave-piercer and SWATHS), hydrofoils, surface effect ships, and air cushion vehicles. Dramatic advances in design and performance in recent years, and steady increases in size, have greatly expanded their range of appropriate employment. AMVs have proven their dependability and safety — and their economic viability — as ferries in Europe and the Pacific Rim. US ferry operators and transportation planners have begun to consider AMVs, and a few operators are already acquiring them. The reauthorization process for ISTEA (Intermodal Surface Transportation Efficiency Act) this year, called NEXTEA, has focused additional attention on AMVs.

See AMV Workshop, Page 11

IHS HOME PAGE

The URL for IHS's home page is: http://www.erols.com/foiler. If you are not a web surfer but are curious about the home page, IHS can provide you with a hard copy printout on request.

AMV WORKSHOP PROCEEDINGS

If you want a package containing a copy of each paper presented at the June 1997 AMV Workshop, please send a check, to cover printing, handling and mailing, for US$10.00 made out to the IHS at PO Box 51, Cabin John MD 20818 USA.

IHS E-MAIL ADDRESS

foiler@erols.com

INSIDE...

PRESIDENT'S COLUMN

I hope that all of our members will have noticed the improvements, availability of additional services, and increased activity of the Society over the past several years. This has occurred as a result of a "labor of love" on the part of the Society Officers, the Board of Directors members, and others.

The IHS Newsletter itself is a shining example of this, and is due to Barney Black and the many hours he devotes of his private "family time" to editing and composing this much improved publication. He has also found time to put the Society on the "Web." The IHS Home Page is continuously being improved. The text will soon be enhanced by an album of hydrofoil pictures which have been scanned from old and new photographs. We plan to annotate each picture with a short description of its characteristics and history. Also many of the interesting stories that have been published in past issues of the Newsletter are being uploaded to the Home Page. Many of these are the series of great hydrofoil yarns as told by Bob Johnston. Also the PHM history will be included, along with Helmut Kock's stories (and eventually pictures of his hydrofoil developments). All members are encouraged to "log on" from time to time to see the latest additions.

A fallout of the Home Page is the vast amount of electronic mail being generated. This has put even a greater work load on Barney Black, who distributes questions, queries, requests for free Newsletters, etc. to various members in the Society who can help respond. I am pleased to report that the E-mail part of the job is being taken over by Ralph Patterson. He has agreed to administer IHS E-mail in the future and keep track of who does what in response. IHS Secretary Ken Spaulding has been sending out responses to the regular mail and E-mail requests for sample Newsletters and other information. Of course, he sends along an IHS brochure with an invitation to join the Society at the same time. It is through the Home Page that the Society is expanding its membership, with a growth rate of about 14 the first six months of this year.

A highlight of recent IHS activities is its participation in the Advanced Marine Vehicles Workshop in Washington DC on June 4. The Workshop followed about eight months of planning on the part of the three sponsoring organizations including the IHS. William Hockberger played a major role in its planning and also presented an interesting paper on Choosing the Right Ferry. Please see the feature article on page 1 for more details, and the note about ordering a copy of the Workshop Proceedings.

John R. Meyer
President

IHS Member Rick Jones teamed with Dr. Sam Bradfield to produce this hydrofoil sailboat due out in early 1998

WELCOME TO NEW MEMBERS

Dr. Samuel Bradfield is from Melbourne Beach FL where he is President of Hydrosail, Inc. He has been involved with sailing hydrofoil systems since 1977. During that time he has designed, developed and fabricated a number of hydrofoil sailboats. His e-mail address is hydrosail@aol.com, for our readers who would like additional info.

Weimin Hu is a naval architect and structures engineer at Maritime Applied Physics Corp. in Laurel MD. He obtained his BS degree in Naval Architecture and Ocean Engineering at Shanghai Jiaotong University, Shanghai, China, and his MS degree in Ocean Engineering at Florida Tech. He is a Ph.D. candidate of Structural Engineering in the Aerospace and Ocean Engineering Department at Virginia Tech. He worked as a Naval Architect for two years in China and as an engineer for one year at the American Bureau of Shipping.

Richard Jackson is the proud owner of a 1974 VOLGA 70 Russian-built 28 foot hydrofoil. See the Spring 1997 issue of the IHS Newsletter (page 10) for more info.

Richard D. Jones heads up Wilderness Systems in High Point NC for design and manufacture of hydrofoil sailboats. He has joined forces with Dr. Sam Bradfield to produce his design which is planned for early 1998.

Dr. Daniel Savitsky has spent nearly 50 years in marine research and teaching with emphasis on high speed marine craft. He was initially employed by the Edo Cor-

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NEW MEMBERS

(Continued From Previous Page)

poration where he designed float type alighting gear for water-based aircraft. He then joined the National Advisory Committee for Aeronautics (NACA), where he performed basic research on the hydrodynamics of seaplanes. In 1947 he joined the staff of the Davidson Laboratory at Stevens Institute of Technology where, in addition to many other studies, he developed a methodology for evaluating the hydrodynamic performance of planing CRAFT. Relative to his involvement with hydrofoils, he was associated with the development of a hydrofoil ferry using submerged foils with a unique simple mechanical control system, and contributed to the development of *SKI-CAT*, a catamaran craft supported by a submerged high aspect ratio hydrofoil aft and planing hydro-skis at the bow. This craft was extensively tested by the US Navy. He retired as Director of the Davidson Laboratory in 1989 and is currently Professor Emeritus at Stevens Institute of Technology. Dan continues to be professionally active in many aspects of hydrodynamics.

Thomas Wuhrmann is an independent photographer in Stans, Switzerland, where he and his brother own a Photo-Agency specializing in local news, railways, ships, and other subjects. His father was Chairman of the Waser-Shipyard in Stansstad, who built the first post-war von Schertel

IHS E-MAIL ADDRESS:

oiler@erols.com

Hydrofoil Pioneers...

THE RISE AND FALL OF MIAMI SHIPBUILDING

Part One — The Rise

By Robert J. Johnston

After graduating from MIT in 1948, I was assigned to the New York Naval Shipyard, where I engaged in converting the *Essex* Class aircraft carriers from piston aircraft to jets. After two years in Planning and Estimating, I became the Design Officer for the lead design of these conversions. All indications were that I was headed for a naval career in aircraft carriers. In 1952, I was being transferred to the the aircraft carrier type desk at the Bureau of Ships when I got a call from CAPT Cliff Grimes. I had worked for him in New York, and he was now Assistant Chief of the Office of Naval Research. He said, "Johnny, how would you like to be the US Navy's Hydrofoil Project Officer?" I responded, "Cliff, I don't know what you are talking about." He answered "Look it up, you are it." With that, I was off to Washington DC to be the Hydrofoil Project Officer in the Office of Naval Research.

My assignment was a rather rude awakening as to the workings of the Research and Development (R & D) world of the US Navy. What I had assumed was to be a technical assignment was foremost a diplomatic one. The US Navy had never taken hydrofoils seriously in spite the German navy's achievements in World War II. Dr. Vannevar Bush, scientific advisor to President Truman, had a major input to the Navy's R & D budget. Based on some erroneous data, he had concluded that in any future European involvement the Navy needed hydrofoils for rapid transits to Europe and to avoid the growing menace of the submarine.

Dr. Bush had obtained funds to build a destroyer size hydrofoil, and had founded Hydrofoil Corp. in Annapolis MD to undertake the necessary hydrofoil R & D. Gibbs and Cox was the design activity, and Bath Iron Works was to be the builder. The Navy recognized that the project was not practical, creating a dilemma for the development team, who had to keep Bush in the Navy's corner and not upset the Navy's entire R & D budget. In fact, the Navy had classified the hydrofoil program to avoid divulging what many considered was a total waste of money. My orders were to report to Dr. Bush once a week and keep him informed of the Navy's hydrofoil activities.

With this introduction to my new assignment, I began to explore the overall Navy hydrofoil program. It was much broader than the Bush destroyer project. The Bureau of Aeronautics was interested in using hydrofoils to improve landing operations of seaplanes. Gordon Baker and the University of Minnesota were studying Vee foils. Bill Carl was pursuing a high speed vehicle of interest to naval aircraft applications. Miami Shipbuilding Corporation (MSC) had made an arrangement with Christopher Hook, an eccentric British hydrofoiler, who had developed a submerged-foil craft controlled by surface feelers. Work was underway to develop an electronic automatic control system for a submerged foil system at Gibbs and Cox. The consensus of this hydrofoil community was that despite the impracticality of Dr. Bush's destroyer plans, there was still an opportunity for the program to provide high speed naval capability in rough seas.

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MIAMI SHIPBUILDING
(Continued From Previous Page)

With the Korean invasion, the Navy became concerned about the speed of the amphibious forces to transit from ship to shore. So the need for higher speeds for the amphibious craft became a requirement. To increase the speed of the LCVP personnel carriers became the Navy's first operational requirement for hydrofoils. An operational requirement and request for bids was prepared. The major requirement was for these personnel carrier landing craft to become capable of making 35 knots from ship to shore rather than the existing 8 knots. The craft had to be capable of landing on the beach, but did not require amphibious operations. To many, the MSC proposal was a surprise as the most feasible and technical sound bid submitted. Their proposal won the technical competition based on the Hook hydrofoil concept over such other competitors as Gibbs and Cox, The Hydrofoil Corporation, and Baker Manufacturing. Negotiations took place, and a contract was awarded to MSC to build a full scale hydrofoil LCVP(H). This contract was later modified to include a manned scale model construction and test prior to the full scale construction. This model was named the "$d\alpha/dt$." It should be noted that based on the results of Gordon Baker's test craft *HIGH POCKETS*, a second contract was let to the Baker Manufacturing Company for construction of a second LCVP(H) using surface-piercing Vee foils.

With the award to MSC for the lead in the landing craft program, I started to spend more time visiting and working with the MSC technical staff. This group, headed by Jean Buhler and including engineering professors from Miami University, was most impressive for a small shipyard. Not only were they a talented group, but they made visits by Naval personnel very pleasant. After a busy day in the office, an evening meal together was always a pleasant affair, and many good ideas were left sketched on dining napkins. It was through this association that I got to know the Buhler brothers and their very interesting father, Emil. In fact, on several occasions I was invited to attend the daily family meeting on events of the day that took place with an evening beverage at Emil Buhler's delightful and interesting home.

After an eventful two years with the Office of Navy Research, I was ordered to the Bureau of Ships. My time in ONR had given me the opportunity to look at hydrofoil activities all over the world. This included getting to know and work with all USA hydrofoilers including many dedicated and technically strong government personnel. Also a trip to Europe was ordered to study the remains of the German WW II effort, to visit the first commercial operations of a hydrofoil built by Supramar in Switzerland, and to learn as much as we could about the hydrofoil work that Russia was doing. Phil Eisenberg accompanied me on this venture, and Dr. Georg Weinblum, a former paper clip scientist at the David Taylor Model Basin who had returned to Germany and was head of the School of Naval Architecture at Hamburg University, was our guide. My assignment to the Bureau of Ships was a bit of a disappointment, as I was designated to work on the landing craft desk. This would be the type desk to which the hydrofoils under construction would be assigned if and when they joined the fleet. Time and events had passed me by to return to the world of aircraft carriers. It was obviously a long time before the LCVP(H) would be fleet ready. In the meantime Navy storage spaces were filled with landing craft which were deteriorating. My assignment became one of preserving these assets for future Naval needs. Compared with being the hydrofoil project officer of the U S Navy, this was not an exciting assignment.

With these thoughts in mind, along with concern over the family life with me as a naval officer and the fact that naval pay was not outstanding, I began to think about returning to civilian life. This was a difficult decision as both my wife and I thoroughly enjoyed navy life, particularly the group of people, engineering duty officers, with whom we were working. Several opportunities had been offered to me to pursue the development of hydrofoils, but I had not given them any serious consideration up to that time. We finally decided to explore civilian opportunities that had a future potential. With this I began to inquire and look at where I might find a future business home. Several opportunities were presented to me. Bick Moorman, MSC's representative in Washington DC, learned of my activities and came to me with an offer of an assignment with MSC. Studying MSC led me to conclude that this small shipyard had the potential to succeed in the hydrofoil world. It had the capability of building what I foresaw as the Navy's future requirements for hydrofoil craft and an excellent technical staff. I considered two other opportunities: one, with Chrysler Corp., which was interested in establishing a future hydrofoil group, and the other with my friend Bill Carl, who owned Dynamic Developments on Long Island NY. At that time Bill's workload could not really afford another employee. With that I went to Miami to visit Paul Buhler, the treasurer of MSC. Paul was most open with me and discussed the financial position of MSC. Financially MSC was not a completely sound corporation, but the future prospects were good, and there were no insurmountable problems. He and his brother Ted, the president offered me a position as Vice-President of Engineering with responsibility for the hydrofoil programs. Jean Buhler said he was comfortable with my assignment and the prospect of our working together. After some serious family discussions, I re-

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signed from active duty and joined the Naval Reserve (I am pleased to be able to say that after 25 years of service I retired as a Captain USNR). With this, in the summer of 1954 I joined MSC.

From my Navy background I knew that submerged foil systems with electronic automatic control were the way of the future. Looking at MSC's LCVP(H), my initial plan was to develop a suitable automatic control system for the craft. The only other known system at that time was being developed at MIT for a Gibbs and Cox runabout. We therefore decided to develop our own system. We hired Walter Keller as an electronic developer to head this effort. We found out that Ted Rose, a strong technical innovator and well known by the Navy, was available. He had been Dr. Bush's Chief Engineer at the Hydrofoil Corporation when a borrowed aircraft autopilot had been installed on their test craft *LANTERN*. He agreed to join us as Chief Engineer and brought in his son Rod, a bright engineering undergraduate, who initially worked for us during his summer vacations. Ted was also able to bring with him US Navy support for some study contracts that included retractable, right angle gear drives and designing foils for fatigue life that supplemented our engineering income. We needed a hydrodynamicist and were fortunate to lure Ray Wright who had a background in sea plane development to join us. With the technical staff complete, full attention was devoted to making the Navy's LCVP(H) program a success. The name for this craft came from Jean Buhler who from his friend, Walton Smith, learned of a long-legged insect found far at sea called *HALOBATES Sericeus*.

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RUSSIA'S LEGACY: VARIATIONS ON A THEME

By David Foxwell

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The Soviet Navy experimented extensively with several types of advanced hullforms, leading to a number of hydrofoils and an SES entering service, with varying degrees of success.

The *MATKA* class is a hydrofoil, but differs from Western hydrofoil designs by having a single, forward, hydrofoil rather than one forward and one aft. This missile-armed vessel was first seen in 1978. It had a hull like that of the *OSA*-class monohull and single hydrofoil forward similar to the *TURYA* class. This made it a better sea boat than the *OSA*. However, the *MATKA* class is being phased out of the Russian fleet, and all vessels of the class in the Baltic Fleet were scrapped in 1995.

The *TURYA* class remains in service, but some vessels have had their foils removed, and many are non-operational or have been scrapped. The *BABOCHKA*-class patrol hydrofoil also featured the single hydrofoil forward, but only one remains in service.

Fourteen *MURAVEY*-class patrol hydrofoils are in service, but several are non-operational. Whereas the *MATKA* class and its close relatives have a single hydrofoil forward, the *MURAVEY* has a large hydrofoil forward and two smaller hydrofoils amidships to provide additional lift.

One of the most recent additions to Russia's patrol force is the *DERGACH*-class, classified as Guided Missile Patrol Air Cushion Vessel. These twin-hulled SES vessels displace around 750 tonnes, are about 65m overall, and are powered by gas turbines. The two *DERGACH*-class vessels, *BORA* and *SAMUM*, were built at the Zelenodolsk shipyard and were commissioned in 1990 and 1994, respectively. According to *Jane's Fighting Ships 1995/96* the design is unreliable, and no more will be built. As with many classes of ex-Soviet Navy surface warships it is difficult to know whether the failure of these vessels should be attributed to design faults, poor manufacturing, or the Russian Navy's generally moribund state.

They are undoubtedly high-speed vessels; the *BABOCHKA* could make 45 kt foilborne, and the *DERGACH* class an impressive 58 kt. The Russian gas turbines on most of these fast craft are probably less reliable than Western models and consume a lot of fuel. When foilborne, the foils are noticeably short-legged and not "sea friendly."

MIAMI SHIPBUILDING
(Continued From Previous Page)

The design work on *HALOBATES* was well underway. Jean Buhler's knowledge of wooden hull ship design proved useful in the design of the hull, particularly the fitting of the bow door. Retraction of the foils and over-the-stern drive were particularly difficult. The operational schedule for the design called for the landing craft to leave the mother ship with the foils and drive fully extended and as the craft approached shallow water to continue to fly with the equipment partially retracted. Finally before hitting the beach all was fully retracted but with craft underway hullborne. In the meantime the design of the Hook feelers which controlled the foils became more cumbersome as they were scaled up from the test craft. This put more emphasis on the need to eliminate these feelers for any craft that would be acceptable to the Navy. In a lab equipped for development of the automatic control system, a simulator was installed along with one of the first computers in Miami. The heat was on the staff to come up with an acceptable system.

In 1957 *HALOBATES* was completed and ready for sea trials with its mechanical feelers for foil control. Some time had been lost when the over-the-stern drive that was designed and built for us by Cabi-Cattaneo of Milan, Italy failed its test. Ted Buhler had gone over to witness these tests and discovered that the completed design would not retract. The gear train locked up on retraction. This caused a major modification which included having to accept some bearings with shorter life than we had initially specified. It also put Senior Cattaneo in mourning as he had designed the gear train, and at that time he was one of the few gear designers who had produced right angle drives. Anyway, trials finally got underway in 1957, and *HALOBATES* demonstrated 35 kt in 5-foot waves, good banked turning characteristics, and the ability to partially retract and remain foilborne. However any seaman who looked at the cumbersome feelers, used that argument to reject the concept. Fortunately an automatic control system was ready for installation and sea trials. The successful trials allowed the Naval personnel who witnessed them to visualize a practical naval hydrofoil. At the same time the Navy became interested in British developed air cushion vehicles that could transit ship to shore, then crawl up on the beach. Naval interest in the LCVP(H) waned as the Navy studied air cushion vehicles as landing craft. However, a final contract mod allowed *HALOBATES* to serve as a sea trial test bed for gas turbine engine. Thus MSC installed and tested the first gas turbine on a Naval vessel (a Lycoming T-53).

The successful *HALOBATES* sea trials led the US Army to become interested in applying foils to their landing craft. Colonel Spears, one of the fathers of the Army's DUKW, thought that foils could increase the sea speed of this vehicle. He and Rod Stevens of Sparkman and Stevens visited us in Miami, participated in one of our *HALOBATES* sea trials, and initiated the contracting process to get a DUKW flying on foils. This was to be a MSC project, but — since the Army foresaw a production contract for DUKWs on foils and since these were wheeled vehicles for land operations —we had to accept the Lycoming Division of AVCO as the prime contractor. They had no hydrofoil experience, so the initial design, conversion, and sea trials became MSC's responsibility.

Our first concern was whether a DUKW could achieve take off speed without swamping, and if it could, what was the power required for take-off? The Army was willing to loan us a DUKW for tests if we could provide a ship to tow it through the speed range of interest. We got the Navy to make an AKA, which was a converted DE, available with a full Navy crew. Trials were scheduled to be run out of Fort Eustis on Chesapeake Bay. Jean Buhler designed and made a dynamometer to measure the drag of the DUKW, and we were off to tow it to a speed of about 20 knots.

We arrived at Fort Eustis to find our DUKW being readied for towing. Much to our surprise we found the Army personnel hurrying about with much paperwork. The Navy's AKA was berthed at the Fort, and we were assigned berths on board the ship. Now a little aside: During WW II, I was in charge of a design office manned by Naval Officers and Bluejackets. We were given special projects that the Navy did not want to put into civilian design groups. One of our design projects had been to prepare plans to convert DEs to AKAs. This project was primarily redoing the internal arrangement of the DE to provide berthing and living space for transporting Army contingents. In redoing the forepeak area to accommodate troops, we had to put some of the bunks together than allowed by Navy design practice, making it very difficult occupants of these berths to turn over. When this spacing finally was finally approved I can remember saying "Well, I know I shall never have to sleep there." Well guess where the berth was that was assigned to me... one of the "too close" berths!

Finally all arrangements were complete, the dynamometer was installed in the tow rig, and we were ready to head to sea to conduct the towing tests. The underway trials lasted about two days, and we were able to gather the necessary data for the design of the propulsion system. To our pleasant surprise the DUKW planed beautifully, and we got the craft up to take-off speeds of interest

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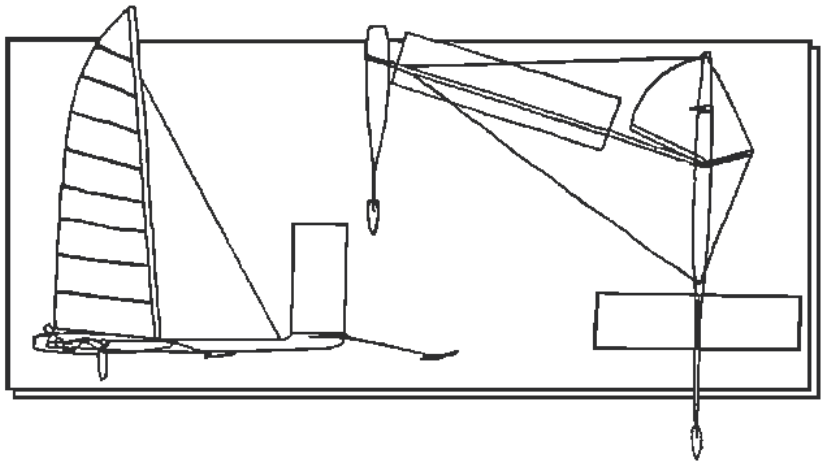
without any swamping. So a delighted test crew returned the DUKW to Fort Eustis. To our surprise we were greeted by unhappy Army personnel. Having assumed that the test craft would be lost during the towing they had assigned all unaccountable material for their DUKW operations to our loaner. Now they had to undo all that paperwork!

Using the data from the trials and adapting data from *HALOBATES*, including its autopilot, and using a Lycoming T-53 gas turbine for main propulsion, a flying DUKW was designed, and successful demonstration trials were conducted in Miami waters. Mel Brown, a former Navy colleague of mine, was hired at MSC to be the project manager for the program. Speeds in excess of 30 kt were demonstrated (compared with the 5 kt of the conventional DUKW).

Seeing the craft rise from the water with its wheels in place was quite a sight. Our measured mile was along the Miami Beach Causeway, which had a road running alongside. I think we caused some near accidents as drivers saw this cumbersome vehicle rise from the sea and come to about the same speed as they were making in their autos.

With the success of these trials, the US Marine Corps became interested in increasing the waterborne speed of their amphibian vehicles. Later on, the Lycoming Division of AVCO was to build LVHX-l based on the hydrofoil principals demonstrated in MSC's Flying DUKW design. Food Machinery Corp. also built LVHX-2 using surface-piercing foils. MSC did not participate in these ventures for reasons that are included in the rest of the story... but that

Continued in Autumn 1997!



ONE OAR IN THE WATER

By Dave Culp
[First appearing in AYRS #112]

I've built an aerodynamically balanced hydrofoil with automatic 2-axis control via surface sensors. It flies on a single foil (the one oar of the title), and uses aerodynamic elements to supply 3-axis control and overcome both heeling and pitchpoling moments from the conventional catamaran rig. The basic boat design is Greg Ketterman's, designer/ builder of *LONGSHOT* and *TRIFOILER*. My input was to design the construction details and subsystems and the actual construction. The foil and some substructures were built by Larry Tuttle of Santa Cruz CA, who built the foils for *LONGSHOT* and all *TRIFOILER* prototypes.

The new boat is powered by conventional soft sails. It is innovative in using only one hydrofoil; an inverted "J" foil similar to *LONGSHOT*'s. The boat gains 3-axis stability when flying through use of aerofoil elements. Pitch, roll, and heave are auto-controlled via surface sensors, and yaw control is pilot induced via a bow mounted air rudder.

The boat is a 'one way' proa. Though it sails quite happily on the 'off' tack, it can do so only when hullborne. The pilot sits in the windward ama, fully 24 ft. to windward of the main hull and rig. The main hull is 22 ft. long (plus an 8 ft. sensor arm) and the boat is 26 ft. wide (plus 8 ft. overhang at the canard wing) overall. The masthead is 26 ft. above the deck and the mainsail (a stock Prindle 16 catamaran main, but set on a beefier cut-down Prindle 19 mast) is 170 square feet (sq. ft.). The boat carries an additional 32 sq. ft.. in the air rudder (jib?), and 128 sq. ft.. in horizontally mounted airfoil elements. All aerofoils are symmetrical sectioned rigid wings.

Auto Controls

For roll control there is a 4 ft. by 16 ft. wing element, mounted on and free to rotate about, the cross beam. Its center of effort is 15 ft. to windward of the main hull. This wing is actuated by a leading edge mounted surface sensor on an 8 ft. arm. This sensor gives the wing a nose up attitude when hullborne and a nose down attitude when the windward ama rises too high. At low speeds, the upward lift from the wing helps ama lift-off. At higher speeds, downward lift from the wing counteracts heeling due to sail forces. Greg's VPP program indicates that best speed (at highest efficiency) will be achieved when this wing is nominally not loaded, either positively or negatively. The aerofoil elements aren't meant to carry significant load at speed (too much induced drag). Their main

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LETTERS TO THE EDITOR

Lake Lucerne

I enclose my membership application. My father was Chairman of the WASER-SHIPYARD in Stansstad, who built the first post-war von Schertel hydrofoils. The shipyard also built the first commercial passenger hydrofoil *FRECCIA D'ORO* in 1953. The shipyard was the home of the SUPRAMAR prototypes for many years. So my father told me a lot of tales about these famous high speed boats when I was a child. Unfortunately he died in 1989. In June 1988 I took my first trip on a hydrofoil boat on Lake Maggiore, between southern Switzerland and Italy. On this trip, I shot my first photograph of a hydrofoil. It was the slow beginning of a fever. I'm not a sailor, engineer, student or a doctor. Since 1993, I'm an independent photographer. My brother and I have our own Photo-Agency, specialized for local news, railways, ships, etc. We work also on commission for companies and private people (documentary, advertising, weddings and many more). We make also commercials, documentaries, and cartoons on video and film. You see, there is no direct connection between my profession and my passion. In the last 10-12 months, I began a serious searching for any kind of info and photos to write a book about the hydrofoils on Lake Lucerne, Central Switzerland.

Thomas Wuhrmann
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Switzerland

Ode to a WIG

The IHS web site looks great! The Nigg *FLYING FISH* may share its name with several craft. There's also a German wing in ground effect craft by the same name. I'm afraid Donald Nigg's boat is one of a kind and purely of his gifted creativity and stubborn tenacity. I'm trying to build a wing in ground effect stabilized by foils and powered by sail because...

If you could make a sailboat float
On a cushion of air,
You could go as fast as you dare,
On a wing and a prayer.

Evan Riddle
ERiddle229@aol.com

[Nothing like a bit of versification from our unofficial hydrofoil poet laureate to add tone! -Ed.]

Power For *HERCULES*

Accumulation of equipment to put the [former USS] *HERCULES* underway towards Missouri is nearly complete. The MTU [diesel engines] have been mated with the original gearboxes, test run, and are ready to install. Our control system is the original helm yoke coupled with the original servo-controlled hydraulic actuators via a programmable logic controller (PLC). This alteration differs from the original design of resistor networks but in tests has performed flawlessly. Of course the real test will be in sea trials. The PLC also takes inputs from switches at the helm and controls all engine/gearbox functions as well as inputs from the engine monitoring sensors which are projected on a computer screen at the helm.

Our research towards foilborne operation continues. All literature indicates approx. 15,000 hp is required to fly the ship. This is the power necessary to bring the ship onto foils at about 30 knots and then accelerate to 40+ knots. Once the hull is clear of the water, the drag reduction is so significant that the hp required to sustain foilborne operation at say 35 knots would be approx. 1/3 of total power??? Of course the turbine engine will gobble nearly as much fuel at reduced power setting as at full power. My question is, (finally): Would it be feasible to link three 5,000 hp turbines together for take off and operating at full speed (or high seas) and yet drop 1 or 2 out for cruising in calm sea states at reduced speed? Since such a link would require a clutch of some sort even with a "free" turbine to keep the unpowered turbine from acting as an air pump (or would it?), Is there be a way to use linked turbines (ones which have the output shaft directly connected to the compressor section)? These turbines are considerably more plentiful and less expensive.

Eliot James
esjames@vax1.rain.gen.mo.us

Three turbines into one pump (assuming *HERCULES* still has the single ALRC foilborne waterjet) would be tough. Would need a combining/reduction gear with three input pinions. Historically, such arrangements have not been successful. Backing off on total installed hp would also reduce thrust margin at takeoff in higher sea states/high temperatures. If *HERCULES* is operating at a much lower full load displacement, this may not be that important. Last issue is complexity. Much simpler plant with a single LM-2500. Have never heard of "linking" gas turbines as suggested by Mr. James - I don't think it's feasible. It may be appropriate to check with turbine manufacturers.

Mark Bebar
Bebar_Mark@hq.navsea.navy.mil

Your President is Not a Crook

The IHS newsletter provided me some direction for seeking info on a boat I am currently investigating. I have found that the boat was imported by Kettenberg Marine in Oxnard California. They went out of business in 1978. I am still seeking data on this boat. An article in the newsletter noted that an American company bought ten 6-passenger VOLGA class

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LETTERS TO THE EDITOR
(Continued From Previous Page)

hydrofoils back in the 1960s. This may be the type of boat I'm looking at.

This is what I know now: approx. length - 25 feet, beam - approx. 6 feet; fully riveted aircraft aluminum construction; originally I/O powered by a Volvo 6 cyl. diesel (though there is currently no engine or drive); various components have Cyrillic name plates; 6-passenger interior configuration with three aluminum seat frames along each side of the interior; hull has "stepped" configuration like a flying boat; built in Finland (or maybe Russia), and appears to be 1960s vintage. The boat may have been "gifted" to Richard Nixon by the Finnish government. The boat was last registered in California in 1974 (I am currently investigating former owners through the CA. Dept of Motor Vehicles). It sounds like this boat is a Volga 275.

The boat is in "rotting position" in a local boat yard with the swamp growing in it; it looks pretty much, as my wife commented, like a "piece of *[vulgarity deleted!]*." I am thinking of buying this boat with the idea of restoring the hull and re-powering it with a modern big-block and outdrive, or perhaps retro-fitting it with a modern outboard mounted to a "sea-drive" with power trim and a vertically adjustable jack-plate. Are hydrofoil boats very sensitive to CG location, thrust vector and relative height? Can you recommend any texts that will educate me on hydrofoil theory and design? Before I jump into this sort of a project, I want to find as much background data as possible. Any leads or info would be *most* appreciated.

Frank Eichstadt
eichstad@spacehab.com

Build It Yourself

I'm interested in designing and building a high speed single or two seater hydrofoil and need as much info as I can get. I'm still in the concept stage and would like to discuss ideas with other hydrofoil designers/builders.

Neil Morris
morrisn@ihug.co.nz

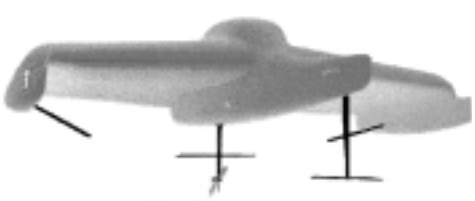
[If you want a motor powered craft, you can get plans and components from Hydrofoils Inc.; PO Box 6006; Lake Worth FL 33466; 561-964-6399 voice or fax; web: http://www.hydrofoil.com*. If you are talking about a sailing vessel with hydrofoils, contact DAK Hydrofoils, 123 South Pacific Street, Cape Girardeau MO 63703, phone: 573-651-6582, (e-mail:* dvpw98e@prodigy.com*), (web site:* http://www.igateway.net/~dakh). Another contact for sailing hydrofoils is Dr. Sam Bradfield. He does not have a web site, but he can be reached at: Prof. S. Bradfield; Hydrosail, Inc.; 3040 South AIA Highway # 154 F; Melbourne Beach FL 32951; hydrosail@aol.com*. -Ed.]*

ALAHW

Guten Tag! We are doing lots of calculations for the Air Lift Aided Hydrofoil Waterbike (ALAHW). Besides using Computational Fluid Dynamics (CFD) methods for resistance prediction and optimization programs for wing configurations, we do some work on details. We know about the difficulties and try to avoid as many mistakes as we know of.

We have built a CPP to be used on the boat and tested it on two different hulls. A special pump driven by the shaft inside the lower bulb will be controlled by dynamic pressure to achieve the right pitch at the right speed. But still there is the money... I mean no money! I guess that is the problem for most enthusiastic waterbike builders. It is a pity that German universities do not invest in practical research by their students.

Claus Abt
abt@cadlab.tu-berlin.de



The Berlin Waterbike Team's ALAHW
(See Letter This Page)

Hobie *TRIFOILER*

I suggest that you provide a link to the Hobie *TRIFOILER* web page at: http:// www.paw.com/Sail/hobie/trifoiler.html. It is the best well marketed hydrofoil for the general public. Also it was difficult to find your web site. Considering its potential importance and the purpose of the Society, perhaps some recoding of the search engines catalogues could be done.

Harry T. Larsen
Mercer Island WA 98040

[The home page has been revised to emphasize "hydrofoil" as a key word and has been re- registered with various search engines. We are interested to hear about other experiences good or bad finding the IHS web site via search engine. The Hobie Tri-Foiler home page has been added to the IHS "Links Out" page per your suggestion. -Ed.]

The Letters To the Editor section allows hydrofoilers to ask for or provide information, to exchange ideas, and to inform the readership of interesting developments. All are invited to participate. Opinions expressed are those of the authors, not of IHS.

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ONE OAR IN THE WATER
(Continued From Page 7)

function is to auto-control heeling (and pitch), allowing the pilot to keep sail power 'full on' and concentrate on course keeping. Greg credits this auto-control with his successes with *LONGSHOT*. We designed the rest of the boat's dimensions and weights around this parameter. The wing does see both positive and negative transient loads, of course, as the boat and pilot respond to wind and wave. The net design goal, however, is no lift.

Second, pitch: Greg has come up with a rather clever approach here. The main (only) hydrofoil is positioned well aft on the main hull, under the sail's center of effort. It is aft of the main hull's center of gravity, but coincides with the boat's overall CG when the ama is flying. The foil actually carries 98-100% of the boat's weight at speed. There is a canard wing at the bow of the main hull (actually two wings—one on either side of the bow—but cross linked to move as one). The canard's center of lift is 16 ft forward of the hydrofoil. This wing is actuated by a second surface sensor, also on an 8 ft. arm. (Both sensor arms are somewhat flexible, to attenuate the sensors' being buffeted by small waves).

The hydrofoil is permanently set at a slight positive angle of attack (it is also asymmetrical, using a NACA 63 series low-drag section), but at hullborne speeds, its lift is insufficient to raise the boat; also drag is fairly low. The aerofoil canard has a pre-set positive angle of attack set by the sensor. When boat speed and thus apparent wind is sufficient for the canard to lift the hull's bow (we want about 12 kt. boat speed and 18 kt. apparent wind speed at this point), the bow-up hull pitch angle adds to the hydrofoil's angle of attack and the hull lifts out. If the bow rises too high, the sensor calls for a negative attack angle on the canard and the bow comes back down. The sensor thus controls the canard's attitude, the canard controls the bow's altitude (and thus the hull pitch angle), and the foil slaves along after, doing all the real work.

The advantages: 1) The highly loaded main foil doesn't need to be actuated and is rigidly bolted to the hull. 2) The main strut is vertical and thus resists ventilation. 3) Only one surface piercing strut minimizes spray loss and ventilation sites. 4) Wetted surface is minimized; in this case, exclusive of the sensors' 'footprints,' wetted area is about 3.73 sq. ft..

Third, yaw: Greg has specified an air rudder in order to reduce wetted surface and induced hydrodynamic drag. His VPP shows that aero drag at speed will be less than hydro drag of an equivalent water rudder.

It is significant that all aerofoil elements are providing minimal lift and drag at top overall boat efficiency; the sensors are contributing less than 10% of the total drag; and designed boat speed is 3.1 times true wind speed (46.8 kt. boat speed in 15 kt. true wind speed). Lest one suppose these predictions are extreme, I note that Greg degraded efficiency figures from those used for *LONGSHOT*. Foil L/D suppositions are from empirical data taken from in-the-water boats using very similar foils. A similar VPP run on *LONGSHOT* predicted 2.3 times wind speed at 15 kt. true and the boat has been measured at 2.5. Greg actually thinks that these figures are conservative.

Results To Date

First, the boat is heavy. The VPP supposes the all-up weight with pilot to be 480 lb., of which 280 is in the ama. Actual all-up weight is about 555 lb., with 290 in the ama. This will surely increase take-off speed and lower top speed, but very little.

Construction went well. Details are in my web page: http://www.dnai. com/~daveculp/speedsl/sheerspeed.html. The boat is complete and in the water, but we've only managed about 1 1/2 hours of sailing time this year, and all in winds under 12 kt. The boat has expected teething problems. The over square (wider than long) and asymmetrical geometry create helm balance challenges. The helm changes quite significantly from port to starboard tacks and also from hullborne to foilborne attitude. The boat has not yet flown and I expect it will need another season's tweaking before we get it right. Nothing has broken yet and the boat sets up rather easily in about 1-1/2 hours with

ABS ISSUES REVISED GUIDE FOR HIGH-SPEED CRAFT

Fast Ferry Int'l Apr 97

A revised edition of its *Guide for Building and Classing High-Speed Craft* has been published by the American Bureau of Shipping. The classification society says, "In response to the many recent changes that have affected this dynamic sector of the marine industry, ABS has amended its first *Guide*, published in 1990, in a major undertaking.

"The result is an enhanced standard which takes into account advances in hull forms, material usage and propulsion machinery as well as the new IMO Code of Safety for High Speed Craft. The revised *Guide* offers designers, builders and operators of these specialized craft the latest technological guidance for steel, aluminum alloys and fiber-reinforced plastic construction."

The *Guide* is available in three volumes. The first details the overall criteria related to design, evaluation and survey, while the other two contain criteria related to hull and machinery selection, including joining methods for the three construction materials.

Continued on Page 16

AMV WORKSHOP

(Continued From Front Cover)

Agenda

- Welcome by Paul B. Mentz, Maritime Administration R&D Coordinator, and Introduction: *Background and Objectives,* by Philippe Goubault of Band, Lavis & Assoc., Inc., Chairman, SNAME Panel SD-5
- A new video: *Advanced Marine Vehicles*, by Advanced Marine Enterprises sponsored by SNAME.
- *Markets for Fast Ferries and the Prospects for Generating Revenue*, by Jennifer J. Zeien of Fort & Schlefer, LLP; Chairman, SNAME Panel 0-36, Maritime Economics
- Discussion: Why Not More High-Speed Ferries in the USA?
- *AMV Types and Their Worldwide Employment Today*, by David R. Lavis of Band, Lavis & Assoc., Inc.
- *A Range of Fast Ferry Designs*, by Peter Lenes of Halter Marine Group
- Discussion: Availability of Proven, Reliable, Economical Fast Ferries
- *Rules and Regulations Governing Ferry Characteristics*, by Jack Booth, US Coast Guard
- *Choosing the Right Ferry: Relating Performance to Profitability*, by William A. Hockberger, Consultant
- *Financing for Ferry Acquisition*, by Eugene Miller, Fort & Schlefer, LLP
- Discussion: Major Factors Inhibiting Broader Use of AMVs

Summary of Discussions

The AMV video highlighted the growing problem of surface transporta-

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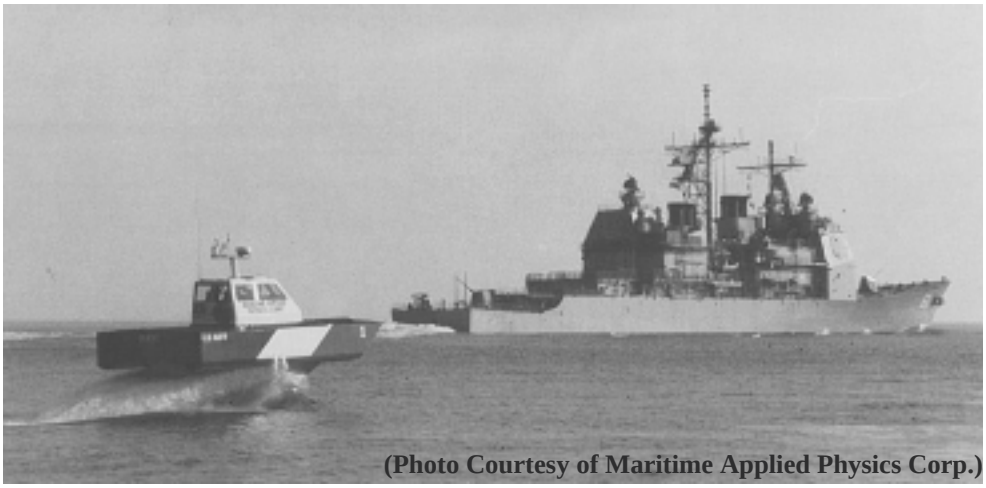

(Photo Courtesy of Maritime Applied Physics Corp.)

***QUEST* Overtaking Another Navy Ship**

QUEST UPDATE

By John Meyer

For the benefit of newer IHS members and IHS Newsletter readers, *QUEST* is a Hydrofoil Small Waterplane Area Ship (HYSWAS) demonstrator craft, 12-tons and 27 feet in length, designed, built and tested by Maritime Applied Physics Corp. (MAPC) under a US Navy Small Business Innovation Research Program contract. Articles on this subject have appeared in previous issues of the Newsletter, namely: Autumn '95, pg. 9, and Autumn '96, pg. 6.

In November of 1996 and March-April 1997 time frame, intensive rough water trials were carried out in the Norfolk VA area. *QUEST* was located at and supported by the US Navy Amphibious Base in Little Creek VA. A contingent of US Navy and civilian personnel were in attendance during both trial periods and witnessed *QUEST* operations from boats operated by the US Coast Guard and US Army with photographic and video coverage by MAPC and Navy photo teams. MAPC took the opportunity to catch *QUEST* with the US Navy DDG-51 Destroyer headed out to sea as shown above.

QUEST successfully operated foilborne at speeds up to 35 kt in all directions in waves which at times reached a height of eight feet. It was observed that the ride comfort in this small craft was remarkably good, and it was able to maintain foilborne speeds without excessive power demands. The data collection system on board has collected a huge amount of information which is being analyzed.

Current plans are to incorporate modifications to *QUEST* during the next

HYDROFOILS IN KIT FORM

David A. Keiper of *WILLIWAW* fame announced that DAK Hydrofoils is taking advance orders for do-it-yourself kits to get your catamaran flying on hydrofoils. According to Mr. Keiper, "Our foils should be suitable for the Hobie 14, 16, and 18, Nacra 5.2, Prindle, Sea Spray, A-class, others, plus some home-built catamarans. We expect a catamaran with these foils to be able to fly in a true wind of 9 to 10 kt. In ideal conditions, foils may double the speed. Mostly, foils will add 50% to speed." Contact David A. Keiper, DAK Hydrofoils, 123 South Pacific Street, Cape Girardeau MO 63703, USA; telephone:573-651-6582; internet e-mail: dvpw98e@prodigy.com; web site: http://www.igateway.net/~dakh.

AMV WORKSHOP
(Continued From Previous Page)

tion in and around major US cities, many of which are near water. The US Navy's AMV development successes exemplify the technological strides made during the 1970s and 1980s in the USA. That this technology has been commercially adopted worldwide was illustrated in the video by a host of fast ferries of all types operating in Europe and the Pacific Rim.

Jennifer Zeien discussed ferries in the transportation system, pointing out that they do not operate in isolation, but are only one link in the intermodal transportation network. She asserted that demand for fast ferry services ultimately arises from individual choices among competing modes of travel. Zeien then outlined two types of ferry markets: commuter-based and tourist-based services. For the former, she showed a hypothetical service load factor profile. For the latter, she noted that tourist-based ferries must usually carry vehicles as well as passengers, and that marketing is needed and important because the service is not founded on constant use by a single rider pool. The balance of Ms. Zeien's paper related the differences between commuter-based ferry services and general cargo and the cruise market. She went on to describe a profile of ferry market geography, operating scenarios, and evaluation factors for a proposed ferry service.

To open the morning discussion period, moderator Tom Mackey asked why there are not more AMVs in the USA. He referred to current heavy traffic areas. It was noted that the Maritime Administration (MARAD) had a mandate to influence the utilization of the waterways. The possibility that companies like Federal Express might turn to AMVs to bypass traffic gridlock areas was mentioned. Also it was commented that ferries were simply not generally recognized as logical alternatives by many planning organizations. A high percentage of government dollars go to highway-related projects and a relatively low percentage into ferry projects. There is also a fairly widespread ignorance about the nature and potential of AMVs. However, examples of successful operations supporting the New York airports were cited. There is a general perception that ferries are "slow" compared to trains, etc. Commuter AMVs could serve tourist routes in off hours or off seasons. The 1984 Urban Mass Transportation Authority (UMTA) study is still generally applicable to USA operations.

Further discussion covered the differences between USA and Europe regarding ferry utility. Also, if the demand for faster water transportation is there, it has been demonstrated that people will pay extra for speed. Vallejo CA looked into all aspects of ferry use before buying new ferries, including off-peak, tourist-based uses for the ferries. The possibility for a Baltimore - Annapolis MD ferry was mentioned; although there was one some years ago that went out of business, but a combined passenger - freight ferry might be successful on that route. It was proposed that such a ferry carry passengers during the day but freight at night. A comment was offered that federal money for ferries comes through highway appropriations, but that even if those people are conscientious and honest, they are still quite unaware of fast ferries and what they might offer. In certain specific areas, such as LaGuardia-Manhattan NY, private money has been successful in starting and operating faster ferries.

The need for maintenance, reliability, and backup craft was highlighted, as was passenger perception of safety and comfort. There must be a willingness to use alternatives (to highway transportation) in future planning, but there must be distinct geographical advantages to justify use of AMV ferries. In state-run ferries, there may be negligible incentive to upgrade for higher speed.

There are many ferries in the Seattle WA area, and there is free downtown bus service for ferry passengers. The question was raised whether it is possible to use highway money for passenger-only ferries, in view of ferries as direct substitutes for highways. Is the Lewes DE to Cape May NJ route good for fast ferries? Band Lavis Assoc. did a trade-off study five years ago. This is a tourist route, and tourists don't tend to be so time-sensitive; they are looking for a good time. There is an absence of Long Island NY to Connecticut fast ferry routes, whereas it would appear that this area would be a good place for them.

Mr. Mentz said that the US Department of Transportation relies mainly on private industry and doesn't advocate particular alternatives, but DOT is interested in ferries and supportive. MARAD has participated with the Defense Advanced Research Projects Agency (DARPA) on ferry projects, and can provide Title XI loan guarantees to fund them. For the NEXTEA it was suggested that ferry proponents emphasize traffic congestion mitigation and air quality improvement aspects. ISTEA emphasis is on freight transportation, and 95% of present ISTEA funds go through the MPOs (Metropolitan Planning Organizations), which have latitude to decide how best to invest the money. Some recent ferry projects had gone through the MPOs, and it was remarked that this is how things are supposed to work.

Studies at Grumman years ago are still relevant today. Problems cited included debris in the water, traffic, terminal connections, river ice, etc. The importance of local government support was stressed, and positive examples in New York City, Virginia, and North Carolina were cited. In many areas however, there is strong political resistance.

David Lavis described types of AMV hullforms, gave state-of-the-art

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HYDROFOIL NEWS DIGEST

PRESENT AND FUTURE PROJECTS DETAILED IN SINGAPORE

Fast Ferry Int'l, May 1997

Several of the speakers at the 13th Fast Ferry International Conference that was held in Singapore at the end of February took the opportunity to discuss either medium term projects, possible long term developments or the operation of vessels that are already in service. We selected one.

Whither Fast Vehicle Ferries?

A speaker who gazed into the crystal ball at the conference was Incat Tasmania's Robert Clifford, who, not unsurprisingly, restricted his comments to passenger/vehicle ferries.

He feels, "In five years' time, I believe I can reasonably predict that the vast majority of fast ferries will be 91m wave piercing class, powered by diesel engines with capacities of around 900 passengers and 240 cars. Incat is geared to produce five or more of these craft a year from our Hobart shipyard. Simple mathematics suggest that well over 20 such ships will dominate the market in five years' time.

"Other yards will produce both larger and smaller craft and others may try to copy us with similar sized vessels. Associated yards will produce a number of vessels under Incat license agreements. Some will be similar to our wave piercing craft and others will be simpler but faster, like our 50 knot K50, the first of which is currently being built in Panyu, China. In five years' time, at least ten vessels built at the Chinese yard will be in service.

"It is the ten year prediction that is the most interesting! For this, I have extrapolated from the past 20 years to give a indication of where the industry may be. What do we expect of operating speeds in 2007? Today we have two lines of progress to confuse us - calm water ship and open water wave piercer.

By 2007 I think it is reasonable to assume that most fast displacement catamarans will be capable of speeds over 50 knots. As we already have hovercraft and two K Class catamarans in service at over 50 knots, this is not a startling revelation. But it must be kept in mind that some operators will find difficulty in justifying the high cost of high speed. Those who can justify the cost will do so because of the higher utilization.

"Sixty knot craft will generally be available by 2007 and these will serve sheltered areas, e.g. the River Plate and the Kattegat. High utilization will also be achieved by fast turnarounds, which in some cases will be less than 10 minutes. What will these 'ships' look like? What options does the operator who wants to compete with aircraft have? Is it a flying boat capable of say 300 kt or wing in ground effect at 150 kt, or something a little less ambitious?

"I favor a boat that takes advantage of lift from wing like surfaces, yet which remains essentially a ship. It might, for example, have a displacement of 400 tons with lift from the wings providing, say, 350 tons. I see it with three very narrow planing hulls and powered by water jets and gas turbines. *[It is not clear if Mr. Clifford really means "wings" or did he mean to say "foils?" If the latter, it has already been invented; it is called Hydrofoil Small Waterplane Area Ship (HYSWAS), and the concept has been successfully demonstrated both in the US. and Japan. -Ed.]*

"The development of fast ships is on a steep learning curve and this is certain to continue as weight saving technology keeps moving ahead. The conflict of speed versus deadweight will however remain.

An additional complication is the attitude to speed and wash from the environmentalist lobby. There is no doubt that higher speeds and higher displacement can only be achieved in open waters.

"Freight ships will require much higher deadweights whilst maintaining moderate to high speed. The HHS has set the standard and the world is watching and waiting to see who will be the next to order other craft of this capability. It is unlikely to be Incat built for some years. I believe Incat is likely to continue to serve the middle market. The 1,000 passenger-250 car mark is not likely to be exceeded by Incat.

"I favor the view that the mainstream fast operators will go for moderate size and high frequency of service. If I have to predict, I suggest size may well stabilize at below 100 meters. Such a craft is unlikely to be severely restricted by sea states but, at 1,000-1,500 passengers, will still be small enough to maintain frequent services."

Robert Clifford also gave some thought to fast car ferry production. He reminded delegates that after 74m *Hoverspeed Great Britain* was built in 1990, "For three years, only two vessels per year were averaged. By 1993-1994 numerous yards around the world had entered the market.

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SINGAPORE
(Continued From Previous Page)

"Unfortunately for them, and perhaps fortunately for the overall good of the industry, some yards have already departed the scene. The fast ferry business is clearly not for everyone. A special flair is required to blend high performance with reliability and safety, and yards which have proven highly experienced at building conventional ships have made a mess of their first fast ferries.

"Today we find there are less builders of fast ferries than there were a year ago. No doubt new players will appear on the scene but others will depart. A serious limitation to the growth of the industry will be the availability of experienced constructors of craft, and unless mega-dollars are injected into training personnel to construct ships and manage the projects, ten years of progress may still see the world production of 50 ships per year as an almost unobtainable goal."

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AMV WORKSHOP
(Continued From Page 12)

examples, reviewed attributes and specific issues associated with each AMV type, cited trends for high performance vessels worldwide, and listed obstacles to fast ferry development. He described the "advanced means of lift," i.e. means of lift other than buoyancy or planing forces. These are: support by water/air static and dynamic lift, and combinations of same, referred to as hybrid ship forms and illustrated by the Hydrofoil Small Waterplane Area Ship (HYSWAS) and the Surface Effect Ship (SES), an air-cushioned catamaran. He illustrated all of these concepts in a "Lift Pyramid." He reported trends for high performance vessels worldwide including fast ferry deliveries, speeds of fast ferries as of 1996, and distribution by hull type. Lavis noted the growing sizes, speeds, and technological advances that have helped the AMV industry. He then described the obstacles to fast ferry development, in part, lack of information or understanding of their possibilities, perceived reliability issues, large number of hullform types (difficult to make an informed choice), inflated performance claims by builders, and regulations poorly adapted to fast ferries. Lavis concluded that (1) military needs promoted past advances, but today the commercial sector has the lead; (2) Europe and the Pacific Rim have been quicker to adapt the AMV technology, (3) the USA market can be significant, and (4) a national strategy is needed to generalize AMV use.

Halter Marine, Inc. (HMI) unsuccessfully proposed an E-Cat for Washington State Ferries, but Peter Lenes said that they will soon build a prototype using their own funds. Also, HMI designed the *SEAFLIGHT* catamaran with funding from MariTech, and they almost succeeded in getting a customer for it. It was based on a semi-SWATH concept for which Stena holds patents. This necessitated licensing and created other difficulties if the project were to proceed.

In further discussion, the use of ferries in Europe was noted, particularly in the Baltic as floating entertainment bases (casinos, bars, orchestras, etc.). Avoiding taxes of the terminal nations was discussed. Tom Mackey suggested that this workshop's sponsoring organizations should develop standards for comparing AMV types, also that we should learn more about their safety and environmental implications. He has heard about large wakes hitting people along the shore.

How is money for fast ferry work raised in Europe? Information from those programs is usually not readily available in the USA. A reply was that government money is still relied on there, but that they also require specific individuals to support them if they are to be successful. Norway sponsored much work in the 1980s. The Australians historically have built many different types and have received abundant government support and money for export-oriented fast ferry construction. An attendee noted that some successful European ferries carry both people and freight and stated, "Many people there are looking for fast entertainment as well as fast transportation." Wake generation in deep water is not a problem, but more work on fast ferry use in shallow water is needed. The use of prediction programs and model tests to resolve shallow water/wake problems was discussed.

Mr. Lenes was asked about customer response to the HMI portfolio. He said there have been no USA customers for the designs they have licensed from foreign sources and added that it would not make sense to build those designs for other foreign customers due to the license restrictions. As to damage stability of the various AMV types, Mr. Lenes commented that catamarans in general were excellent in this respect because of the greater compartmentation.

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AMV WORKSHOP
(Continued From Previous Page)

A question about wave-piercers and their seakeeping performance and commercial prospects was raised. Someone volunteered the information that the Stena HSS has bilge-keel-like fins at the stern that reduce stern motions. Summing up the discussion period, Mr. Lenes commented that we must "sell to the USA infrastructure" and change the prevailing "car culture" mentality.

Jack Westwood-Booth's goal was to cover US Coast Guard (USCG) initiatives for safety of high speed craft and partnership with industry to facilitate the construction of US-built vessels. He noted that the International Maritime Organization (IMO), which adopted the Dynamically Supported Craft (DSC) Code in 1977, recognized the need to revise it, and in 1995 published the High Speed Craft (HSC) Code. The USCG actively helped develop this Code and moved to incorporate it into USA regulations. The USCG wants to bring USA design standards in line with international standards. He concluded that by taking a pro-active approach to safety now, the USCG, in partnership with industry, can provide a strong foundation from which this small, but rapidly growing industry can continue to prosper.

Ralph Patterson, moderator of the afternoon session, led the discussion period. It was noted that SNAME SD-5 had worked with the USCG in reviewing sections of the new AMV code. It was noted that manning and training are definitely addressed in the new Code; it gives far more flexibility to the designer.

William Hockberger showed in his presentation *Choosing the Right Ferry* that one can follow a systematic process to determine if a particular ferry could be operated profitably in a particular set of circumstances. That process can be applied as many times as necessary to evaluate any number of candidate ferries or sets of circumstances. The process described applies to any type of ferry, not just AMVs. In fact, one reason for carrying out such an analysis is to determine what the ferry's performance should be.

The ultimate measure of candidate craft's suitability for a ferry is the profitability it will enable the ferry company to achieve. There are various technical and operational measures (ferry speed, capacity, total number of customers carried, etc.) that are very important, but they are mainly important as inputs to the determination of overall company profitability. The analysis process must be aimed at developing information as to the profitability implications of the many decisions and choices to be made.

A viable ferry operation must have many components besides the ferry itself: routes, terminals, support facilities and personnel, management and administration, customers of various kinds, efficient connections with the existing transportation system, agreements with area governments, etc. Each component must be chosen to be compatible with all the others — a "total system approach" to selection. Also, attaining the highest possible profitability depends on avoiding any constraints that are not absolutely necessary, to permit the widest range of choice among those components.

During the discussion period, an attendee asked if induced demand for ferry services had been considered in the model presented. Hockberger said, "not explicitly, but this is an important consideration. Once a ferry service is begun, it will provide transportation from an area that may previously have been too isolated for people to travel from easily, and it may then become attractive as a place to live or work." When asked if the process described had been reduced to spreadsheets and calculation procedures, to facilitate application to specific craft in specific situations, Hockberger said, "No, this should be done on a case basis for each specific project. My main objective is to lay out the process framework so that the analysts will be sure to include all of the relevant factors. Often some major parts of the problem are analyzed in detail, but whole pieces are left out, which compromises the results." An attendee said that computer programming is relatively cheap and that we should develop this program and make it available. He suggested that we should then test the program on historical examples. A comment was, "Ultimately, contracting and cash-flow realities drive any program." A participant noted that a successful technique of European ferry operators is to move their vessels around as markets vary.

Eugene Miller cited three examples of financing in his presentation:

- The M/V Kennicott is being built for the Alaska Marine Highway for $80 million, of which the Federal Highway Administration is providing US$64 million, ISTEA US$1 million, and "oil spill funds" US$15 million. The State of Alaska is also setting aside a US$6.6 million reserve fund.

- An Atlanta tourist submarine project raised US$7.35 million to buy a US$3 million sub plus other things. They used a first round of financing to raise US$400,000 to pay for arranging the second, main financing round.

- The third example was a Title XI case. One thing that was clear is that the fees involved are quite large, which is a deterrent to small operators.

Mr. Miller gave an example of a loan having an 8 or 15-year term but with the payments amortized on a 25-year term. This reduces the regular payments, which is a benefit to a company getting started, but it leaves a large balloon payment to be made at the end of the term. If the company is doing well at that point, it

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AMV WORKSHOP
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should have no difficulty getting the loan refinanced.

During the discussion of inhibiting factors, it was noted that the people, such as operators, one believes are most in need of information about fast ferries think there is nothing more they need to know. No ferry operators attended the workshop. The Transportation Research Board (TRB), of the National Research Council and National Academy of Sciences, is where much of the activity in transportation is centered in the USA. Ferry industry people go there to find out what is happening and see other people they need to know and work with. One major shortcoming, however, is that ferry people meet and talk primarily with other ferry people. A better way to spread the word about ferries might be for ferry people to attend non-ferry TRB sessions so as to be on hand when new transportation projects are being discussed that might include opportunities for ferry use.

ABS GUIDE
(Continued From Page 10)

According to ABS president Robert D Somerville, "High speed craft and related concepts are expected to have a significant effect on the marine industry as it advances into the next century. ABS has worked hard on developing its resources to enable the organization to be well positioned for evaluating and classing new designs and innovative concepts as they are presented."

The cost of the new Guide is US$100.00. Order on-line from the ABS web site at http://www.eagle.org, or by mail to ABS Book Order Section, Two World Trade Center 106th Floor, New York NY 10048, USA, or by fax to 212-839-5208, or by phone to 212-839-5016,

HYDROFOIL WATER SKI

by Tony Klarich

Sit down and get ready for the ride of your life. The Air Chair is expanding the limits of the possible on and above the water. In the six years since its introduction, the world's first flying ski has become an exciting contender in the world of water skiing. It's fun to ride, entertaining to watch, and is still new enough to be on the cutting edge.

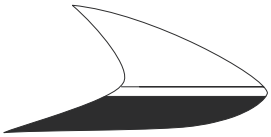
To get ready, take a minute to fasten together the aircraft-grade aluminum hydrofoil to the upper ski and seat tower. A seat belt and foot bindings with are two security features that keep the pilot affixed to the Air Chair for greater control and safety. New riders use a deep-V handle to help keep the ski straight during starts. When the boat first accelerates most of the resistance is on the board. As speed increases to about 14 mph, the underwater foil generates lift and becomes the main steering mechanism. The most common downfall for beginners is leaning back. That's okay for a water ski, but do it on an Air Chair and it will turn into a bucking bronco. The key to success is breaking forward at the waist to get the foil riding level through the water. While in this position beginners adjust their height above the water through controlled handle positioning. With arms straight to the front, raising them causes the board to go down, while lowering the arms them results in a rise.

Intermediate-to-advanced riders use body English rather than handle position to control altitude and direction. Higher boat speeds increase the control sensitivity, and big air can be grabbed with little effort. Quickly leaning back exposes the foil's surface to the water and generates tremendous lift. So much air is attainable with so little effort that the only limit is usually psychological.

Air Chair riders have discovered that the foil slashes through the water like a Ginsu knife, and long rides are less tiring than conventional skiing. Less drag also makes the Air Chair attractive for owners of personal water craft or boats with as little as 25 hp. Rough water is no problem because the ski glides smoothly above the turmoil below. When it's too choppy to enjoy anything else, you can still have a great time on the water. More good news is that you don't need a wake to make big air jumps. Lift is generated by a combination of speed and technique; it is not dependent on leg strength or wake size. Once a rider has acquired the skills, jumps and flips can be performed anywhere behind the boat. Even coming down from all that air has its benefits. The foil breaks the water first, decreases the shock, and makes for cushy landings.

For info, contact Bob Woolley, President, Air Chair; 2175 N. Kiowa Blvd. Suite 102; Lake Havasu City AZ 86403; phone: 520-505-2226; e-mail: airchair@ctaz.com. For a subscription to Tony Klarich's Air Chair newsletter *Flight*, contact him at: 31566 Railroad Canyon Rd. #101; Canyon Lake CA

The NEWSLETTER



International Hydrofoil Society

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Editor: Barney C. Black | **AUTUMN 1997** | Co-Editor: John R. Meyer

Window into the Legislature...

CALL FOR MAJOR DOT FERRY STUDY

By Joel A. Glass, Washington Editor
Marine Log June 1997

American ferry operators and domestic shipyards that build passenger and passenger/vehicle ferries could enjoy boom times if an interesting new piece of legislation filed by Rep. Robert Menendez (D-NJ) ever becomes law. The new proposal (H.R. 1630) from the legislator, who sits on the House Transportation and Infrastructure Committee, would establish the Ferry Intermodal Transportation Act, aimed at boosting and expanding ferry operations throughout the USA, as well as in all US possessions. The measure authorizes US$18 million per year for fiscal years 1998 through 2002 (taken from the Intermodal Surface Transportation Efficiency Act of 1991's Highway Trust Fund) for the Transportation Department to conduct a major study of USA ferry transportation.

The study results would go to the House Transportation and Infrastructure and Senate Commerce, Science and Transportation Committees. They would identify:

- **Existing ferry operations, including the locations and routes served**
- **Name, official number, and description of each vessel operated as a ferry**
- **Source and amount, if any, of funds derived from federal, state, or local government sources supporting ferry operations**
- **Impact of ferry transportation on local and regional economies.**

See Major Study, Page 12

IHS HOME PAGE

The URL for IHS's home page is: http://www.erols.com/foiler. If you are not a web surfer but are curious about the home page, IHS can provide you with a hard copy printout on request.

AMV WORKSHOP PROCEEDINGS

If you want a package containing a copy of each paper presented at the June 1997 AMV Workshop, please send a check, to cover printing, handling and mailing, for US$10.00 made out to the IHS at PO Box 51, Cabin John MD 20818 USA.

IHS E-MAIL ADDRESS

foiler@erols.com

INSIDE...

PRESIDENT'S COLUMN

[IHS President John Meyer graciously relinquished his space in this issue so that your Home Page Editor Barney C. Black could write about the IHS website.]

"The International Hydrofoil Society (IHS) is an all volunteer, not-for-profit organization of and for people who design, build, operate, or simply are interested in commercial, military, research, or recreational hydrofoils of any size. Your participation is encouraged and welcomed." This message greets visitors to the IHS home page.

By attracting correspondents from all over the world and drawing in many new members, the IHS website has broadened the make-up and character of the Society. Veteran IHS members who have not yet visited the website may have noticed some of the changes reflected in the scope of the articles and letters published in the newsletter. Hydrofoils are everywhere it seems, not just in the passenger ferry and military industries.

Hydrofoil sailors now participate strongly. Pioneering hydrofoil yachtsman David A. Keiper's book *Hydrofoil Voyager* is reviewed on page 16 of this issue. Dr. Sam Bradfield's hydrofoil sailboat due to be produced in early 1998 was pictured in the Summer newsletter.

New historical interests have been brought to our door. Alexander McClair's son Douglas proposes to restore the *PLAINVIEW* (his proposal is detailed in the Letters section of this issue). Rick Jackson owns a Volga 70 hydrofoil. Frank Eichstadt is considering buying Richard Nixon's Volga 270 hydrofoil and restoring it. And of course, Eliot James and B. J. Meinhof have bought *ex-PHM 5* for restoration.

Hydrofoil inventors, hobbyists, students, and experimenters are active all over the world. Mike Stevenson's efforts are highlighted in this issue. We regularly receive email from students seeking advice on projects, and various IHS members have been generous with their help

The IHS website consists of the main page at http://www.erols.com/foiler and several subpages:

- Posted Messages (Hydrofoil-Related Chat, Info Sharing, and Networking)
- Announcements (Hydrofoil-Related Current Events and Information)
- Purposes and Activities of the International Hydrofoil Society
- The People at IHS (the officers — names and email addresses)
- How to Join IHS and Why
- Glossary of Hydrofoil Terms
- Hydrofoil Basics - A Brief Tutorial
- Links to Other Interesting Web Sites
- Stories of the Hydrofoil Pioneers

The posted messages area contains email traffic, mostly questions asked and answers received, on a variety of hydrofoil-related subjects. Some of the messages — those of general interest and those that haven't gotten stale with the passage of time — are reprinted in the newsletter. In fact, the ratio of electronic messages to those that come in via the US Postal Service has gotten quite high... another effect of the website. Electronic mail has made IHS much more responsive and timely in its mission to disseminate knowledge to the public... a new benefit, delivered without an increase in the price of membership.

CLEOPATRA'S BARGE

Dr. Paul Johnston, Smithsonian Curator of Maritime History, addressed a joint meeting of IHS, the US Hovercraft Society, and the SNAME SD-5 Panel on October 2, 1997 at the Fort Myer Officer*s Club in Arlington VA. He related the saga of America's first ocean-going yacht, *CLEOPATRA'S BARGE*. Built in 1816 by George Crowninshield of Salem, with profits from privateering in the War of 1812, the 100-ft yacht was fast and lightly constructed in the pattern of a privateering predecessor. She employed an unconventional sail configuration and included every available mechanical innovation for steering, sail handling, and fluid systems. On one occasion she achieved 13 kt for a ten-hour run. Her interior arrangement and outfit were extraordinarily elegant, a notable affront to the frugal mariners of Massachusetts.

In 1817 the owner embarked on a bizarre six-month Mediterranean cruise. Thousands of "royalty" and *hoi polloi* were entertained. The Barge was shadowed by the French, who suspected a plan to rescue Napoleon from the island of St. Helena. The logs and diaries of this voyage could easily inspire a comic opera.

Crowninshield died on board his beloved Barge in 1817. The yacht was sold into commercial service. Following runs to Rio and Charleston, she was sold to Hawaii's King Kamahameha II, and she became the royal yacht and flagship of the Hawaiian fleet. In 1824 the Barge, now *HA'AHEO O HAWA'I* (*PRIDE OF HAWAII*),

WELCOME TO NEW MEMBERS

David A. Keiper heads up DAK Hydrofoils in Cape Girardeau, Missouri and is well known in the sailing community. His book Hydrofoil Voyager is reviewed on the back cover of this issue. For years IHS has received inquiries about how to locate David and how to buy his hydrofoil kits for catamarans. We are delighted to have him as a member and to announce that he is once again manufacturing his kits due to popular demand.

James Stewart is President of Motion Design Creations, in Hudson, Quebec, Canada. He and his colleagues have been working on a concept using "pivoting hydrofoils for planing craft." The concept involves blending the foils' efficiently-generated lift with hull lift on planing craft so that the two lift sources work together to reduce hull drag over the full range of the craft's speed.

Richard Flint, of West Richland WA, is enrolled in the Westlawn Yacht Design Course. Studies so far have concerned hydrodynamics, basic calculations for hull displacement, coefficients of form, stability, trim and balance, etc. Studies have also focused on manual drafting and drawing of the lines plans. He is interested in the use of hydrofoils, especially for private/ recreational uses.

James Leflar is from Conway, Arkansas, and is a student at Webster University in Little Rock, AR. He is interested in hydrofoils and wishes to learn more about them by joining the IHS.

Hydrofoil Pioneers...

THE RISE AND FALL OF MIAMI SHIPBUILDING

Part Two — The Fall

By Robert J. Johnston

The projects described in the previous newsletter kept Miami Shipbuilding Co.'s (MSC's) hydrofoil activities busy and successful from 1954 to 1958. Another interesting contract was for a clandestine hydrofoil craft that could be launched from a submarine's torpedo tube. The craft was to be so rigged that two men could assemble the hydrofoil rig in the water and proceed to shore for their operation. The craft was to be capable of being submerged and hidden underwater while the shoreside operation was underway. The two men then returned to the submerged craft and proceeded foilborne back to the submarine. MSC was assigned the craft and hydrofoil design, and the outboard marine industry got the task of coming up with a suitable outboard motor that could withstand the submerged period. This project became known at MSC as the "Cigar Boat." We built and successfully demonstrated the craft with Prof. John Gill as the project engineer. John, in a hunting accident as a boy, had lost one arm. John also insisted on being the test pilot for the trials, so the controls were cleverly designed for a one hand operation. MSC successfully completed their part of the craft, but the design of an outboard motor capable of withstanding and restarting after a submerged period was never developed.

So from 1954 to 1958 MSC was busily occupied with interesting and challenging hydrofoil projects. I was elected to the Board of Directors and while I was interested in all the work the yard was undertaking, most of my time and energy was focused on the hydrofoil projects. We continually worried about keeping a substantial workload in the summer time when the yachting fraternity was centered up north. So one of the Board's primary interests was to diversify. MSC had for a number of years built a cement block making machine that could be expanded (by adding components) from a one-man machine to an automated producer of blocks. A number of these machines were in operation including many in Cuba. MSC also made a plow that could turn Everglades swampland into producing fields for agriculture. This plow pulled by a tractor could plow up and pulverize the coral and spread it out so that planting could take place. So these products and others provided a non-seasonal work load for the yard. Of course our primary workload came from the repair and maintenance of yachts and small inter-island freighters. MSC had a particularly good reputation with the sailing fraternity. When the Southern Racing Circuit moved into Miami for the winter season, MSC was able to undertake the majority of the yard work required for these ocean racing yachts.

Recognizing that through the hydrofoil effort we had established a rather large and talented engineering organization, we were concerned about keeping an adequate workload to maintain this capability. We therefore decided to establish a subsidiary, Miami Engineering Corporation, to provide engineering services to the many small industries in the Miami area. To incorporate such an organization we had to have a licensed engineer as an officer of the corporation. So Ted Rose and I started studying to prepare ourselves to sit for the examination. We went to Jacksonville FL and sat for

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three days taking the tests. Fortunately we both passed. I was made the president of Miami Engineering Corp., and we were incorporated. This organization undertook some work for Eastern Airlines but did not interest many other Miami organizations to use our engineering skills. We did become a purchasing agent for a number of Latin American companies, using our skills (and discounts) to attract customers. Among other things, we learned how to design pumping systems for the transfer of molasses from shore to ships located some distance off Cuba.

Two hydrofoil projects of interest began to take place. The US Maritime Administration (MARAD), aware of the commercial interest in hydrofoils in Europe and the successes of the Navy's hydrofoil program, developed a growing interest in this promising type of waterborne transportation. MARAD's Coordinator of Research Charles R. Denison was an enthusiastic supporter of this concept of commercial transportation. He awarded Grumman Aircraft Engineering Corporation an extensive parametric study for the future use of commercial hydrofoils. Grumman had acquired half interest in Dynamic Developments, Inc., Bill Carl's company, who had been instrumental in encouraging the parametric study. When Bick Moorman and I went to see Mr. Denison, he informed us that in order to accomplish what he wanted to do he had to have a stronger company as his advocate than MSC. We essentially did not have enough political punch or financial support for his planned efforts. The purpose of this parametric study was to determine the type of hydrofoil craft best suited for future express cargo and passenger applications. This led to the design of *DENISON*, an 80 ton experimental craft with a speed of 60 knots. MARAD had budgeted US$7.5 million for the design, construction, and test of this craft. Before the contract could be awarded, Charlie Denison died. With his demise, the planned funds became US$l.5 million. Bill Carl agreed to take the contract at Dynamic Developments at this price with Grumman's backing. Bill was convinced that he could get other companies to contribute their expertise and products to get aboard this new transportation concept. Bill was successful at this but he risked everything he owned to get Grumman's backing.

MSC watched these procedures with interest and tried to get into the action. We could not undertake such effort without being fully paid. We even contacted Supramar of Switzerland to become a US builder of their designs. They sent Senior Carlo Rodriquez to Miami, who was Supramar's primary licensee at Rodriquez's Shipyard in Messina, Italy, to negotiate an arrangement whereby MSC could offer a design to MARAD. We were never able to make Rodriquez understand the cost and time it took to get a commercial design approved by the US Coast Guard. Also, Supramar wanted a guarantee that we would build a minimum of five hydrofoils if we were granted a license. So MSC was forced to watch from the sidelines as the MARAD program developed.

The other hydrofoil program that was developing was the US Navy's plan to build a hydrofoil craft suitable for anti-submarine warfare. In late 1957 the Bureau of Ships (BUSHIPS) Preliminary Design Branch began the study of a design that would ultimately become the PCH. MSC provided consultation to this group as the design advanced. We were convinced that project was just right for MSC, and that was where our future lay.

At about this same time several unfortunate mishaps in the yard took place. We underbid and overran a contract to overhaul an Air Force rescue boat and at the same time ran into cost difficulties on a major project to modernize a State of Georgia boat. During this same period, while launching the schooner *NORTHERN LIGHTS*, number 4 railway ran off the track. These events put MSC in a critical financial bind. The Navy, who followed our financial status closely with their frequent auditing of our contracts, became concerned about our ability to perform the work that we had under contract. MSC was informed that in order to undertake future Navy work we would need a change of management. Particularly in jeopardy was our chance to compete for the PCH. This led to a lengthy and emotional Board Meeting in which the situation was discussed from many angles. The outcome was that Ted Buhler would step aside as president with me as his replacement. Paul Buhler would resign as Treasurer, and a Navy accountant would be brought on board as his replacement. Bick Moorman was made a Vice-President to work closely with the Navy to assure them we were taking all steps to be qualified to undertake the PCH.

Now my perspective of MSC took on added responsibilities. I learned what it meant to meet a weekly payroll. In reviewing our financial position, I found out that if all our accounts receivable were current we really would not have a financial problem. Customers such as Arthur Vining Davis, probably the richest man in Dade County, was a good customer buying some of the machinery we produced as well as maintaining his yacht. When he was approached about getting his account current he replied, "I am current; my debts are paid on a l20-day basis." When I informed him that all of our suppliers expected to be paid on a 30-day basis, Mr. Davis comment was, "If you can't accept my terms, I'll have to go elsewhere." I was also surprised at the number of wealthy yacht owners that owed us considerable amounts of overdue monies. In discuss-

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ing this with northern shipyard owners, I found out that there were a number of wealthy yacht owners who were using the shipyards to finance their yachting. Working on these accounts became one of the new President's primary responsibilities. Some progress was made in this effort, enough so that Bick Moorman could report to us that we would be able to be a bidder on the forthcoming PCH program. In late 1959 the bid package was received at MSC. Based on a set of contract plans and defined government supplied items, the contractor was to quote on preparing the detail design and building and testing the hydrofoil. Rumors were running in the industry that a buy-in bid was to be expected, such as Grumman had done on the *DENISON* program. With this knowledge I requested a meeting with Admiral James, Chief of BUSHIPS. I had known the Admiral since his days on the Carrier conversion program. He was quite cordial, and when asked about the buy-in rumor, he said that only responsive bids would be acceptable to the Navy. A responsive bid would be one that, based on Navy estimates, could be built for the bid price. With this, MSC went to work on a bid. Considerable time and money was devoted to this task, as winning the PCH contract was the future of MSC. Bids were submitted in early 1960. MSC's bid was US$4.1M.

We were excited when we received a telegram saying to gather our material and come to Washington DC to negotiate on a contract for the PCH program. While we were getting ready to enter into negotiations, a second telegram arrived saying that MSC was no longer in the running for a contract and not to come to Washington. I immediately went to Washington to visit again Admiral James. When I met with the Admiral, he

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THE INTERFLIGHT

HYDROFLIER TAKES OFF

By Mike Stevenson

We knew we had to do something about all the "personal watercraft" taking over the peaceful harbors of the world. You know how irritating the little dirt-bikes-of-the-sea can be: noisy, smelly, loud, far too popular. At least that's the way we felt when we set out to build a quiet alternative, the *INTERFLIGHT HYDROFLIER* (see photos above and on page 7). This was to be a zero-emissions craft (i.e., electric), so we wanted a low-drag hydrofoil. From experience we knew that a hydrofoil is no fun when it's down in the water. Since most harbors have a lot of 5-knot zones, the boat should be able to fly at just under 5 knots. An electric-powered hydrofoil had to be efficient, and it had to be fun despite low power. This meant being able to stunt around in it like an airplane (which is what a hydrofoil feels like). The *HYDROFLIER* would need true 3-axis controls with an airplane cockpit feel, i.e. stick and rudder-pedals.

But first some historical background: Twenty years before, we designed and built the *SPORTFOIL* as a goof-off project to explore sailing hydrofoil possibilities. We found that tacking on the foils was just not quite possible with the limited rig we had, but that light hydrofoils were indeed fun. Having a small outboard motor close at hand, and more time on our hands than was safe, the *SPORTFOIL* quickly came into being.

***SPORTFOIL* — Build-It-Yourself Plans Available From the Author**

When we began to design the *HYDROFLIER,* however, we needed something new for three reasons: The very light wing-loading *SPORTFOIL* was barely able to make it on 4 hp.; we would have more drag with the control surfaces needed for 3-axis stuntability; and we had to stick with a low- power drive.

We came up with an assisted-lift hydrofoil. By having a buoyant underwater section lifting part of the load, the wings don't have to work as hard. We did this by putting a torpedo-like keel with a

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also invited the BUSHIPS officer in charge of procurement to attend the meeting. Admiral James repeated what he had told me in the earlier meeting. Considering our price to be responsive, we had been invited to negotiate. Then procurement informed him that since there were lower bids, these bidders had to state that they could not build the PCH for the price submitted in order for their bids to be declared non-responsive. Boeing was the low bidder at US$2.1M. Though MSC knew — and thought the Navy knew — that the material requirements could not be met for US$2.1M, Boeing said that they could build the PCH for the quoted price. And so in June l960, Boeing was awarded a contract for US$2.08 million to build the PCH.

This was a terrible blow to MSC. Our future in the hydrofoil world looked most discouraging. With the approval of the Board and the major stock holders, we undertook to sell MSC to a major company. Our initial contacts brought several responses of interest, among them Chris Craft, Loral Electronics, Grumman, and AVCO. Although Loral put a representative in the plant for several weeks, only Grumman and AVCO showed true interest.

Grumman saw the advantage of a shipyard building *DENISON* and considered moving all their hydrofoil personnel and assets to Miami as their hydrofoil facility. However the facts that MSC was a unique shop, that Grumman was the only major aircraft manufacturer that was non-union, and that part of the property was leasehold stopped their interest.

AVCO was looking for help and a place to build the LVHX. There was serious discussion within the Lycoming Division as to how to handle the forthcoming contract for that effort. The Vice-President for Engineering urged buying MSC to get the experience of MSC's technical staff. Lycoming's Chief Engineer took the position that they had learned enough as prime contractor on the Flying DUKW program that they could go it alone. After very serious discussions, a proposition was worked out for the purchase of MSC to be presented to the AVCO Board. At the Board meeting to take up this issue, it was brought out that just a year earlier, AVCO had sold a shipyard they owned in New Jersey. At that time they had convinced their stockholders that it was a smart move to get out of shipbuilding. On this basis they turned down the purchase of MSC.

These decisions led to the last Board meeting of MSC that I would attend. It was held at Kenilworth Hotel on Miami Beach. The Kenilworth was a hotel owned by Leo DeOrsay, who was a stockholder of MSC, and Arthur Godfrey, for whom Leo DeOrsay was a financial administrator. MSC had benefited from this arrangement from time to time. At this meeting I announced that MSC could no longer compete in the hydrofoil world, and that I was resigning as president of MSC effective July 31, 1960.

Knowing the condition of MSC, Grumman had been after me for some time to join them. I received calls from others, but only considered joining Grumman. I was also greatly concerned about the personnel of MSC, many of whom I had convinced of MSC's future to get them to join. I talked with Grumman representatives and Bill Carl regarding the talents of MSC's technical staff. With full agreement all technical personnel of MSC were offered jobs at Dynamic Development to work on the *DENISON* contract. So when I went to Long Island NY, most of the technical staff went with me. Most of those who went North had learned to like Florida living too much to stay. But I stayed with Grumman until I retired along with Rod Rose and Ray Wright who became leading engineers in automatic control systems and hydrodynamics. We arrived at Dynamic Developments on August 1, 1960. Our first efforts were to convince Bill Carl to add an automatic stability system to the *DENISON* surface piercing foils. On 30 August 1960 I took off for Italy as the program manager for a joint venture of Grumman and Rodriquez to produce an Italian Navy Hydrofoil. And so one career ended, and another began.

[IHS member Jean Buhler is putting together the entire history of MSC. Anyone who, like Bob Johnston, is able to contribute information of this effort is encouraged to contact IHS. -Ed.]

RUSSIA'S OLYMPIA

By Konstantin Matveev

I would like to tell about new Russian hydrofoils. Such ships as *RAKETA, METEOR,* and *KOMETA* have merited world recognition. Some hundreds of them were built, but during the last decade, a new generation of hydrofoils has been created in Russia. High durability, low cost, excellent navigability, and comfort are the real features of modern Russian hydrofoils. I participated in testing of *OLYMPIA,* a commercial hydrofoil designed to transport passengers on cruises of up to eight hours. Areas of operation are seas and large lakes. Range of travel from home port is 50 miles in open sea or 100 miles in a closed sea. The main features of *OLYMPIA*:

Profile length, 42.5 m
Profile width, 14 m
Hull width, 8.3 m
Profile draught, 4.6 m
Displacement, 138 tons
Diesel engines (2), MTU 16V306TB84
Power of engines, 1905 kW each
Cruising speed, 37 knots
Max. Range, 300 n. miles
Max. Passenger capacity 250

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OLYMPIA
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Passengers are accommodated in bow, middle, and stern salons. The machinery spaces are located between the middle and stern salons. Above are service sections. A bar is in the stern salon. A deck-cabin is located between the bow and middle salons.

The hull, of welded construction, is made of 1561 aluminum alloy. The foil system consists of bow and stern main foils with auxiliary foils above the bow and the mid foils to assist take-off. The entire foil system is of welded construction. A titanium alloy is used for the bow foil; the stern foil is stainless steel; and the stabilizer and mid foils are an aluminum alloy. Rudders are installed on the struts of both the bow and stern foils.

The two main diesel engines d rive through flexible joints, reduction gears, and inclined shafts to variable pitch propellers. Diesel auxiliary power-plants drive AC generators at 43.2 kW each and cooling compressors at 24.3 kW each. An air conditioning system provides ventilation and maintains a constant, comfortable temperature in the passenger salons, service sections, and deck-cabin.

The ship is equipped with an automatic motion control system that enables the ship to keep to a given course and alleviates pitch and roll motions in rough water. The system consists of a central gyroscope, accelerometer sensing elements, and auxiliary foil elements.

The *OLYMPIA* project was developed by the Central Hydrofoil Design Bureau (Nizhniy Novgorod), while production was accomplished by Morye Feodosia Shipbuilding. The first ship was built in 1993. Service was implemented in Europe from the Black Sea to

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HYDROFLIER
(Continued From Page 5)

controllable buoyancy chamber that we could fill or blow like a submarine. Variable buoyancy in the submerged section allowed for differing pilot weights and in-flight trim corrections. An added benefit of being able to house the batteries in the torpedo section, where they wouldn't weigh down the foils as much, would be good for the electric version.

We used a 5hp Honda 4-stroke outboard at first, to work the kinks out. This engine was clean running, even on gas. We reasoned that if the electric power idea didn't work, a low-emissions version running on CNG or propane would still be a vast improvement over the conventional two-strokes.

We made a 1/3-scale model with a small electric motor to test the assisted-lift idea a bit before going to full-size. The model was encouraging, eventually able to do foilborne figure-eights in a pool. One thing we needed to answer was the small instability problem of lifting a weight out of the water with a single buoyancy source: sort of like standing on a beach ball in the pool.

Our contradictory-sounding ideas came together in the first *HYDROFLIER.* It would go 10-12 knots (remember: 5hp), and was really maneuverable. It could get up on foils in less than two boat-lengths and could stay foilborne at 4+ knots. The controls took getting used to, but people seemed to be able to fly pretty well. You could solo right away, but the learning curve was just steep enough to keep it fun.

We tried to get some companies interested in it, but their response after seeing the videotape was: "Why is it so slow?" This was irritating because we were *trying* to make it slow. It's easy to make a fast hydrofoil, but we made one that could go slowly as well. They didn't understand and didn't want to get involved. Interestingly, we recently heard that a personal watercraft company in southern California is working on an assisted-lift hydrofoil.

We shelved the *HYDROFLIER* project, but recently revived it to continue development with the help of students. The next model will have improved foil sections, a more laminar-flow type torpedo, and possibly a variable-pitch propeller. The new model will also begin exploring electric power options. These machines will offer students a lot of fun and education! Hopefully this partnership will eventually lead to the building of a larger, twin-hulled four-seat version, which is waiting in the wings; we'll see what the future holds.

HYDROFLIER is not yet available, but plans for building your own *SPORTFOIL* cost US$15 from Back Yard Yacht Club; PO Box K; Del Mar CA 92014; phone 619-481-3111; email: mail@steveproj.com; website: www.steveproj.com/BYYCHome.html.The *SPORTFOIL* is 12 ft. LOA, beam: 6'-10" w/foils, 4'hull only, wt. = 150 lbs +engine (5 to 15 hp outboard).

LETTERS TO THE EDITOR

Stunning PHM Update

In a deal made with the company that purchased the other five PHMs for scrapping we have traded the *ex-HERCULES* (PHM-2*)* for the *ex-ARIES* (PHM-5), the only PHM that still had the foils attached. We oufitted this ship with original MTU diesels for hullborne ferry back to Missouri. The engine installation is complete; so are the hydraulic system and electrical system (consisting of one 60-cycle genset and one 400 cycle genset). We have a new PLC controller that lets us retain the original helm, and electro-hydraulic actuators that operated the steering and thrust reversers as well as monitor the power train. Our shakedown cruise was on the Cooper River in Charleston SC.

We finally made it to Missouri. Got some great pictures of our ship under the St.Louis Arch. There was an opening on the waterfront, and we just pulled in like we owned the joint. The trip took about 45 days and covered over 2,100 miles. The ship preformed excellently. Our only mechanical problems were with the 60 cyle genset and our launch. The foils do hinder us in docking, so we spent most nights anchored. The reception we received was exactly the same from SC to MO, amazment! If we were paid one dollar for every picture taken, we could have bought a brand new LM2500 for cash! Everyone we met asked, "What is it? " and "What are you going to do with it? " Initially we answered in great detail; conversations about restoration and preservation were carried out with boats putting alongside, and everyone yelling to one another. Eventually that got tiresome, and the answers got shorter! no matter where we were we had company, it became quite comical to see boaters running along side with the resident expert explaining the operation of the foils always using his arms in the same sweeping motions. When we did dock for fuel and supplies we were always treated as royalty; dredges gave way to us, and lockmasters gave us the lock to ourselves. The foils made the lockage tricky but we never had a problem.

We had to change the name of the *ex-ARIES,* so we dubbed her *PEGASUS.* The original is gone now for good. It may be a while before we acquire the necessary funds and parts (GE LM2500s aren't plentiful or cheap), but it is our full intention to fly the ship.

Eliot James
Custom Composites Company
RR 2 Box 192
Salisbury MO 65281-9664
816-777-3300 voice; 816-777-3302 fax
esjames@cvalley.net

[Hydrofoilers can keep up with and participate in the on-going technical discussions about this craft; see the Postings section of the IHS website -Ed.]

Need Sailing Rig

A friend and I are building a surface sensing, 2-man sailing hydrofoil. We have been working on it for two years. It tows good (behind my power boat) but we haven't successfully sailed it yet. It requires 25 kg of force to get it over the hull/foil hump and then drops off to 16 kg. The speed at which it goes over the hump is about 8 MPH. We are having trouble getting a sufficiently powerful rig, are looking at about a 10 sq metre rig unstayed! Any suggestions?

Michael Robert Coote
109a Richardson Rd.
Mt Albert Auckland, New Zealand
Ph/Fax 09 815 3365
live@livewire.co.nz

[You might want to invest US$12.00 ($4.00 each) in the Amateur Yacht Research Society's (AYRS's) publications #90 Hydrofoil Options, #97 Sail Rigs and Hydrofoils, and #101 Windmills and Hydrofoils, These are is available in the USA from Multihull Books, 421 Hancock St., North Quincy MA 02171, and there are other sources. You will find a link to the AYRS home page from the IHS website. Also, check out Hydrofoil Voyager*, reviewed in this issue -Ed.]*

Ski Foil Questions

I own a ski boat that I want to fit with foils. My specs: Direct drive prop, mid engine mount, 20 foot length, 90 inch beam, 2,500 lbs., 44mph top speed, 280 horsepower, and hull style is deep V bow to 10 degree V back to transom. I am desperately trying to modify the shape of the wake with a single trim plate of various sizes and shapes using hydraulics to adjust the angle. But all I really achieve is pushing down the bow and creating harder wakes from all the extra hull in the water. I discovered by mounting the plate on 4" struts below the hull surface I am getting a more suitable wake. I don't really want to raise my hull completely out of the water, but if I could get my stern from 8 " below waterline to a couple inches below waterline I think I might accomplish my goals. Also I do have a mounting location for a forward foil if recommended. I am a metal fabricator and welder so I am able to fabricate the foils. Could you please help me with the specs. on the foil such as the surface area needed and what the cross section of a foil should be shaped like? Currently the flat plate is 39 " x 11 ".

Dean Yaeger
dayaeger@aol.com

Ride Control For Cat

I am a naval architecture student at the Technical University of Berlin, Germany. I am working with an engineer in

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LETTERS TO THE EDITOR
(Continued From Previous Page)

Australia, far away from all my smart books. We have a problem designing a hydrofoil assisted catamaran ferry. We would be interested to gain wisdom on standard profiles selected, design procedures, and cavitation and performance prediction. It would be very helpful, if you could name some websites or other sources dealing with these problems.

Sebastian Bade
bade@cadlab.tu-berlin.de

Save *PLAINVIEW*

I enter this post to generate interest and start a discussion on the feasibility of something near and dear to me. My life has been greatly molded by the events that many of you gather to discuss and review — the creation and improvement of the hydrofoil. I have never been directly involved in your field, but my father has. Many of you know him, Alexander M. McClair. In recent discussions, we were reflecting on the hydrofoil program, the pioneering spirit of thepeople involved, and the tight bonds that were formed among the teams that created the AGEH, PCH and PHM. I often take great pride when I see commercial hydrofoils in use (not that Alec was the father of the hydrofoil); our family lived a lot of years revolving around the boats and the shipyards that made them. We were all present at the launches of these ships mentioned. It was long ago. Since then the use of these ships has grown. As it continues to grow, there is an element missing from the early days of progress: a living example of early hydrofoil design and manufacture. This has been the topic of many conversations between me and my father (as well as many of you). Which has prompted me to begin a journey. A journey to look into the feasibility and logistics of resurrecting a ship, the AGEH *PLAINVIEW*. I have an interest in this to retrieve the AGEH, and restore it to operational status. The purpose is to preserve an early version of today's accomplishments. Those of you involved in the early days of hydrofoil development are keenly aware of the pioneering spirit of your peers. I feel that it is worth saving in the form of a demonstrable vessel, one that stood apart in its day. The AGEH was the fastest ship in its class, and the world's largest aluminum hull vessel in its day. Now it sits on a beach (I think in Goose Bay, Oregon). A number of people and associations have gotten together to restore other vessels in different categories; I would like to do this for a vessel that helped to develop an industry. Its use would be as a floating/traveling museum. I am interested in your responses. Please contact me at my email address below *[or by regular mail c/o IHS -Ed.]*. For those of you that think this is futile, please respond as well.

Douglas M. McClair
dmcclair@mcclair.com

Response...

I believe the *PLAINVIEW* is beyond restoration as an operational hydrofoil for the following reasons:

- The *PLAINVIEW* hull is owned by a church group, and the ship is now moored in the Columbia River east of Astoria. I do not know the intent of the church, but I suspect the hull could be had for a price. The cost of moving it and mooring it at some location will also add to the cost.

- The US Navy scrapped *PLAINVIEW* with all the major equipment removed, including the struts, diesels, gas turbines, outdrives, and Automatic Control System (ACS) electronics. After storing the main struts on the Hydrofoil Special Trials Unit (HYSTU) barge for a period of time, when HYSTU was preparing to close, the gear boxes were removed from the struts, and the struts were scrapped. The gear boxes were below decks of the barge when the barge was turned over to the Acoustic Range on Fox Island. I do not know where the gear boxes are today. I also don't know what happened to the struts. The tail strut was to go for fatigue testing at Carderock, but I don't know if any funds were made available to do so. The tail strut was of interest because of the HY130 steel construction.

- The HUDAP (Hydrofoil Universal Digital Autopilot) sat on the barge in storage without preservation. I believe that when the barge was cleaned of HYSTU parts, the HUDAP was sent to scrap. We have used a IBM PC with D to A (Digital to Analog) and A to D converters to provide flight control on the *HIGH POINT* as a feasibility demonstration. With considerable amount of programming, *PLAINVIEW* could possibly have a couple of PCs configured to provide the ACS function.

4) The retraction actuators were left on the ship. I do not know if they are still there. I also do not know the final results of the incidence control actuators. To replace these actuators alone would be cost prohibitive.

As an alternative, Ron Fraser, the owner of *HIGH POINT*, is working to get the ship operational hullborne. It could be made operational foilborne with restoration work and gas turbines. The gas turbines and diesels were removed when the ship was sold for scrap, but the gearboxes are still intact as well as all the foils and struts. Most of the work done by Ron so far is to remove unwanted equipment such as the test instrumentation and installing generators and head equipment. I am sure Ron would accept any help in getting his ship restored.

Regards to your dad. We had quite a time together when he worked for Lockheed Shipbuilding and Construction Co. and I worked for Supervisor of Shipbuilding, Construction, and Repair, Seattle on the *PLAINVIEW* project.

Sumi Arima
arimas1@juno.com

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LETTERS TO THE EDITOR
(Continued From Previous Page)

Needs Exercise

Is it possible to build a one-man hydrofoil, powered by muscle (pedal) and, if yes, where can I get plans?

Ingo Fengels
fengels@datacomm.ch

[See the TRAMPOFOIL® Human Powered Hydrofoil at their web site, http://www.trampofoil.se*. -Ed.]*

Safety Rules

I read in the Summer '97 issue of the IHS Newsletter about the American Bureau of Shipping (ABS) rules for high speed craft and will order a set. Do you know if there is a set of US Coast Guard rules for safety?

Stan Siegel
stansiegel@aol.com

[The U S Coast Guard publishes a multi-volume "Marine Safety Manual" that can be downloaded from their website:
http://www.dot.gov/dotinfo/uscg/ welcome.html*. The USCG (and IHS) participated actively in reviewing the International Maritime Organization*'s (IMO's) safety standards for high speed craft, published as Chapter X of the International Convention for the Safety of Life at Sea (SOLAS), available from various booksellers. See the IMO home page http://www.imo.org *for more info. -Ed.]*

Build Your Own

I am trying to find plans to build a hydrofoil (engine powered). More efficient means of transportation for Southeast Alaska are desperately needed. I do have an existing hull to experiment with. There is a lot of mystery around this kind of project; no one seems to know the basics. Is there a formula for weight to power to drag ratio? I don't know if I'm asking the right question. A basic foil design would be nice... I could fabricate it if I had plans and dimensions.

Cary Taylor
617 St. Anns
Douglas AK 99824
CTaylor169@aol.com

Response...

Our experience with home-built hydrofoils has led us to conclude that low wing loading is VERY preferable. Most builders go for low drag, which means small foils, which leads to high loads. I took a look at the DAK site, http://www.igateway.net/~dakh, and it does have some good looking foils. Another site you should look at is ours! We have a set of plans for building a small powered hydrofoil. At any rate, you should look at different approaches to narrow down what you want to build. Our *SPORTFOIL* plans are viewable at: http://www.stevproj.com/SpecPurp.html. Our latest hydrofoil project is at: http://www.stevproj.com/XBoats.html. Building a pretty good sport hydrofoil is not really magic. You should be able to have a lot of fun, but don't let the preponderance of technicalities weigh your project down.

Mike Stevenson
mailback@stevproj.com

Response...

Most people who call/Email me are enthusiasts or would-be designers / builders; that is they want to build a hydrofoil, not buy one. When asked the cost, I say that conversion of a 24ft outdrive-powered craft such as *TALARIA III* would be about US$20,000. Not expensive, in boating terms, but beyond the casual hobbyist's budget. The callers are usually deterred when they find out it requires an autopilot. If so, I suggest the Hobie Trifoiler mechanical submerged foil concept or the Russian and Florida model boat hydrofoil surface piercing design concepts as approaches to consider. The questions are usually about the hydrofoils, an area where I have little knowledge, my background is better in the fields of automatic control, hydraulics, analog electronics and software. I have had a few visitors stop by to see the boat. If mutually convenient, I can take them for a ride (the boat is kept on a trailer). I am pleased to talk with anyone whom I can help. Re: sale of kits/ conversions, the market interest has not so far been sufficient, i.e. no one has expressed an interest in buying a kit. No one has asked about buying the boat either.

Harry Larsen
hlarsen0@gte.net
http://home1.gte.net/hlarsen0

Adding Foils

I want to obtain any drawings or pictures that might aid me in the design and installation of hydrofoils on my Victor Model Products "Wildcat" Radio Controlled Catamaran. Any suggestions as to which type of foil (ladder or single) to use would be greatly appreciated.

Tracy L. St. Phillips
Laser 13021@aol.com

Boeing 929 *JETFOIL*

Anyone curious about the operation of the Boeing 929 *JETFOIL* feel free to respond. I operated the first boats in Hawaii and then moved to Seattle working with Boeing Marine Systems as captain in their test group.

The Letters To the Editor section allows hydrofoilers to ask for or provide information, to exchange ideas, and to inform the readership of interesting developments. Much additional correspondence is published in the Postings section of the IHS web site. All are invited to participate. Opinions expressed are those of the authors, not of IHS

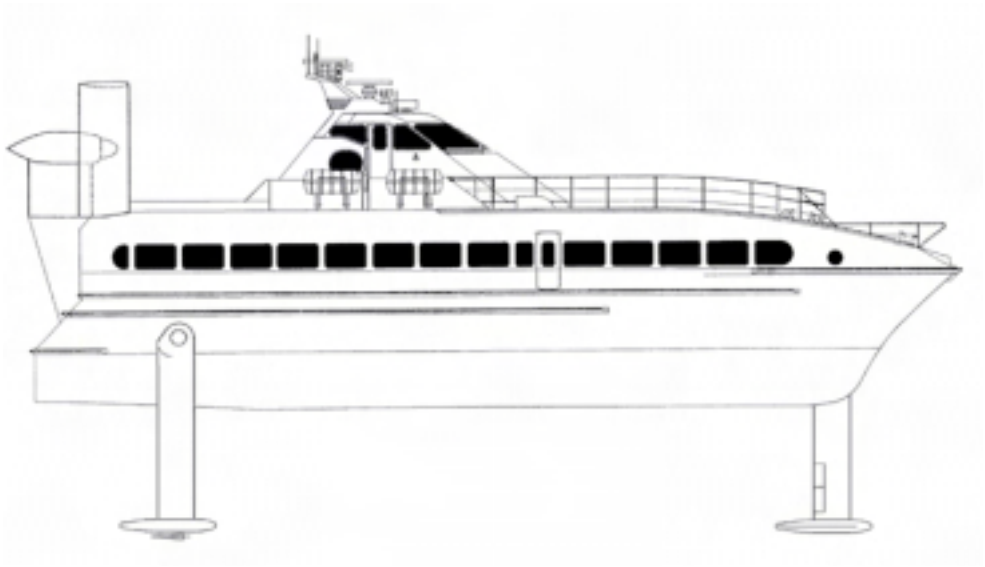
DEVELOPMENT OF A HULL FORM

Navatek Ships, Ltd., founded in 1987, is pioneering the research, development, and engineering of a variety of hull technologies, including SWATH (Small Waterplane Area Twin Hull), SLICE (a fast SWATH hull variant incorporating four underwater pods) and MIDFOIL (a SLICE hull derivative employing an underwater foil instead of pods). In conjunction with its MIDFOIL R&D program, Navatek Ships studied a variety of foil hull variants, including advanced hydrofoil and *FOILCAT* technologies. In 1996, Navatek's parent company Pacific Marine acquired intellectual property rights to the *WESTFOIL* and Westamarin *FOILCAT 2900* technologies, together with demonstration craft. Navatek is currently modifying and refining those technologies to produce a new hydrofoil called *NAVAFOIL*.

The *WESTFOIL* fully-submerged hydrofoil design was pioneered by Westfoil International of the USA. Construction began on the 25-meter *WESTFOIL* prototype in 1987, with sea trials taking place in 1991. Pacific Marine acquired the prototype in 1997. The *NAVAFOIL* design will adapt from the *WESTFOIL* its foil construction technology, flap actuation via electric servo motors, air propeller propulsion system, and air/water propulsion gear boxes.

The *FOILCAT 2900* was developed by Westamarin West a.s, a Norwegian company specializing in high-speed hydrofoils and catamarans. The *FOILCAT 2900* is a hydrofoil-assisted catamaran combining the best properties of the slender hull catamaran with the speed capability of hydrofoil craft fitted with fully submerged foils. It entered service in 1992 between Norway and Denmark and subsequently ran in commercial service in Indonesia before Pacific Marine acquired it in 1997. The *NAVAFOIL* design will incorporate from the *FOILCAT 2900* its catamaran hull form, flight control instrumentation, low-flying concept, and Z drive propulsion.

FOILCAT 2900

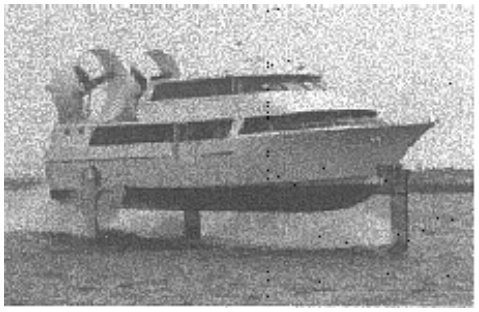


Navatek's *NAVAFOIL* Due To Begin Construction in 1998

According to Michael Schmicker, Navatek's VP of Business Development, "The *NAVAFOIL* design will also feature refinements and enhancements developed by our in-house engineering staff. These include improved microprocessor technology, electronic performance, air propeller technology and composite and other materials, and advanced servo motors." Finally, the *NAVAFOIL* adapts the foil arrangement and ride control system pioneered in the Boeing *JETFOIL*.

Two different designs of the *NAVAFOIL* are being developed for the market, including a passenger ferry (Mark I), and a sightseeing/tour boat (Mark II). Construction of the first *NAVAFOIL* craft is scheduled to begin in the first quarter of calendar 1998. The completed craft will be put into commercial service while it also serves as a demonstrator for potential customers and as a test bed for further design refinements.

[For more info on NAVAFOIL*, contact Michael Schmicker, Vice President of Business Development; Navatek Ships; 841 Bishop St., Suite 1880; Honolulu HI 96813 USA; phone:*



WESTFOIL

IHS 25th Anniversary Celebration/Conference Proceedings

To order a copy of the *Proceedings* containing a complete collection of papers presented, send US$18.50 for shipment within the US or $25 for international shipment to George Jenkins, Treasurer; 713 S. Overlook Drive; Alexandria VA 22305 USA.

MAJOR STUDY
(Continued From Page 1)

The study also must identify potential domestic ferry routes in the US and possessions, and develop information on them, including location that might be served and estimates of capacity required, capital costs of development, annual operating costs, local and regional economic impact, and potential for the use of high-speed ferry services.

Once the report has been sent to Capitol Hill, the Transportation Department must arrange meetings with the chief planners for each metro area where a ferry service is operated, or for where a potential route has been identified to discuss the results of the study and the availability of federal and state resources for providing ferry services.

The Menendez Bill also authorizes US$7 million a year for Fiscal Years 1998-2002 for a new Title XI program. It would authorize the Secretary of Transportation to guarantee, or make a commitment to guarantee, the payment of the principal of, and the interest on an obligation for ferry operations in the transportation of passengers or passengers and vehicles in the USA and its possessions. Although these guarantees and commitments would be subject to all laws, requirements, and procedures applicable under Title XI, a formal Rule would have to be promulgated by the Transportation Department to provide ferry operators with "a simplified application and compliance process for guarantees and commitments made under this [Bill]."

If the legislation is passed as written, it would bind Congress to the following findings:

- Today's ferries are a critical transportation component in many communities, providing vital transportation services for passengers, automobiles, buses, and trucks in locations where practical alternatives are insufficient or do not exist. Ferries provide alternatives to other transport modes that are facing severe capacity constraints.

- Ferries do not require the construction of costly infrastructure such as roads, bridges, or tunnels, thereby reducing environmental impacts, capital investment, and the time required to begin operation.

- Ferries reduce single-occupancy vehicle traffic, thereby reducing traffic congestion, air pollution, and energy use. Ferries are flexible because vessels and some loading facilities may be shifted to new locations to respond to changes in demand or in times of national emergency.

- Joint efforts by private operators and local governments already have resulted in innovative and successful ferry operations in many urban areas.

The Department of Transportation strategic plan for the National Transportation System (NTS) urges emphasis on those modes of transportation that promote those interests of critical importance to our country, including clean air, reducing energy consumption and safe, comfortable, and cost-effective transportation goals that ferry transportation embodies. Ferry transportation is an important and unique component of the NTS which should be encouraged and supported in those communities for which it is applicable.

[H.R. 1630 was introduced on May 15, 1997. It has been referred to the House Committee on Transportation and Infrastructure where it is under review by the Subcommittee on Surface Transportation and the Subcommittee on Coast Guard and Maritime Transportation. To research the status, contents, sponsors, and other information on this or other bills before the US Congress, go to website http://thomas/.loc.gov*, a service of the US Library of Congress. -Ed.]*

OLYMPIA
(Continued From Page 7)

the Baltic Sea. Currently two such ships, *LAURA* and *JAANIKA* are operated on the Helsinki, Finland - Tallinn, Estonia route by Tallink Express.

During *OLYMPIA*'s trials, there was one negative phenomenon — so-called singing of foils. The sound generation on the foil at cruising speed was so intense that it violated the certification requirements for passenger ships. Initial measures could not eliminate this problem. I developed a mathematical model of autovibration in the foil system at the trailing edge of the wing based on von Karman's theory, theory of elasticity and Lighthill equations. This model described the experimental data well. Using this model, the designers of *OLYMPIA* and I developed a foil profile that eliminated the "singing"of the foils without diminishing their hydrodynamic performance. We patented this method.

Here in Russia there are many hydrofoil projects in the proposal stage, but after *OLYMPIA*, no new project has come to fruition. Negotiations take place constantly, but nobody wants to invest money to develop new ships. All would like to buy only ready ships. That's why *OLYMPIA*, *KOLKHIDA*, and others are being built in small numbers, and there is no opportunity to create a new hydrofoil. All young specialists have left their design bureau to work for trading companies. Trade and oil are the only profitable businesses in Russia now.

Most Russian designers and managers of high-speed ships believe that the USA will become the world leader in this sphere in the near future. I agree with them. There is money available that could be invested in development of high-speed ships, and there are geographic features (Great Lakes, Caribbean Islands, sea coastline) which enable the hydrofoil to be the fastest and cheapest kind of transport in some areas.

HYDROFOIL NEWS DIGEST

FERRY OPERATORS IN A HURRY TO ADD FASTER CRAFT

by Linda Gillett
Marine Log May 1997

Though plenty of conventional vessels are still being ordered, demand for high speed ferries is continuing to grow. There seems to be no let up in the US and worldwide appetite for fast ferries. Most US yards specializing in this tonnage have healthy order books, and word is that at least one of them will soon announce an export order (no, don't look for it among the pending Title XI applications; it's being financed through the engine builder's financing associate).

Demand is such that the main objective at Gladding-Hearn Shipbuilding, Somerset, MA, has become "faster building time" according to its president, George Duclos. "We subcontract outside companies to build the hulls, while we build the cabins," he says. "There are just not enough hours in the day to do both." Gladding Hearn is one of two US licensees of Australia's International Catamarans (the other is Nichols Brothers, Whidbey Island, WA). Its range now includes vessels with composite hulls.

"Our decision to build composite hulls came because we are continuously developing hulls to be lighter," says Duclos. "The two 65 ft, Incat XP300 ferries [*FLYING CLOUD* and *LIGHTNING*] we delivered to Water Transportation Alternatives for commuter service between downtown Boston and Logan Airport have strong composite hulls with good acoustic and thermal insulation."

Duclos is hoping to repeat the company's busy 1996 schedule of four fast ferry deliveries. As well as the two Incat XP300s, Gladding-Hearn supplied a 85 ft ferry with a 400 passenger capacity to Sayville ferries on Fire Island, and the 31 knot *FRIENDSHIP V,* a 350 passenger catamaran ferry.

Composite hulls aside, Gladding-Hearn is currently building an aluminum-hulled Superferry to operate the Cape Cod-Nantucket route for Hyline Cruises in Hyannis. The *GREY LADY II,* a 149 passenger, 4,500 hp Incat design fast ferry, is to replace the 1995-built *GREY LADY I.* "The *GREY LADY II is* faster and has better Maritime Dynamics Inc. ride control system. It's a tough run on that open water route, and the ferries operate five or six times daily, all year round, in any condition. Even when the airport closes, the ferries are still going," Duclos explains. The crossing on the new 35 kt ferry will be one hour compared to a two-hour journey on a conventional ferry. The *GREY LADY II is* due for delivery in November 1997.

New York Cats

A New York operator in the market for somewhat higher speeds is New York Fast Ferry. Earlier this year, it put two high-speed passenger catamarans into service in New York Harbor. The New York 38 design was developed by Derecktor Shipyards, Mamaroneck, NY, to meet the demands of a high-volume commuter service in the city's harbor. Designed by Nigel Gee & Associates of the UK, the two vessels, *FINEST* and *BRAVEST,* load from the front and carry 350 passengers at 35 kt. The 37.7 m slender hull catamaran produces a low wake and has low fuel consumption.

"Derecktor Shipyards has seen increased interest in ferry vessels, particularly high-speed boats," says Mary Ann Clerkin of Derecktor. "Our clients are from all around the world, many from cities where ferry transportation was once routine and is now sought as an economical, environmental alternative. Other customers have been involved in ferry transportation for many years and are in the market for new, high-tech vessels to replace older boats which have become outdated."

Challenge to Incat

Though Incat designs have long dominated the USA fast ferry scene, they are now being challenged by designs from another Australian shop - Advanced Multihull Designs.

Dakota Creek Industries, Anacortes, WA, has been selected to build Washington State Ferries'(WSF's) new fast passenger ferry, with an option for a second. "The selection process was long and complicated. We did not select the ferry that was the cheapest to build, but the ferry that would provide the best life cycle cost and reliable service," says a WSF company spokesperson. "The fast passenger ferry design is the AMD385, capable of 34 kt nominal transit speed. It is projected to have a low wake profile that will permit us to operate at normal transit speed through Rich Passage. That means a run between Bremerton and downtown Seattle of under 30 minutes, which is half the usual trip time. The ferry can do 30 knots with one engine off line. That means our maintenance crews can service high time engines without taking the vessel out of service." The 143

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HURRY TO ADD FAST FERRIES
(Continued From Previous Page)

ft 350-passenger vessel will have four Detroit Diesel 16V149 engines, each at 1800 hp, and each driving Bird Johnson/MJP model J650 water jets.

Conventional Ferries

Besides fast ferries, WSF remains in the conventional ferry market. The Jumbo Mark II Class Ferries *MV TACOMA* and *MV WENATCHEE,* built at Todd Shipyards, Seattle, and at its subcontractor, MCI in Bellingham, travel at a moderate speed of 18 kt. Each 460 ft in length, the two ferries will carry 2,500 passengers and 218 cars and will be the first of three of a new breed of jumbo vessels to enter service with WSF. The vessels feature more comfortable seating, reduced vibration, and lower noise levels.

Another major conventional ferry project is underway at Halter Marine, Moss Point, MS, which is building a 120 car/750 passenger ship for the State of Alaska, valued at $80.3 million and scheduled for delivery next April. Atlantic Marine Inc., Jacksonville, FL, earlier this year delivered the passenger/vehicle ferry *JEAN RIBAULT* built for State of Florida, Department of Transportation. The 168 ft x 64 ft ferry, designed by Cunningham and Walker Marine Consultants, Inc., St. Augustine, FL, can carry 220 passengers and 40 vehicles. It has replaced the operation of the 45-year old *BUCCANEER* ferry between Mayport and Fort George Island, FL. Traveling at 12 knots, the ferry is powered by two EMD 645E6A main engines at 975 hp each with Lufkin RS1616 reduction gears driving 66 inch 4 bladed bronze propellers at each end. The vessel has two Detroit Diesel 60 kW 1,200 rpm main generators and one 25 kW emergency generator set.

Blount Industries, Inc., Warren, R.I., is currently beginning the engineering work on a 125 ft 800 passenger ferry for an undisclosed client. The two-deck, monohull ferry will have a 28 ft beam and a design draft of 7 ft. Three engines, providing a total of 1350 hp, will give the ferry a service speed of around 14 knots. Delivery is to take place in early 1998.

Hawaiian SLICE

A new ferry design is being considered for Hawaiian waters *[see article, page 11]*. "The SLICE is an economically feasible option for a medium-speed ferry for inter-island operation in Hawaii," says Michael Schmicker, vice president of business development for Pacific Marine, Honolulu. "There is no other state in the US, with the possible exception of Alaska, that has the same sea state conditions as Hawaii. Our open-ocean sea state means we get 8-12 ft seas in winter, sometimes even reaching 16 ft. This provides a tremendous challenge to the ride quality of a ferry. We had originally considered the SWATH vessel as an option, as all catamarans and monohulls would not contend with the ride. Increasing the SWATH's speed (20 kt) to that of a medium-speed or fast ferry would mean doubling the horsepower, and that is not cost effective. The SLICE, on the other hand, is 50 percent faster than the SWATH, reaching higher speeds for the same horse power (3,425 hp for each MTU engine on the prototype)."

The 104 ft, 30 knot SLICE prototype incorporates a high-speed SWATH ship technology designed by Lockheed Martin and built in Hawaii by Pacific Marine under a cooperative agreement with the US Navy's Office of Naval Research. "Hawaii needs an inter-island ferry transport system, and we will ultimately get one. We hope it will be in the form of the SLICE ferry. It will have two applications, serving the tourist market as a sight seeing passenger ferry, and then as a mixed traffic vessel, carrying cars and trucks, for the local market."

Casino Service

Though the first boat from the Mashuntucket Pequot Tribal Council's new yard in New London, CT, will serve its Foxwoods casino, the tribe has taken no gamble on its design. It will be a FBM Marine Group TriCat. Proven in Hong Kong, the TriCat, which is powered by Taurus 60 M gas turbines, will attain 51 kt. The tribe has rights to build and sell TriCats in North and South America, the Caribbean and Hawaii.

Bigger As Well As Faster

"The trend in Europe and Scandinavia is towards larger [fast] ferries, particularly those in the 100-150 vehicle capacity range," says Dave Luck, manager, marine applications and ship integration, GE Marine & Industrial Engines.

And while demand in the Asia Pacific has tended to be towards high speed, passenger-only ferries, he envisions requirements for more vehicle capable high speed vessels could develop in the future.

"There are even some of these type vessels being looked at in the US as a means of transportation," he notes. But unlike Europe where ferries have traditionally been a preferred form of transportation, Luck points out that US interest in high-speed vehicle/passenger ferries has to be cultivated. With the MDV 3000 order, GE's portfolio in the fast ferry market includes applications of 12 LM2500 gas turbines in two Aquastrada Class vessels and three Stena HSS 1500 catamarans.

"Gas turbines, either in combination with diesels or by themselves, have advantages for both cats and monohulls," states Luck. "While there is considerable debate over which hullform is better, we

Continued on Next Page

HURRY TO ADD FAST FERRIES
(Continued From Previous Page)

fit in both markets quite well, particularly in weight-sensitive applications."

If owners are looking to build operational flexibility into a fast ferry, they must also consider the stricter standards regarding NOx exhaust emissions. An advantage claimed for gas turbines is that NOx emissions are about one-third to one-fourth of the output of an equivalent diesel engine on a per unit basis.

Chantiers de l'Atlantique, GEC Alsthom's shipbuilding subsidiary, has won an order to supply a 11500 Corsaire-type high speed monohull car ferry to Sweden's Rederi AB Gotland. The order follows a cooperation agreement signed recently between Chantiers de l'Atlantique and Leroux & Lotz. The 112 m ferry will carry 700 passengers and 140 cars at a service speed of 35 knots between Stockholm and the island of Gotland. Built jointly by the two shipyards, the ferry will have a steel deep V hull with an aluminum superstructure. Propulsion is supplied by four 7080 kW

DESIGN OPPORTUNITY

IHS Member Malin Dixon is undertaking to design a small hydrofoil boat that is an alternative to a Rigid Inflatable Boat (RIB). Malins runs an electronics company in England and finds that the main thing he is short of is time to apply to this project. Is there an engineering graduates who would be interested in coming to work for Malin to get this off the ground (or water)? Is there a designer with a similar or compatible project in mind that would like to collaborate? If so, contact Malin Dixon by email for more information (malin@onspec.co.uk).

STUDENTS WANTED

IHS membership costs full-time students only US$2.50 per calendar year.

CALL FOR PAPERS

International Conference on High Performance Marine Vehicles
24-26 February 1999
Zevenwacht, South Africa

Papers are invited on the design and operation of high-performance marine vehicles such as hydrofoils, wing-in-ground (WIG), air-cushioned vehicles (ACV), surface effect ships (SES), fast monohulls, multihulls, etc. and related topics such as hydrodynamic or structural analyses, economic and ecological aspects, etc. Papers of a survey character are encouraged and will be given extra printing space. Authors are encouraged to give value to the readers, such as detailed design data or details of methods. Abstracts should make clear which details will be revealed. There will be no parallel sessions. Each paper will be allotted 10 pages of printing space on A4 format, and each lecturer will be allowed 20 minutes for the presentation. Proceedings will be bound in hard-cover.

Key Dates

Submission of abstracts: 1 Sep 98
Notification of acceptance: 14 Sep 98
Submission of papers: 1 Nov 98
Early registration : 1 Nov 98
Conference dates: 24-26 Feb 99

Current Details for HiPer '99 are posted at website: http://www1.sun.ac.za/local/academic/fak_ing/meg_ing/home.html.

For early registration, contact Dr. Volker Bertram, Ship Technology Research; Lammersieth 90; 22305 Hamburg, Germany; tel: +49-40-2984-3173; fax: +49-40-2984-3199; electronic mail: bertram@schiffbau.uni-hamburg.d400.de.

To submit an abstract, contact Gerry Thiart, University of Stellenbosch Dept. of Mechanical Engineering; 7600 Stellenbosch; South Africa; tel: +27-21-8084261; fax +27-21-8084958; email: thiart@maties.sun.ac.za.

MEMBER NEWS

V. H. Van Bibber is preparing an article on the Personnel Transport Module (PTM) now being produced for the US Navy's Landing Craft Air Cushion (LCAC). Van Bibber was involved in the design and manufacture of these modular units, which can be set up quickly on the LCAC cargo deck and used to transport troops or to evacuate civilians and casualties. When not in use, the PTM can be disassembled and stored in one 8 ft. x 8 ft. x 20 ft. van.

At the end of June 1995, **Charles G. Pieroth** left (Northrup) Grumman after 32 years and established Sound Technology Management, Inc., a consulting firm that provides technology planning and licensing services.

CDR John W. Peterson, USN is finishing his second year in the Washington DC area serving in J-3 on the Joint Staff. He is looking forward to taking command of *USS HOPPER* (DDG 70) late next year. This ship will be somewhat slower than his previous command, *USS HERCULES* (PHM 2), but he thinks he will make do somehow!

IHS regrets to report the passing of **Marilyn Martin**, who was killed in a car accident on September 21, 1997 while on a business trip in Pascagoula MS. Marilyn is well known to those who worked with the PHMs as the NAVSEA person in charge of logistics. Marilyn retained her active interest in the PHMs after they were sold for scrap, and in her spare time she was helping Eliot James and B. J. Meinhof obtain manuals, drawings, and parts to restore ex-PHM 5, which they bought at auction. At her memorial service in Alexandria VA, the mourners sang two hymns chosen by her family because they were Marilyn's favorites — both were Christmas carols — and the choice was both poignant and appropriate. Marilyn will be missed as an exceptionally competent and caring

Book Review...

HYDROFOIL VOYAGER

by David A. Keiper

"If someone told you that a Force 4 puff of wind on 380 sq. ft. of sail could lift a sailing yacht weighing a ton and a half right out of the water, and make it go faster than the true wind speed, you might not believe him. But that is exactly what can be done." So begins *Hydrofoil Voyager*, David Keiper's story of how he designed and built the 31'4" sailing yacht *WILLIWAW*, then logged almost 20,000 miles of cruising around the Pacific to test and fine tune the design. You'll never get closer to boat building, open-ocean sailing, and hydrofoiling without actually doing it yourself. Keiper tells his own story, and the precision of his telling — he seems to recall every wave, squall, and leak — pulls you into the adventure with him. Read, and you are there, thrilled as the hull surges up to sprint on its foils; impatient as the sea goes flat in a dying wind; inventive as some new crisis presents itself for a solution hundreds of miles from land.

Setting the bow foil by inserting one of two shear bolts below the waterline. It is a wet job out at sea.

Hydrofoil Voyager is rich with hard-earned insight on how to design, build, and sail your own boat, hydrofoil or not. By "living" through a design's trial by sea, you gather the lessons as they become evident through experiences during the voyage. You confront the problems along with the author, and you arrive with him at solutions by following his reasoning (not all of the "how to" nuggets are buried in the story, however; if you prefer your data bulletized, go to the appendix "How to Build a Hydrofoil Sailing Yacht").

The late afternoon sun catches *WILLIWAW* streaking across Hawaiian waters at 20 knots, powered by the northeast tradewinds. The hard-working leeward foil is almost hidden in its own spray. Molokai Island is seen in the distance.

Design and construction details are not the end of useful information in Keiper's book. The author (with readers in tow) also faces the perils of infectious disease on remote islands, creates ways to pay for extended voyages, and solves the thorny problem of recruiting female crew (yachting is largely a male sport, unfortunately).

Will there be a *Hydrofoil Voyager, Part II*? As Keiper muses, "... somehow, the time, the place, the situation, and the money, all have to come together as they did when I created *WILLIWAW*. I trust that these things *will* all come together... I would be happy to work in partnership with others to bring about the reality of hydrofoil trimarans sailing all over the world." Meanwhile Keiper is creating new designs on his computer and manufacturing foil kits for daysailing catamarans and power boats.

IHS members may order *Hydrofoil Voyager* directly from Hinsdale Press, 123 South Pacific Street, Cape Girardeau MO 63703 USA to receive the discounted price of US$25 incl. shipping (US$7 extra for shipment overseas). You can contact the author by email at dvpw98e@prodigy.com and visit his web site http://www.igateway.net/~dakh.

[*Reviewed by Barney C. Black*]

Retracting *WILLIWAW*'s stern foil

ABOUT THE IHS WEBSITE

The announcements area provides an immediate forum to publicize upcoming news and other items of interest that otherwise would have to wait for the quarterly newsletter. This forum is available to the members and to individuals or organizations with news of interest to hydrofoilers. Submit announcements to IHS via email or by post.

A separate page contains links to other relevant websites. If you provide hydrofoil related services, your website should be there... let IHS know. There is a tremendous range and wealth of information accessible from this page, so it is well worth exploring here.

The Stories of the Hydrofoil Pioneers page aims to put all the past newsletter articles in this category onto the web. Unfortunately, progress has been slow getting this information up due to the volunteer editor's inexperience with graphics as well as other demands on his time. This is an area where some outside help would be greatly appreciated.

For the future, we would like to improve the postings section from its present rudimentary state to a fully functional usenet??? usernet??? with search capability, ability to thread messages on similar subjects, listserver, etc. But this will have to wait for a volunteer with the knowledge and time to implement it. The day may come.

But now and in the future we need for knowledgeable hydrofoilers to visit the postings page periodically and help out with answers to some of the inquiries we receive. If you can answer one of the questions asked, go ahead and correspond directly with copy to IHS... just click on the inquirer's name to open an email message and let the process of communication proceed. And if you are the one with the question, then ask away!

Note that the additional material on this partial page was intended for the Newsletter, but there was not space to include it. The printed edition was and is limited to 16 pages. There was no electronic version available in those days. - Editor

IHS BOARD OF DIRECTORS

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William M. Ellsworth	**Jerry Gore**	**Mark R. Bebar**
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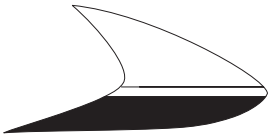
The NEWSLETTER



International Hydrofoil Society

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

Editor: Barney C. Black | **WINTER 1997-98** | Co-Editor: John R. Meyer

Hydrofoil Pioneers...

SMALL-BOAT HYDROFOILING IN THE 1950s — THE STORY OF THE UP-RIGHT HYDROFOIL KITS

By
Thomas G. Lang

I was active in small-boat hydrofoil development from 1952 to 1960. During this period, I designed about 12 hydrofoil configurations, and then built and tested them with the help of my father. I obtained a patent on the final hydrofoil design, and licensed it to a company in California which made and sold about 80 all-aluminum kits for converting planing boats to hydrofoil boats. My story may help others to design and build a hydrofoil, or to develop a hydrofoil kit for sale.

I worked in torpedo hydrodynamics at a US Navy laboratory in Pasadena CA. My father had a shop in his garage at nearby Redlands. I typically spent a few weeks designing each new hydrofoil configuration, and then my father and I would spend the next few weekends making hydrofoils, and testing them at Lake Elsinore or the Salton Sea. All designs consisted of add-on foils which converted existing 14-ft to 16-ft boats into hydrofoil boats. The hydrofoils typically added ten mph, doubled the fuel mileage, and smoothed the ride in waves.

All of my earlier hydrofoils were made of steel. Their upper and lower surfaces were curved plates welded at the leading and trailing edges, and then finished by carefully grinding the two edges to the required shapes. The later hydrofoils were made from 6-inch aluminum extrusions using a die — ordered from Alcoa — which had a 16-510 NACA airfoil cross section.

See Hydrofoil Kits, Page 3

HYDROFOIL VIDEO ANYONE?

Your Board of Directors is considering the possibility of creating a half-hour video documentary of "Hydrofoil History" with the cooperation of the US Naval Surface Warfare Center, Carderock Division. We plan to write a narrative and assemble video clips collected over many years to depict the worldwide development of hydrofoils. The video will treat early concepts, many small, experimental craft, commercial and military hydrofoils, closing with the Foilcats of today. IHS would pay only for narration costs, but this requires dipping into the IHS treasury. We believe it is prudent to proceed only if there is enough interest on the part of IHS members to purchase such a video to help defray these costs. It can be assumed that the price will be compatible with the "going rate" for videos of this length and subject matter, approx. US$30. IHS therefore needs your input. **Please give us your reaction to this proposal** by email (foiler@erols.com) or regular mail.

INSIDE...

PRESIDENT'S COLUMN

Although somewhat belated, I sincerely hope all IHS members and their families enjoyed the Holiday Season and will have a happy and rewarding 1998.

As we look back over 1997, we have a lot to be proud of regarding our accomplishments as a Society — constantly moving ahead to fulfill its purposes and objectives. I personally appreciate the time and effort of the IHS officers and Board of Directors. Thanks especially go to Barney Black and those who have supported him in his many personal contributions to the modernization of the Society, bringing it into the electronic age. I can't really say enough about that because words are inadequate.

The IHS website includes a Hydrofoil Tutorial. Although brief and rudimentary, it is now complete with figures to illustrate the text. Some of these figures need improvement in quality — and we are working on that. Also, a host of hydrofoil pictures have been incorporated in the Photo Gallery. We will be adding text to describe each hydrofoil. Also, more photos will be added. I request members (and others) to send in good quality photos that are missing and would be good additions to the Gallery.

I hope that all of you on the Internet will look into the IHS Home Page from time to time as additional material and improvements are made. Barney's links to other organizations are really fantastic — performing a great service to people like myself who are not as adept at "surfing the net" as Barney is.

Your Board of Directors, who meet every month, are struggling with the challenge of hydrofoil information distribution. IHS receives many requests for information. The challenge is to make the information, reports, and papers, etc. available to first, our members, then to other hydrofoil enthusiasts without consuming a lot of volunteer time and financial assets of the Society. A policy on this matter is being developed. All members will be advised shortly.

We will continue to need everyone's support and help in 1998, as we have further plans for doing great things to improve services to our own members and others interested in hydrofoils.

In a different vein, it is always regrettable to report the passing of our fellow hydrofoilers. We learned of three, namely, Mel Brown, Bob Ripley, and Peter Payne. Bob Johnston has done a masterful job of writing tributes to Bob Ripley and Mel Brown in this Newsletter. You will also find Bob Ripley's eulogy, written by his son, on the IHS website. Peter Payne, long known to many of us, only recently had joined IHS. His most recent hydrofoil contribution was delivered at FAST '97 in a paper "On the Maximum Speed of the Dynafoil." This was the last of his many varied technical contributions to this interesting field.

As I have reminded all of you many times, the Society is an all-volunteer organization, and we rely on the financial support of our members to pay operating expenses. You will find with this Newsletter a "DUES NOTICE." It will be much easier during the remainder of 1998 if all will respond during the next few weeks to this call for dues. Those who have been negligent about their 1997 dues, please recover your reputation by enclosing a double check to cover both years.

Best wishes for a great 1998!

John R. Meyer, President

WELCOME TO NEW MEMBERS

Michael Koronaios **has been a student at Staffordshire University in England for 2 years, and he will complete his studies in June of 1998. His Bachelor's major is in business, but he plans to study one more year to obtain his MBA. Next semester he will work on a marketing planning project for a Greek hydrofoil company. He has had difficulty finding information about hydrofoils or fast ferries (including the market for hydrofoils, or information from hydrofoil companies, how they prepare their marketing plans, etc.). He is seeking help from anyone who has or can direct him to such information.**

CLARIFICATION

Dr. Georg Brustad of Dynamica a/s informs us that after reading the article "Development of a Hull Form" in the Autumn 1997 IHS Newsletter, that the reader gets the impression that Navatek/Pacific Marine has rights to the ride control system of the *FOILCAT 2900*; however, rights to this system belong to Dynamica, according to Dr. Brustad. For more information contact Dr. Brustad by email (gb@dynamica.no) or visit his website at http://www.dynamica.no. IHS did not intend to make any assertion about the rights to this system, and has no means of verifying such rights.

1998 DUES ARE DUE

IHS Membership is still only US$20 per calendar year (US$2.50 for students). Your renewal or new membership is important and needed. Please remit 1998 dues as soon as possible to IHS at PO Box 51, Cabin John MD 20818 USA. Overseas residents with no easy way to send US funds overseas should contact IHS for suggestions.

HYDROFOIL KITS

(Continued From Page 1)

The first few configurations consisted of two surface-piercing, V-shaped hydrofoils mounted in tandem on a 14-ft rowboat, with different kinds of roll-stabilizing means attached to each side. Figure 1 is a photo of one of these earlier hydrofoil configurations which was stabilized in roll on each side by a spring-mounted planing plate. The outer ends of the planing plates were bent upward to help keep the plates from submerging in turns. The bow foil angle was controlled by a control stick which could either be locked in position, or operated by a passenger in the front seat. The boat was powered by a 10-hp Mercury outboard, and achieved 32 mph with 2 people on board. We sportingly called it "the fastest rowboat in the world."

Fig. 1 — 1952 hydrofoil design, the "fastest rowboat in the world."

Other side-mounted roll stabilizers evalutated on this boat included: (a) a negative-dihedral hydrofoil, (b) the same foil with a welded-on tip extension which had a positive dihedral, (c) a horizontal, arc-shaped planing foil placed flush with the bottom of the boat at the transom, and (d) a small V-shaped foil attached to the underside of the horizontal planing foil. The latter design worked so well that we then eliminated the center V-foil at the aft end, leaving simply one bow foil and two stern foils.

The next major set of hydrofoil configurations began with the design shown in Figure 2, consisting of a three-Vee, all-steel, clamp-on set of foils which

Fig. 2 — This 1954 three-Vee hydrofoil attained 35 mph with a 25 hp Johnson outboard. The author is driving, and his father is seated next to him.

could be mounted on most 14-to-16 foot boats without bolts. The kit weighed around 300 pounds. With a 25 hp Johnson outboard, the largest outboard available at the time, this hydrofoil boat achieved about 30 mph with a full load of five people, and a maximum speed of about 35 mph. The ride was remarkably good, even in fairly large breaking waves. The boat was so stable that it could be operated "hands off" in waves.

If the peak-to-trough height of breaking waves reached around twice the operating depth of the foils, then head waves would begin to hit the hull, and the larger following waves would occasionally cause the boat bow to plough into the wave crests, slowing the boat. This typically only happened under conditions when other boats of a similar size headed for shore for safety. This hydrofoil boat operated well in large ocean swells because they are typically fairly long, so the boat simply followed the water surface.

Fig. 3 — One of the first all-aluminum hydrofoil designs mounted on an existing fiberglass boat. With a 40 hp Scott Atwater outboard motor, this boat achieved around 39 mph.

After several months of use, it became clear that an all-steel kit was too heavy and expensive to be marketable. Therefore, I purchased an extrusion die from Alcoa, and all subsequent foils were made from extruded aluminum, together with their attachments. To save weight and cost, the foil units were designed to be bolted on. Figure 3 shows one of our next all-aluminum, hand-made foil configurations attached to a fiberglass boat.

Figure 4 shows the bow foil. Note the plate extending above the center of the foil tube; this plate is used for adjusting the foil angle. The plate angle is controlled by a short threaded rod which is attached by a universal joint to a long rod having a handle located near the driver. The bow foil angle is adjusted by rotating the rod, and can be adjusted when underway. The bow foil is retracted by removing two bolts from the central collar, and then pivoting it up and over the bow.

Fig. 4 — The bow foil is attached by four bolts. Note the angle adjustment plate and threaded rod positioned above the center of the cross tube.

Figure 5 is a close-up photo of a stern foil mount. The hydrofoil angle can be adjusted at rest by rotating the large knob shown in the photo. Also shown, is a spring-loaded motor mount which permits a short shaft outboard to be used with a standard short transom; this mount automatically lowers the motor about 5 inches when thrust is applied. Alternatively, a long shaft outboard can be mounted on a standard short transom.

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HYDROFOIL KITS
(Continued From Previous Page)

The motor shown in Figure 5 is a 40 hp Scott Atwater. A 35 hp Evenrude was also used on this boat. With either motor, speeds of around 39 mph were achieved with two people in the boat.

Fig. 5 — Each aft hydrofoil is bolted to the transom, and retracts about a 45-degree axis at the inboard end. Note the adjustable spring-loaded motor mount, and the short-shaft outboard.

We designed and tested several alternative bow foils in the 1950s, including a base-vented bow hydrofoil, a superventilated bow hydrofoil, and a spring-mounted bow foil designed so that its angle of attack automatically reduced when lift and/or drag increased. The base-vented hydrofoil concept was patented as US #3,077,173 in 1963. However, these alternative foils did not seem to work as well as the final bow design.

A note of caution for future hydrofoil designers: No matter how careful one is, the chances are that the foils will hit either a floating or a submerged obstacle if a boat is used often enough. For safety, I recommend attaching foils with shear bolts or shear links. To recover a sheared-off foil, a cord several-hundred-feet long is recommended. I once tried to retain a sheared-off foil with a 15 ft cable, but the cable snapped. Another mistake is to design a V-foil to rotate about a horizontal axis after hitting an obstacle. I tried this one time, and hit an unseen mud bar. The bow foil sheared off as designed, but the rear foils rotated back about 15 degrees, scooped up mud, and broke the transom. I found that a reasonable design load for shearing off a foil is around 500 pounds. If the design load is too small, the foils break free too often; if the design load is too large, people can be hurt and/or the boat damaged. I once hit an empty soda can floating on the surface that wrapped around the bow foil. The drag of the can was not large enough to shear the foil off, but it caused my passenger and me to lose our seats and receive minor bruises, but fortunately nothing got broken.

Fig. 6

I applied in 1959 for patents on the final hydrofoil configuration and on the spring-loaded motor mount. The patents were issued in 1963 as US #3,094,960 and #3,140,685. In 1960, I licensed these pending patents to Up-Right Scaffold Co. (Berkeley, CA) whose scaffold materials, namely aluminum extrusions and castings, were also suitable for the foil kits. This company quickly designed and made the necessary tooling, and began selling Up-Right Hydrofoil Kits in 1961, Figure 6, for $375.

Figure 7 shows a production bow foil in its retracted position. This bow unit is mounted using four bolts.

Fig. 7 — The bow foil can be retracted from the driver's seat, or adjusted in angle by the driver when underway.

Figure 8 shows a stern foil in its retracted position. Each stern foil is attached to the transom with three bolts.

Figure 9 (next page) shows a 15-ft fiberglass boat outfitted with the production foil kit. With a 65-hp Mercury outboard, this boat achieved 47 mph. The unique aspects of this foil configuration are in the use of: (1) differential dihedral angles, (2) rear hydrofoil splay, (3) special overall shapes with quick-mounting method, (4) a retraction system, (5) methods for foil angle adjustment, (6) means to release foils upon impact, (7) an optional motor mount, and (8) an optional propeller design. To elaborate on each of these unique aspects of the configuration:

(1) The outer sides of the rear V-foils have a 30 deg. dihedral angle, while their inner sides have a dihedral angle of 45 deg. This differential dihedral produces a roll moment when turning that makes the boat bank nicely into turns. Also, the bow foil had a 35 deg. dihedral in the upper part, and 45 deg. dihedral in the lower part; for a given hydrofoil depth, this design provided more takeoff area, and a higher turn rate at design speed than a foil with a constant dihedral.

Continued on Next Page

Fig. 8 — Each stern hydrofoil is mounted to the transom with three bolts, one of which is used to adjust its angle by rotating the large knurled knob. The small container with the black lid to the left of the inner end of the foil contains 500-ft of coiled cord for retrieving the foil if it hits an obstacle and shears free from its mount.

HYDROFOIL KITS
(Continued From Previous Page)

(2) The rear Vees were splayed rearward about 1.5 deg. as a safety feature. This splay caused the outer part of each rear Vee to operate at a lower angle of attack than the inner parts of the Vees. In the tightest turns, without this splay, the outer side of the outer foil would ventilate first, causing the boat to suddenly tilt out of the turn. However, with splay, the inner side of the inner V-foil ventilates first, causing the boat to tilt strongly into the turn (much safer).

(3) The rear foil extrusions were bent into a triangular shape which provided a continuous surface consisting of a V-foil with an inverted horizontal portion welded together at the upper inboard corner. Prior to bending, the horizontal portion was placed in a special press, and its camber was reversed so that, after bending, this portion provides lift when immersed. The horizontal portion of each rear foil was mounted above the bottom of the boat, but low enough so that it helped to reduce trim at hump speed before takeoff. During turns, the horizontal surface of the inner hydrofoil dips into the water and generates lift to help increase the turn rate and control the bank angle. The bow hydrofoil assembly is mounted with two bolts through the bow stem, and one bolt rearward on each side. Each stern foil is mounted with three bolts through the transom.

(4) The Vee bow foil is attached to an above-water horizontal tube. To retract, the foil and tube are rotated until the foil is a little beyond its inverted position. The foil is rotated by two cables which are wrapped around the foil tube on one end, and around a ratchet winch on the other end which is located near the driver. After raising the bow foil, the boat bow can be beached, typically without raising the aft foils. After leaving shore, the bow foil is lowered by releasing a catch on the ratchet, and gently pushing the bow foil forward with a paddle until gravity takes over to rotate it back down until it rests against an adjustable stop. For trailering, the rear foils retract about a fore-and-aft axis, angled around 45 deg. from the vertical, which permits them to pivot upward and backward out of the water.

Fig. 9 — Boat equipped with the production Up-Right Hydrofoil Kit. This boat achieved 47 mph with a 65 hp Mercury outboard, and could carry six people.

(5) The bow foil can be adjusted in flight by rotating a rod with a handle located near the driver. Such an angle adjustment is needed if one or two passengers move from the front seat to the back seat, or if five or six passengers are carried instead of one or two. Generally, the rear foil angles do not require changing; however, they can be changed by rotating a large knurled knob which adjusts the angle of a plate attached to each foil relative to the transom.

(6) All three foils are attached by shear links so that each foil will individually shear free of the boat if it strikes an obstacle with a force greater than about 500 pounds. Each foil is recoverable by a 500-ft cord attached to the boat.

(7) Typically, a standard long-shaft outboard motor is mounted on a boat with a transom designed for a short-shaft outboard in order to lower the propeller 5 inches for hydrofoil operation. Alternatively, I designed and patented a spring-loaded motor mount which attaches to the boat transom so that the outboard motor will automatically lower about 5 inches when thrust is applied. When thrust stops, the springs automatically retract the outboard back to its original position, well above the waves.

(8) It was not in the kit, but I developed a special propeller which improved on the then-available propellers for faster boats. Basically, this prop acted much like an automatic transmission with overdrive. The propeller was designed to superventilate (from exhaust gas emerging from its hub) when the boat accelerated from rest so that full engine RPM and power are available. The prop then automatically base ventilated upon reaching about 25 mph, and the engine speed reduced about 1,000 RPM, providing the overdrive feature. The prop then remained base ventilated up through cruise speed. However, if accelerated to maximum speed, the propeller again superventilated so that maximum engine RPM and power are available. I later found that this prop worked well even when partly out of water; therefore it would eliminate the need for either a long shaft outboard motor or a spring-loaded motor mount. This propeller concept was patented in 1963 as US #3,109,495.

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HYDROFOIL KITS
(Continued From Previous Page)

About 80 of the Up-Right Hydrofoil Kits were sold around the world in 1961 and 1962, although most of the kits were sold in the US. I heard that one kit was used by the Boeing Company as a chase boat for their hydrofoil craft. Another kit was later resold and used by the Navy in Vietnam. The Up-Right company did a fine job of manufacturing design and packaging. About 300 kits a year had to be sold to be profitable, so production was discontinued in 1962. I still have one unused kit, and one used kit, both of which I would like to donate to a museum, but have not yet found one which has display space available.

Thomas G. Lang
lang@electriciti.com

IN MEMORY OF PETER PAYNE

Peter R. Payne headed up Payne Associates in Severna Park, MD. Though he became a member of IHS only recently, he has been associated with the Advanced Vehicle world for many years. He designed and built the Avian 2-180 VTOL autogyro in 1958-59, the most recent such aircraft to be FAA certified. He was responsible for the first two manned SWATH-like craft, the *FICAT* catamarans, (1964-66). Other marine-related firsts include the Gayle Boat series of supercritical planing hulls (1965-69), the first passive laminar flow underwater vehicle (1968), the *SEAKNIFE* (1971), the *WAVESTRIDER* foil-supported catamarans (1982-84) and the Dynafoil (1995).

Author of two textbooks and over a hundred archival publications, Peter Payne has been chiefly responsible for the development of "added mass" planing theory during the past 20 years. He has also been involved in the developing BOAT3D, the first general purpose time-domain PC computer program for fast boats.

IN MEMORY OF MELVIN BROWN

by Robert Johnston

As I read the MIT *Technology Review* for Nov/Dec 1997, I learned that Mel Brown died on 16 Mar 97. While never active in IHS, Mel was an early contributor to hydrofoil development.

Melvin W. Brown was commissioned in the US Navy upon graduation from the Naval Academy. He had an illustrious WWII war record as a survivor of the sinking of the *USS INGRAHAM*. Out of crew of 230 he was one of 11 that survived several days in the water before being rescued. Mel told me that the long wait for rescue took many lives, but, he said every time he thought he couldn't continue to hold on he told himself, "I can't die now, I haven't even lived." Upon being rescued, Mel continued his war experience in the South Pacific later taking command of *USS LUDLOW*. Following WW II Mel attended MIT and in 1949 earned Masters Degrees in Naval Architecture and Marine Engineering. After several years with the US Navy Bureau of Ships he resigned his regular Navy commission in 1955 and joined the Naval Reserve, retiring as a Commander.

It was while on duty with the Bureau of Ships that he became involved with hydrofoils. These were the early years when the Navy was trying to determine whether there was any naval requirement for hydrofoils. Mel joined the team of supporters that believed in the continuation of support for investigation of this principle. He was involved with the planning of the necessary programs that led to the construction of the R&D vessels and ultimately the PGHs and the PHMs. In the meantime I had also joined the Naval Reserves and was heading the Miami Shipbuilding hydrofoil effort. When we received the contract to put the Army's DUKW on foils, we needed a program manager for this effort. Mel joined us as this program manager and made significant contributions to the success of the Flying DUKW.

Mel's interests in the amphibious field turned to using the air cushion concept for this application. Mel then joined Bell, where his interest in air cushion landing craft developed. When Bill Ellsworth and Jim Schuler undertook the responsibility for the Navy to develop this concept they brought Mel in to head this effort at the David Taylor R&D Center. The success of this effort is displayed by current day acceptance of LCAC (Landing Craft Air Cushion) as the standard for the Navy and Marines. Mel's contribution to the US Navy will long be remembered, and we at IHS are proud that he was also a "hydrofoiler."

IN MEMORY OF BOB RIPLEY

by Robert Johnston

Robert K. died of a heart attack while playing golf near his family's winter home at Sanford NC on 3 Dec 97. I have heard it said that a golfer's wish is that when his time comes he may be in the middle of a golf game. There he is enjoying the blue of the sky, the green of the grass, and the lie of that little white ball near an approach shot to the green. This must have been Bob's wish also rather than suffering a long illness.

As Captain Robert Ripley on duty in the Pentagon, he was an outstanding supporter of the hydrofoil concept for military applications. His duty there occurred while the US Navy's policy was to promote a NATO hydrofoil program. A NATO working group was formed to study advanced ship types and to select the platform best suited to perform NATO missions. Four ship types were considered. The British Navy supported the air cushion vehicle, the Swedish delegation argued strongly for their catama-

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LETTERS TO THE EDITOR

1965 Classic

We have for sale a 6-seater hydrofoil: Classic 1965 Russian-built Volga 9 Meter hydrofoil - Volvo Penta Diesel 115HP - Aluminum hull, stainless steel foils — restored in original boat show livery. Call or send email for full info.

John Taylor
phone (UK): 1736 33 10 18
john.taylor20@virgin.net

Pontoon Foils

Looking for a 18' to 22' standard or tri-toon pontoon boat used for recreation (fishing and skiing). Top speed should be somewhere around 35-40 mph, powered by an outboard motor. Major consideration is a very stable and smooth ride on inland waterways and lakes.

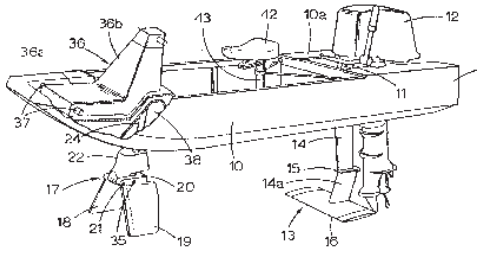
George Kelley
GKelley819@aol.com

[Attention hydrofoil entrepreneurs: IHS has received several inquiries about add-on foils for pontoon boats... maybe an unexploited market. -Ed.]

Need Sea Scooter Info

I am looking for a picture/s of a Sea Scooter built in the late 1960s. Note the drawing *[below]* from 1969 US patent 3,456,609 by Peter Thomas and Mence Nott. The craft was built. I saw some foilborne video clips with one person riding. I think they tried to market it.

Amiram Steinberg, Naval Architect
amiram@netvision.net.il



Plans To Build

I am looking for the plans to build the 'Solo Hydrofoil' that was in the Sep 67 issue of *Mechanics Illustrated*. It is "a 1-man Hydrofoil; foam-filled fiber-glass hull by an Italian designer." Have others built this that you are aware of? Is there a more modern design?

George Faulknor
gfaulknor@corp.home.net

Super Cavitation

I am a Ph.D. student at the University of Stellenbosch. I am looking for information on super cavitating hydrofoils (base ventilated and fully cavitating) for possible application to hydrofoil supported catamarans. Could you provide me with references?

Gunther Migeotte
migeotte@icon.co.za

[We do not have a handy long list of the many papers written on this subject, but start with the IHS References Page at http://www.erols.com/foiler. *Reference No. 62 will refer you to Young Shen (*shen@oasys.dt.navy.mil*). He is an expert in this field and can lead you to a more material. He is at the US Naval Surface Warfare Center, Carderock. Contact him and give him more specifics regarding your particular project. - Ed.]*

Grumman 14' Runabout

I own a Grumman hydrofoil. It is a little over 14 ft. long. Its beam is about 5 ft. It is of aluminum construction. The ribs and gussets show a definite aircraft influence. It flies on three foils, two forward and one full width astern. It is propelled by a 40 hp outboard with an extended shaft and lower housing (factory). Although I last rode in and saw this boat running in the late 60s it is in some disrepair at present. I believe that I have most of the "original" parts to put it back into running order. I am looking for any and all information about this or sister craft. The Manufacturer Tag gives the data: Metal Boat Co. Div. of Grumman Aircraft Eng. Corp. Ser # 4-G-14-RW.

Stew Fischer
Stewandjan@aol.com

Response...

The foil system was developed by William (Bill) P. Carl, President and major stockholder of Dynamics Development Inc. (DDI). DDI was acquired by Grumman Corp. when they decided to establish a hydrofoil division. For some time DDI manufactured the foils that were designed to be used with the Grumman 14-ft aluminum runabout. The demand for this hydrofoil was steady but not enough to become a major product of Grumman. While I was head of Grumman's marine division we continued to stock spare parts and kits for customers. Grumman and Northrup became a new corporation named Northrup Grumman. It is my understanding that even before this new conglomerate, the Grumman hydrofoil effort had ceased. I suspect that any spare hydrofoil parts were out of inventory before the merger. Perhaps Bill Carl may have more info. If you want design info he is the one to contact. He may know what happened to any spares. Bill's address is: Mr. William P. Carl; PO Box 767; Kilmarnock, VA 22482 USA

Bob Johnston
RJohns0199@aol.com

Gordon Baker's *MONITOR*

I am interested in information on Gordon Baker's sailing hydrofoil *MONITOR*. My world wide web page http://home.worldonline.nl/~hbsmits/hydrofoi.htm might interest you.

ir. Hanno Smits
hbsmits@worldonline.nl

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LETTERS TO THE EDITOR
(Continued From Previous Page)

[See the Hydrofoil Pioneers section and the Posted Messages section of the IHS website for MONITOR info and photo. - Ed.]

Commercial Operating Costs

Does anyone have reliable cost data on the experience with the Jetfoil ferries operating in Hong Kong. I'm interested in operating and maintenance costs as well as any recent cost experience in building new boats.

Stan Siegel
Stansiegel@aol.com

Response...

I think a lot of this kind of infoappears in Fast Ferry International articles. I don't recall when I last saw anything about JetFoils, but I'm sure it has been there at times. In FFI you can find info on seasonal and annual traffic, revenues, profitability, various aspects of cost, costs of acquiring new craft (of all types) and facilities, etc. One may speculate on the reliability of some of it, but my opinion is that it's generally credible. I'm inclined to think that if companies don't want certain info to get out, they hold it close and don't put out spurious information just to confuse people. A fair amount of the same kind of info is presented at annual industry conferences such as Ferries'97 or Cruise+ Ferry, though again I don't know when JetFoils per se may have been discussed.

Bill Hockberger
hockberg@erols.com

***TUCUMCARI* Model Builder**

Need info on PGH-2 *TUCUMCARI*. I have a Aurora model that I want to build as accurately as possible to the real thing while it was in the Far East. All I have to go on is the box art. The box is dated 1969, kit #727-250. Aurora is out of business, and the kits are collector items. The kit title is "Boeing PGH-2 *TUCUMCARI* Hydrofoil." These kits can sell for over $100, so I'm going to be real careful when I build it.I have a friend who has [another] model kit of *TUCUMCARI* he would like to sell. He's asking $75 for the kit, which is unbuilt. Please let me know if you are interested ASAP.

Bill Faulkner
WFaulk0001@aol.com

[Go to the Photo Gallery section of the IHS website. - Ed.]

Response...

TUCUMCARI particulars and plan and elevation views are in "Boats of the USN", Navships 250-452 issued May 1967 and available through the US Government Printing Office. The booklet of general plans is PGH2-845-2533352. I know the set of drawings originally held by SUPSHIP Seattle has been destroyed.

Sumi Arima
arimas1@juno.com

Russian/Chinese Diesel Engines

I am looking for the manufacturer of hydrofoil engines based in China. Originally the manufacturer of this particular model was from Russia. The vessel is a ferry. I am not sure of the manufacturer of the engines, but I know it is the same engine as used in the Chinese Navy; it was like an M-104A model.

Rachel L. Haynie
Rachel@hol.gr

Response...

We use engines M401A and M417A on hydrofoils *METEOR* and *VOSKHOD* produced now in Russia. The producer of these engines is AO "ZVEZDA": Russia, 193012, St. Petersburg, ul. Babushkina, 123; phone: +7-812-2620747, marketing department: +7-812-2628142, fax +7-812-2673776.

Konstantin Matveev
matveev@lili.teknikum.uu.se

Response...

I contacted China State Shipbuilding Corporation (CSSC) that is the state owned enterprise and controls the most of shipbuilding industry in China, including shipbuilding, engines and ship equipments. Under CSSC there are a number of diesel factories for marine use. Among those, there are two factories manufacturing high speed diesel engines for high speed crafts and hydrofoils. They are Luoyang Diesel Factory and Sichuan Diesel Factory. Luoyang Diesel Factory is in Luoyang, Henan Province. It manufactures 12V180 diesel, 1200 HP and MWM diesel 400-1000 HP. They have the license of manufacturing MWM. Sichuan Diesel Factory is in Sichuan Province. They have the license to manufacture STYER diesel about 1000 HP. If you need detail information, please let me know the items. CSSC promised to offer the information.

Shi-Tang Dong
stdong@online.sh.cn

Hydrofoil Textbooks

I'm a French student leading a project entitled "The Hydroptère, Hydrodynamics of Foils." My task is to do some calculus with these foils. So please help me in finding this information (I can't locate it anywhere)!

Sebastien Thellier
sebastien.thellier@hol.fr

Sailing Catamaran

I am curious whether any company or organization has added hydrofoils to a sailing catamaran. My cat is 44 ft, fiberglass. It seems to me that foils can be housed, extended, and retracted into the underside of the area between the hulls. Are there commercially available stock parts to do this?

Steven
kao@aimnet.com

Response...

As far as I know, no one puts foils on any 44-foot fiberglass sailing catamarans. I assume that this is an offshore,

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LETTERS TO THE EDITOR
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cruising catamaran. I see quite a few problems involved, partly the way you suggest doing it. Many cats have too little clearance between the underbelly and the water, and foils retracted to there would hook almost every wave coming through. The foils would also need some rather fancy folding mechanisms. I fear the sea would make short work of the foils, taking them apart quickly (the water forces exerted on foils can be greater than one ton per square foot at times). Further, if your boat is solid fiberglass, it won't lend itself well to foils and high speed sailing. Fiberglass can flex considerably, making secure foil attachment problematic. Also, as the fiberglass hulls flex, one can not keep the rigging tight enough for efficient high-speed sail rigs. I don't know of any commercially available stock hydrofoil parts: each company has to obtain its own extrusions, forgings, etc. A long time ago, we offered some stock aluminum foil extrusions, but soon discovered that experimenters were unable to utilize them effectively.

David A. Keiper
dvpw98e@prodigy.com

Where to Buy a Hydrofoil

We are interested in contacting a builder for hydrofoils 70-80 passengers to operate in Lake Nicaragua. It has been difficult to locate this information.

Raul F. Calvet
careli@ibw.com.ni

Response...

There are three types of Russian hydrofoils currently in production that you should consider: *VOSJOD-2*, *METEOR*, and *KATRAN* (a variant of the *KOLKHIDA*). *VOSJOD-2* and *METEOR* are for freshwater rivers and lakes, though there is a *VOSJOD-2* variant, the *VOSJOD-2M* for salt water use; *KATRAN* is used on large lakes and in sea areas near the coast. *VOSJOD-2* is 27.6m length, range of 270 nautical miles, 71 passengers, and crew of 4. *METEOR* is 34.6m length, range of 320 nm, 116 passengers, and 5 crew. *KATRAN* is 34.5m length, range of 150 nm, 155 passengers, and 5 crew. Production time for either *VOSJOD-2* or *METEOR* is 5-6 months after signing of the contract; keep in mind, however, that winter weather conditions during the period Dec though Apr preclude delivery of *METEOR* during those months. The price of either ship in the production version, with optional air conditioning installed, is well below US$1M. You now have the option with *METEOR* of substituting German engines for the standard Russian engines; however this raises your overall cost to slightly above US$1M. *METEOR* is the most rapidly expanding type of hydrofoil in Russia. These ships are also supplied (with the air conditioning option installed) to China. Production time for *KATRAN* is normally 10 months after signing of the contract, but keep in mind the restriction on winter delivery. Your cost for *KATRAN* will be between US$2.0M and US$2.8M depending on machinery, electronics, and outfitting options that you select. Hydrofoils of this type were supplied to the Virgin Islands and are employed by Virgin Hydrofoil Service Inc.

Konstantin Matveev
matveev@lili.teknikum.uu.se

Letters To the Editor allows hydrofoilers to ask for or provide information, to exchange ideas, and to inform the readership of interesting developments. **Much additional correspondence is published in the Postings section of the IHS web site**. All are invited to participate. Opinions expressed are those of the authors, not of IHS.

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BOB RIPLEY
(Continued From Page 6)

rans, the French group presented their concept for a SWATH vehicle, and the other nations led by the US delegation, presented a strong case for the hydrofoil. These discussion continued through several meetings of the working group in Brussels NATO headquarters. I was privileged to attend several meetings of this group, but one meeting stands out in my mind. Most of the concepts had been put aside with the exception of the catamaran and the hydrofoil. The Swedish delegation head, a Navy Captain, had the floor and his big argument was that any vehicle should be tried out under combat conditions. Then Bob Ripley took the floor with his big deep voice and in his own inimitable way said "Captain, if you would like to join a war, come join ours. You might not like it, but it is the only war we have." At that point discussions ceased, and the hydrofoil was adopted unanimously. The rest is history with the US building the PHMs, assisted in the early design by the Germans and Italians. Italy built a smaller patrol hydrofoil, and the British evaluated the hydrofoil principle by acquiring a Boeing-built military version of the *JETFOIL*.

Bob was an IHS stalwart. The time came that the future of IHS was dependent upon moving the headquarters from England to the USA, Bob Ripley was one of the movers and shakers that brought this about, and IHS continues to grow and thrive with the management over here. In many of our meetings, Bob's voice was heard, always in a constructive way and adding to the knowledge of the group.

Bob was raised in Montana and was a 1949 US Naval Academy graduate. He earned a master of arts degree in education at Stanford University. He served in destroyers, cruisers, and amphibious ships, and commanded three ships, two in combat zones. After his

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HYDROFOIL NEWS DIGEST

SUPERJET-40 FOIL ASSISTED CATAMARAN ORDERED

Fast Ferry Int'l, Nov 1997

Japanese-operator Ishizaki Kisen has ordered an Hitachi Zosen Superjet-40 foil assisted catamaran for operation between the islands of Honshu and Shikoku. The new design is a development of the Superjet-30, eight of which have been delivered by Hitachi since 1993, including two to Ishizaki Kisen. Jointly developed by the company in association with the University of Tokyo and Setouchi Craft Company, the Superjet range, Hitachi reports, "Provides passengers with improved ride comfort even at high speed. Hydrofoils located between the V-shaped hulls have auxiliary flaps which control ship motion. This is suppressed to one-eighth compared with conventional catamarans."

Compared with the Superjet-30s delivered to Ishizaki Kisen, the Superjet-40 design is 7.5m longer and 1.6m wider, gross tonnage is 110 grt greater, passenger capacity is 25% higher and installed power is more than doubled to increase maximum speed by 7 knots.

The new vessel is to be introduced between Matsuyama and Moji. Scheduled crossing time will be 2 hours 30 minutes and two return journeys a day are to be operated.

Hitachi Superjet-40: Length overall — 39.0m; Beam molded — 11.4m; Draught Without foils — l.9m; Displacement — 300 tonnes; Passengers — 200; Maximum speed — 45 knots; — Main engines 4 x high speed diesels, 100% mcr, 2,750 ps; Propulsion — 2 x waterjets; Classification — JG

RIDE CONTROL RETROFITTED TO INCAT/NICHOLS 30M VESSEL

Fast Ferry Int'l, Nov 1997

Nichols Brothers Boat Builders reported details of a refurbishment program completed earlier this year on an International Catamarans 30m vessel that the Whidbey Island yard originally delivered in 1986. Work included new passenger interiors and the retrofitting of a Maritime Dynamics Inc. (MDI) ride control system utilizing aft trim tabs.

The vessel was purchased last year by Catalina Channel Express Lines from Alaskan operator Phillips Cruises & Tours. Renamed *CAT EXPRESS,* it re-entered service towards the end of May 97 on the company's routes between southern Los Angeles and Catalina Island.

Capacity is now 350 passengers in twin deck saloons and external seating on the upper deck. Service speed, Nichols Brothers reports, is 28 kt, and the vessel normally carries a crew of five or six.

According to the yard, "MDI worked closely with the vessel's designer and Nichols Brothers to design a system for the vessel taking into account the prevailing sea conditions of the route. MDI provided the detail design and hull integration of the trim tabs, the hydraulic specifications, and the electronic controller. Nichols Brothers fabricated the trim tabs, and designed and procured the hydraulic system."

JETFOILS PROPOSED FOR THE VANCOUVER-VICTORIA RUN

The Seattle Post-Intelligencer reported on October 21, 1997 that several ferry operators submitted formal proposals to B. C. Ferry Corp. to provide year-round, high speed ferry service between Vancouver and Victoria. Far East Hydrofoil Co. Ltd. and Clipper Navigation, Inc. of Seattle WA teamed in a joint venture to propose two 240-passenger Boeing 929 Jetfoils operating daily from early morning until late at night from the SeaBus Terminal in downtown Vancouver to Swartz Bay north of Victoria, according to the Post-Intelligencer story.

Clipper Navigation now carries 400,000 passengers a year between Seattle and Victoria using four high-speed catamarans and the *PRINCESS MARGUERITE III*, a car-passenger ferry leased from B.C. Ferries. The Post-Intelligencer quoted Clipper Navigation President Darrell Bryan as predicting that about 600,000 people would use the proposed new service the first year. Far East Hydrofoil operates a fleet of 20 Boeing Jetfoils, carrying 11 million passengers a year between Hong Kong and Macau. The company is owned by Stanley Ho, who has extensive business interests in Vancouver, according to the Post-Intelligencer article.

The Post-Intelligencer reported that a list of pre-qualified bidders for various potential fast-ferry routes in British Columbia includes the Clarke Group, owner of Harbour Ferries of Vancouver, Spacious Yachts Ltd. of Nanaimo, B.C., and TTS Transportation Systems Inc., also of Nanaimo. Other bidders include operators from New York, San Francisco, London, Sydney, and Singapore.

More News Items on Next Page

NEWS DIGEST
(Continued From Previous Page)

REVOLUTION 98

Revolution98 is an Around The World powerboat attempt to break the 83-day record set in 1960 by the US nuclear submarine *TRITON*. You can join the adventure first hand by logging in (http://www.revolution98.com) to see the Daily Updates, Photos, and — once under way — the position of the *REVOLUTION*. Official Start is from Miami FL on February 28, 1998.

PHOTO GALLERY ADDED

The IHS website has a new gallery of hydrofoil photographs; go to : http://www.erols.com/foiler/fotos.htm. This is a modest beginning that will grow incrementally over time. IHS members and visitors to the website are invited to suggest (and provide) additional photos for inclusion. The gallery also needs a one-paragraph description of each vessel featured... please pick your favorite hydrofoil and draft the paragraph; IHS can use the volunteer help!

AMV WORKSHOP PROCEEDINGS

If you want a package with a copy of each paper presented at the June 1997 AMV Workshop, please send a check, to cover printing, handling and mailing, for US$10.00 made out to the IHS at PO Box 51, Cabin John MD 20818 USA.

IHS membership costs full-time students only US$2.50 per calendar year. Why not join now?!

LLOYD'S REGISTER OUTLINES CHALLENGES FACING HIGH SPEED CRAFT

Maritime Reporter Oct 97
http://www.marinelink.com

The technical, environmental and human challenges confronting the rapidly expanding high-speed craft industry were recently highlighted by Chris Wade, managing director of the Marine Division of Lloyd's Register (LR).

Speaking at FAST '97, Mr. Wade emphasized that, to meet these challenges, classification societies would have to extend their involvement beyond structure and machinery. The service experience essential to calibrate theoretical calculations or to validate model experiments is still limited for larger high-speed craft.

In formulating its Special Service Craft (SSC) Rules, LR adopted a first principles approach taking account of the environmental envelope for the intended service, the loads to which the craft is subject, the strength assessment, and the acceptance criteria.

With continued research, Wade feels this philosophy may be extended into a load factor and resistance design approach, a complete departure from the empirical rules which now predominate.

High speed craft can be constructed from an array of materials including composites, aluminum alloys, high tensile steels or, increasingly, a combination of these materials. Concern in this area, according to Mr. Wade, is related to the ability to carry out effective and economic repairs on unforeseen circumstances and in remote locations. Mr. Wade also suggested that classification societies can and should play an important role in resolving these problems when they arise and, more importantly, prevent their recurrence by introducing rule changes.

BOB RIPLEY
(Continued From Page 9)

retirement, Bob stayed active in military affairs as a member of the board of The Retired Officers Association. He also entered Montana politics to run for the US Senate. He attracted a respectable number of votes, but was not elected.

Above all, Bob was great family man. There is no better evidence of this than the profoundly moving tribute written by his son, Robert K. Ripley, Jr. The text is posted on the IHS website at http://www.erols.foiler/ripley1.htm, and it is well worth reading, even for those who did not know Bob personally.

To Martha, Bob Jr., and the rest of the family: we share your grief in the loss of a good friend and a wonderful colleague. The "old timers" of IHS will be the keepers of the corporate memory of what Bob did for hydrofoils world wide, for the US Navy, and for the International Hydrofoil Society.

IHS HOME PAGE

The URL for IHS's home page is:
http://www.erols.com/foiler

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 Newsletter and Home Page Editor at bcblack@erols.com.

IHS 25th Anniversary Celebration/Conference Proceedings

To order a copy of the *Proceedings* containing a complete collection of papers presented, send US$18.50 for shipment within the US or $25 for international shipment to George Jenkins, Treasurer; 713 S. Overlook Drive; Alexandria VA 22305 USA.

VIRGIN FOILS IN VIRGIN WATERS

HYDROFOIL SERVICE, TOURS

By Norita Lee
Virgin Islands Business Journal
http://www.vibj.com

Since introduction of the Russian-built hydrofoil *KATRAN-1* to the Virgin Islands waters in April 1995, Virgin Hydrofoil Services, Inc. has been making waves in the commuter ferry business.

The original intent of the craft was to offer passengers another way to commute between St. Thomas and St. Croix, but immediately following its debut it became obvious passengers were riding the vessel for pleasure, not just business. Today that fleet has grown to four vessels, all owned by Virgin Hydrofoil Services and backed by Swiss investors.

Charters and commuter ferries are becoming an important part of the company's future. In addition to the St. Thomas-St. Croix daily ferry commuter service, the operation has expanded with charter services to Puerto Rico and the British Virgin Islands, a sightseeing historical tour around St. Thomas and St. John, and weekend ferry services from St. Thomas to San Juan.

Hydrofoil System of KATRAN-1 Built by Volga Shipyard and Operated By Virgin Hydrofoil Services, Inc. *(Photo Enhanced By Stan Louden)*

Virgin Hydrofoil has tapped yet another new market with the introduction of inter-island transportation of cargo at reasonable rates.

Traveling at 34 knots average, the craft makes the 40-nautical mile crossing between St. Thomas and St. Croix in one hour and 15 minutes, riding on foils which raise the cabin eight feet above the water. The St. Thomas-San Juan trip takes two hours. The fare for round trip passenger service between St. Thomas and San Juan is $37. According to spokesman Stan Louden, this is less than regular air fare rates to San Juan.

The Virgin Hydrofoil website is http://www.st-thomas.com/hydrofoil, email: hydrofoil@islands.vi or phone 1-340-776-7417. Volga Shipyard is at http://www.plugcom.ru/~volga; email: volga@pol.ru.

SEAKEEPING PREDICTION SYSTEM INTRODUCED

Maritime Reporter, Oct 97
http://www.marinelink.com

Consilium Marine AB recently introduced its new SAL Seakeeping Prediction System (SPS) whose purpose is to provide information regarding wave induced dynamic effects on the ship. The information is obtained by theoretical calculations in combination with measurements of the ship motions.

The SAL SPS allows basic configuration monitoring of bow slamming, green water on deck, hull vertical bending moment, acceleration levels and effective heel angles. SAL SPS displays responses in a processed form in terms of the most probable maximum value encountered during a certain period of time.

The new system also features a more sophisticated forecast intended to serve as an operational guidance tool in critical situations. This service allows the operator to test the outcome of different actions prior to executing them in reality and will also indicate the optimum corrective action.

IHS E-MAIL ADDRESS

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