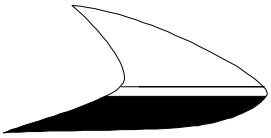
The NEWSLETTER



International Hydrofoil Society

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

Editor: Barney C. Black | SPRING 1998 | Co-Editor: John R. Meyer

From the 14th Fast Ferry Int'l Conference...

LINKING FAST FERRIES TO NATIONAL POLICY

By Martha A. Reardon
Principal, The Harbor Consultancy International
Officer, International Marine Transit Association
Chair, Committee of Ferry Transportation, TRB (USA)
(Reprinted With the Author's and FFI's Permission)

"The oracle whose seat is at Delphi neither speaks nor conceals, but indicates." The words of the ancient philosopher Heraclitus illustrate the essence of this presentation. A manufacturer of fast ferries seeking markets, or a fast ferry operator seeking new opportunities, can look to contemporary oracles — newspapers and media, or those seated in parliaments, regulatory agencies, and government administrations around the world — for indications of where there are needs that might be met by fast ferries, and where there are potential fast ferry markets that might emerge from new policies.

Voices speaking from urban centers around the world identify congested roadways, polluted air, concerns about energy efficiency, lack of transportation access for underserved populations, including the disabled, and the lack of adequate jobs among current and pressing problems. Where there are problems, there are also opportunities. Where it can be demonstrated that fast ferries can help to address these problems, public investments can be justified for fast ferry systems. It is important that ferry entrepreneurs understand the environmental, transportation, social, and economic policy context within which fast ferries will operate. Examples of how fast ferries complement policy objectives in the United States illustrate this thesis. A performance/ policy matrix against which fast ferries can be measured is proposed as an addition to the traditional vessel specifications sheet.

See National Policy, Page 7

1998 DUES ARE DUE

IHS Membership is still only US$20 per calendar year (US$2.50 for full time 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 abroad should contact IHS for suggestions. Don't forget to include your postal and e-mail addresses. *Important:* Please indicate whether you want your newsletter in electronic or printed hard copy format!

EXTRA PAGES

The printed version of the IHS newsletter is limited to 16 pages maximum. The electronic version, which can be read and/or printed with free Adobe Acrobat Reader 3.0 software, has no such limitations. This issue features information-packed **extra pages**, exclusively for readers of the electronic edition! See the IHS website at http://www.erols.com/foiler for details on the IHS electronic edition.

INSIDE...

JOINT MEETING

INTERNATIONAL HYDROFOIL SOCIETY - US HOVERCRAFT SOCIETY - SNAME SD-5 PANEL

Thursday, 18 June 1998

AN OVERVIEW OF THE FAST SHIP PROGRAM AT DARPA

Dr. Theo Kooij

Fort Myer Officers' Club (Abrams Room), Arlington VA USA
6:00 to 7:00 PM Cash Bar - 7:00 to 8:00 PM Dinner - 8:00 to 9:00 PM Program
Menu: Choice of Baked Salmon or Prime Rib of Beef, Vegetables, Dessert, Coffee

US$24.00 Per Person (Please Make Checks Payable to IHS)

Make reservations no later than mid-day June 15, if you plan to attend. *[Please honor reservations. Sponsoring Societies are responsible for "no shows."]* Contact Patsy Jackson: 703-418-1688 (pnjackson@jjma.com); Connie Buck: 301-227-4581 (buck@dt.navy.mil) or Mike McGinn: 410-544-2800 or 301-261-1030

The Fast Ship Program addresses technology required to build and operate long-range, fast, big ships. The talk will address the top-down requirements for fast ships, which leads to the lift/drag ratio (L/D) as the crucial factor. Some of the results from DARPA studies on hydrofoils and hybrid foils (which combine buoyant and hydrodynamic lift), and test results from some recently constructed manned models will be described. This will be followed by describing a potential roadmap for a research program in drag reduction for a specific Fast Ship application.

Theo Kooij was born in Dordrecht, the Netherlands. He received an MS degree in Mechanical Engineering at the University of Technology in Delft, Netherlands, in 1961. In 1977 he obtained a Ph.D. in Electrical Engineering at Catholic University of America. He joined the SACLANT ASW Research Center in La Spezia in 1961 as a Research Scientist. He joined the David Taylor Research Center in 1968, where he worked on target strengths of submarines. After a short time at the Underwater Systems Center in New London, he joined DARPA, first as Technical Director of the Acoustic Research Center at Moffett Field, and later as Program Manager at DARPA HQ in Arlington, Virginia. In 1983 he joined the Office of Naval Technology (now ONR) as Program Element Manager for ASW. In 1986 he left the government to work for the Arlington affiliate of BBN as Division Scientist, leading research in low frequency active sonar. Dr. Kooij returned to ARPA in 1993 (now again DARPA) as program manager. His programs include, among many, active and passive ASW detection and classification; the Center of Excellence for Research in Ocean Science (CEROS) in Hawaii; and Fast Ship studies.

WELCOME NEW MEMBERS

Mark Daskovsky is a physicist and engineer. He worked on elementary particle research programs at Fermilab and CERN before joining the computer revolution in the late '70s. For most of the past 20 years, he has worked as a system architect, engineer, and project manager on projects using embedded computers or microprocessors for data communications, telecommunications, and real-time control. His many past and present clients include: Bell Labs, Northern Telecom, GTE, and Disney World. In 1996-97, he worked with Peter Payne to develop the Dynafoil, a hydrofoil with a resilient suspension between the foils and the hull. He is currently investigating the use of the Dynafoil for high speed sealift and commercial cargo transportation.

Cory Roeseler is an engineer with Hood Technology Corp. in Hood River OR. He has experimented with kite-powered hydrofoils using an Air Chair hydrofoil water ski. During the past 15 years he has perfected the *KITESKI*, for recreational water sports enthusiasts; it is water launchable without assistance. The standard "skiing" version is featured in AYRS 118 *Ultimate Sailing III*.

Gunther Migeotte is working on his Ph.D. in Marine Engineering at the Univ. of Stellenbosch, and is doing research on foil-assisted catamarans. His interest lies in application of hydrofoil theory to design of catamarans particularly the semi-displacement and planing type. He is currently researching a number of methods to model these vessels with the final aim of developing a software tool for the design of suitable hydrofoils (sub-or super-cavitating) for a particular hullform. This work includes hydrodynamic and structural design.

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Hydrofoil Pioneers...

THE FATE OF FRESH-1

By William Ellsworth

[The US Navy's Boeing-built 16.7 ton, 53 foot Foil Research Experimental Supercavitating Hydrofoil, was intended to evaluate a variety of foil designs and arrangements at high speed. The space between the twin hulls allowed different foil systems to be mounted with complete freedom of arrangement and location relative to each other. FRESH-1 *capsized at 70 knots during an Acceptance Trial on 18 July 1963. The incident influenced the US Navy's decision to abandon its goal of a 100-knot hydrofoil and concentrate instead on achieving reliable 50 knot operations. This account of the capsizing is excerpted from the author's 1986 book* Twenty Foilborne Years.*]*

On 18 July 1963, Acceptance Trials with *FRESH-1* in a canard foil configuration were scheduled. Supervisor of Shipbuilding representative Pete Sias occupied the co-pilot seat. Vern Salisbury, Boeing test pilot, as usual occupied the left seat at the controls. Salisbury had been recruited from the Boeing flight line. In the rear seat, Bob Hubbard, manager of the Boeing autopilot development team, manned the instrument station. Data from the extensive instrumentation suite was recorded and also telemetered to a shore station where it was continually monitored by Boeing engineers during trials.

The trial on that afternoon was ill-fated. During the high speed run, the craft completely capsized. In a taped interview of Vern Salisbury on 22 Feb 84, he recalled events during the accident:

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***FRESH-1* Foilborne**

A 100-KNOT HYDROFOIL? MY FIRST QUESTION IS, WHY?

By Robert Johnston

There are interesting motivations behind the high speed hydrofoils of history. Forlini had a seaplane application in mind. Bell wanted a speed record for waterborne craft. Canada's *MASSAWIPPI* was initially a private venture for a speed record.

Starting in the World War II time period, the US Navy and the National Advisory Committee For Aeronautics (NACA) were interested in the take off and landing application of hydrofoils for seaplanes. It was demonstrated that seaplanes could take off and land in higher sea states by using hydrofoils. This led to Bill Carl's XCH4 which upped Bell's

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WHY NOT 100 KNOTS?

By Kenneth E. Cook, CEO
Hydrofoils, Inc.

In 1955 we designed, built, and tested a 13.5 foot hydrofoil racing craft in response to many uncontrolled race boat accidents where turning was the cause. Powered by the standard Mercury Hurricane 20 it had a wing deck between the two sponsons to create lift to get the hull up off the water and ran between 80 to 90 mph similar to most hydroplanes of that era. The only difference was the skid fin that was modified by adding a variable incidence horizontal foil used to pivot down (dig in) to hold the craft down on the water on the turning side. The outside was allowed to continue around, giving the effect of spinning around a street sign. Immediately it became apparent that if pitched up instead of down, the foil could lift the craft off the water. Now if you can lift the boat out of the waves with the variable incidence skid fin (hy-

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FRESH-1
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"We came down the Duamish River from the Boeing Missile Production Center into Elliott Bay and started the main engine. We proceeded hullborne to the test area where the chase boats and the Coast Guard patrol boats and helicopter had positioned themselves along the six-mile course. We traversed the measured mile off Vashon Island which the Navy accepted as valid for determining speed. Pete Sias was in the co-pilot seat which was normally occupied by a Boeing test engineer or member of the control system development group. They were usually jockeying the flaps to maintain proper foil depth. Their control input was more than I had ever recognized and consequently I did not take into account the fact that Pete was not performing the same functions as the regular co-pilot. I had recognized all along that some adjustments were continually being made during previous R&D trials but I didn't realize they were as significant as they later turned out to be.

"As we got down to the end of the test course and were turning around to come back and complete the exercise, I noticed that we were flying a little high. Hubbard agreed that we were a bit high and I said I thought we were too high. He suggested pushing the controls over to bring her back to the right height. Neither of us recognized that by pushing the nose down we would induce a directional instability by not having 'enough feathers in our arrow' back aft. This was because the aft end was too high without enough strut in the water. So, I pushed the nose down just slightly and it seemed like it was starting to correct, but it leveled off so I pushed it down a little more. Then it took off to the right. I immediately put the wheel over to the left-full over, thinking this would correct it. I did throttle back a little bit but I didn't want to pull the throttle completely because this was a record run and I didn't want to abort it in the middle. The craft continued to yaw and then started to roll and I pulled the throttle back further. She continued to roll and I thought she was going to catch on the port catamaran hull but it didn't. It had enough momentum to gradually roll completely over.

"When it hit, it was upside down and at a speed of about 70 knots. We had been going 80 knots down the course so I had killed off about 10 knots before we hit. The window in front of me carried away but it didn't hit me in the face; it hit Pete Sias and cut his chin pretty deeply. When I saw the glass carry away I reached back and tried to unlatch my door but turned the handle in the wrong way since we were upside down. I unlatched Pete's seat belt and tried to get him turned around. By this time the water had nearly filled the cabin and I was just about out of breath. I had grabbed a deep breath when I saw the window carry away. With Pete blocking the way to the bubble of air that remained in the cabin, I went out the window. I almost cut my hand off on the ragged edge of glass that remained. In the meantime, Bob had seen the bubble of air so he unlatched himself and got Pete turned around and got his head in the bubble. Then he managed to get his door open and both got out of the cabin. I had taken another breath at the surface and went back only to find both of them gone.

"Back on shore, Boeing had been advised of the situation by the marine telephone link and tugs and a barge crane were already underway to the scene. The chase boats picked us up out of the water and took us to the Fauntleroy ferry dock where an ambulance was waiting to take us to the hospital.

"All of the prior planning which had been done caused everything to work like clockwork. Furthermore, the instrumentation records permitted us to completely reconstruct the whole sequence of events which provided solutions to go forward with the next generation of hydrofoils. With all the procedures, controls, and safety features we had built into the program I don't think there was ever a possibility of losing someone.

"I have only one regret about the accident and that is it influenced the Navy's decision to not continue attempts to go 100 knots. I believe that in R&D you have to stay way out in advance and I don't think it was a good decision to cut off our ability to go on up in speed."

After the accident, the craft was refurbished, successfully completed all trials, and was accepted by the Navy. At this point, however, the focus of the R&D program was on the achievement of reliable 50-knot operations, and pursuit of 100-knot hydrofoils was suspended. *FRESH-1* was then put into mothballs at Boeing and never ran again. Also, even though they were completed by Grumman and delivered to the Navy, a transit foil system [designed to provide a smooth transition from a sub-cavitating to a fully cavitating flow regime and thus permit speeds up to 100 knots] was never tested. Even so,there was a positive result for the *HIGH POINT* (PCH-1). The instrumentation system from the *FRESH-1* was eventually installed on *HIGH POINT* and served the US Navy's hydrofoil R&D program well during later trials.

Interested in hydrofoil history, pioneers, photographs? Why not visit the IHS website at http://www.erols.com and go to the history and photo gallery pages. To expand the content of these important pages, IHS needs your help. First, additional photo contributions are needed, along with descriptive text. Also, storage space is needed on other servers. If you can help, contact IHS now!

100 KNOTS... WHY?
(Continued From Page 3)

speed of 70 mph to 78 knots. As the US Navy began to phase out the use of seaplanes, the related hydrofoil effort was discontinued.

The US Maritime Administration's (MARAD's) interest in high speed waterborne transportation was evaluated when Bill Carl's company Dynamic Development and Grumman produced the *DENISON*, which demonstrated open ocean capability and speeds to 60 knots.

Meanwhile, the US Navy's interest in high speed hydrofoil craft continued with an ultimate goal of achieving 100 knots. Under contract with the US Navy, Boeing built *FRESH-1*. A two phase program was planned with a Boeing canard configuration designed for 80 knots for Phase 1, and a Grumman-designed transiting set of foils for Phase 2 with the objective of demonstrating 100 knots. The difficulty of stabilization at these speeds was driven home when *FRESH-1* capsized during Phase 1 trials.

Although the US Navy's Auxiliary General Experimental Hydrofoil *PLAINVIEW* (AGEH-1) was designed for an initial speed of 50 knots, it had the capability to take additional power and different foils to achieve a much higher speed. However, as the Navy evaluated their hydrofoil craft, it became obvious that military craft up to 50 knots were achievable and fulfilled Navy mission requirements. With this, the surface Navy lost interest in the very high speeds.

In the meantime, other studies directed toward high speed waterborne craft for passenger and cargo transportation also showed that hydrofoils were competitive in time and operating costs with air transportation at speeds up to 50 knots and ranges of up to 150 nautical miles.

The only application that I can think of today to use 100-knot hydrofoils could be in the drug interdiction and capture of Cigarette boats in rough water conditions. However, the PHMs demonstrated their effectiveness in this role at 50-knot speeds.

The 100-knot hydrofoil is a tough foil and stability design problem. I think that the problem a hydrofoil designer should pursue today is to design craft in the 40 to 50 knot range that can be built and operated at the per seat costs of the catamaran. The hydrofoil has demonstrated its superiority in rough water ride qualities, but the comparative costs today make the catamaran more acceptable as a business venture. So, I have to ask: why 100 knots?

100 KNOTS... WHY NOT?
(Continued From Page 3)

drofoil), then why not invert the wing deck and use the air to push down instead of up to avoid the dreaded "blowover" and turn accurately at any speed. If you then balanced the downward air force against the up hydrofoil force by controlling size, aspect ratio, curvature, etc. than you should be able to have a balanced system at any speed with the hull out of the water above the waves.

In 1972 we founded Hydrofoils, Inc. to produce experimental models and production tooling for manufacture of high tech hydrofoils that could "turn at any speed." In Oct 73 our first US patent was issued disclosing the benefits of these high-speed, high-control craft. We then produced and tested a number of 16.5 foot, 130-mph boats.

In 1976 a proposal design for a 28 foot Patrol Hydrofoil was assembled for a request for quote from the Canadian Dept. of Fisheries. Russian fishing boats could be fined by the amount of illegal fish that were verified on board when stopped. The Russians knew this and would start throwing the catch overboard when the chase began. So the faster the chase boat, the higher the fine. This 28 foot project was not sold but started the design process towards larger craft. In 1978 we demonstrated a 16.5ft, 2-man hydrofoil by invitation of the Society of Naval Architects and Marine Engineers (SNAME) at the Advanced Ships Conference in San Diego CA, USA. In 1979 the initial design of 30' turbine powered hydrofoil began.

Back to the story. If you can push this boat forward at any speed and it stays in balance, and on the water, than you should be able to put a rocket on it and it will still work, right? Well, we did (put a rocket on a 36" model) and it did (work at ultra-high speeds). It worked so well in fact, in late 1997 the scaled up calculations went into a larger (~ 6 ft length) version, a rocket hydrofoil, that we fully expect will be able to do literally hundreds of miles per hour on water!

But why, and how do we make this useful? What if we all were directed to drive to work at 35 mph, turnpike, parkway, freeway and all? We did until the cars could go faster. That's what the fastest "fast" ferries do today. The only reason is that they can't go much faster, and if they could, would it be safe? There is plenty of room to navigate (assuming control), certainly more than the few feet clearance we give ourselves to pass at 60 mph on the road.

Continental US aircraft speeds are limited by the environmental stresses of the sonic boom. When offshore, supersonic aircraft don't just stop at mach one. They double those speeds — because they can.

Our autos can all far exceed the 60/75 mph US speed limits, but we are constrained by lack of control at higher speeds. As the control issues are resolved

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100 KNOTS... WHY NOT?
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in the future, auto speeds will increase dramatically to the next BIG hurdle, "G" forces on the human body. Well, if rail, helicopter, and auto normally operate between 60 to 100 mph, then what is the marine industry doing to be intermodal? The ability to connect seamlessly and effortlessly, carrying similar numbers of passengers, at similar speeds with other forms of transportation is paramount to the survival of marine industry. Air, auto, rail, and bridge technologies are rapidly advancing. We can use it or lose it. We need to shake off that "do what you want, but not on my watch" restrictive thinking and reach out for a better system. Building safe, high speed boats has not been a problem for many years. Financing them has been the problem. If we want the gold, we will have to get up and go for it. To the politician or navy officer, why let the other forms of transportation claim most of the funding, when most of the earth is water? We don't think bigger slow boats full of people will help the marine industry, do we? True advanced thinking, better terminals and docking, and true high speed ferries and freighters will rejuvenate this industry. Hydrofoils Inc. is designing a 75 foot, 30 passenger 100-mph ferry, and we are conducting open water tests of *unmanned*, radio controlled, extremely high performance, advanced composite, *[model]* hydrofoils with max speeds estimated at several hundred mph. So, I have to ask: why *not* 100 knots?

[Contact the author at: kencook@hydrofoil.com or visit his website at http://hydrofoil.com. Anticipating skepticism as to Ken Cook's expectations of "safe" ultra high speed capability your editors did contact Ken just to make sure that he stands by his figures (he does). Certainly his personal vision of hydrofoils in the future is dramatic, unique, and sincere. The counterpoints to Ken's view are presented here in the two accompanying articles by William Ellsworth ("The Fate of FRESH-1*") and Robert Johnson ("A 100-Knot Hydrofoil? My First Question Is, Why?"). -Ed.]*

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MEMBER NEWS

Scott Slocum retired from the US Navy to pursue work for a non-profit organization: Voyage of the Spray. They are going to duplicate Joshua Slocum's solo circumnavigation of the globe over 100 years ago. The crew will include teams of three school teachers who will provide lessons from the boat via Internet. Email: voyageofthespray@va.edu.

Dr. Leopoldo Rodriquez formed Marine and General Industry Consultants (Ma.G.I.C.) with 5 colleagues (engineers and naval architects from the technical office of Rodriquez Shipyard, now retired), Offices are located at Corso Garibaldi 118, 98122 Messina, Italy. This group offers research, design and development of advanced marine vehicles, fast passenger and car ferries, and fast catamaran and Foilmarans. Contact Dr. Rodriquez by e-mail at lrodriq@tin.it. Website: http://space.tin.it/scienza/lrodriqu.

IHS membership for full-time students is only US$2.50 per year.

CALL FOR PAPERS

International Conference on High Performance Marine Vehicles
17-19 March 1999
Zevenwacht, South Africa

Papers are invited on 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. 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: 17-19 Mar 99

Current Details for HiPer '99 are posted at website: http://www1.sun.ac.za/local/academic/fak_ing/meg_ing/HIPER_99/HIPER_99.html. For early registration, contact Dr. Volker Bertram, Ship Technology Research; Lammersieth 90; 22305 Hamburg, Germany; telephone: +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; telephone: +27-21-8084261; fax +27-21-8084958; email: thiart@maties.sun.ac.za.

INTRODUCTION

Transportation Policy — A Regional Example

The *Cape Cod Times* of 16 Jan 98 carries two newspaper articles which present contrasting oracular pronouncements projecting a future for fast ferries. The first emerged from conventional experts, transportation planners from the Cape Cod Commission. They spoke from a platform where concerns about traffic congestion, mobility, intermodal transportation opportunities and Cape growth policy have long been key items on their agenda. For over twenty years, access to Cape Cod [Massachusetts, USA] has been restricted to two bridges, often choked by seasonal traffic for eight hours at a time. Summer traffic on Cape Cod has also reached the choking point in a number of locations. Increasing traffic congestion on Cape Cod has presented an unresolved puzzle and dilemma for transportation planners trying to figure out better options. According to the newspaper report of this particular meeting, "the brightest hope in the Cape's future are high-speed ferries."

In the context of a somewhat clouded vision for the answer to traffic congestion on Cape Cod, other sources were tapped to provide clearer vision. The newspaper commissioned its own unconventional experts to forecast solutions for Cape Cod traffic problems. Professional psychics, Blackbird-Dreaming, and fellow clairvoyants, "conjured up visions of hovercraft and golf carts — or gridlock and negative energy." One clairvoyant projected an alternative route for Cape Cod: " ...I see in the future ... what they use in Vancouver, Canada, sea buses, that take people to the islands...They move quickly, like hovercrafts....". Her suggested ferry links to the Cape included connections to Boston, New Bedford, Rhode Island, as well as inter-Cape links serving Hyannis and Provincetown. One psychic meditated and reported: "We are not taking advantage of water, of ferry service.....a bright future begins by seeing a vision, such as...a vision of increased ferry service, and following through with it."

While the *Cape Cod Times* reports the visions of clairvoyants as well as emerging visions of traffic planners, both of which indicate a future for fast ferries, technical studies underway in two states, Massachusetts and Rhode Island, have analyzed fast ferry markets, and new route opportunities and constraints, and propose similar routes and services. Supporting the potential, US$50 million has been authorized in a Massachusetts bond issue for water transportation investments. A fast ferry demonstration is one of the proposals now being entertained by state transportation staff.

Here, in one region, the tide of expectations is rising, to the point where fast ferries could be launched to meet them, and to serve an articulated need. The Cape Cod Commission has embarked upon a technical study which is now examining possible new water transportation routes, and appropriate fast ferry technologies. In addition, the proposal of a major new Cape Cod intermodal transportation center, including parking for 5,000, and bus connections with ferry terminals, is central to the development of a broad set of transportation improvements.

Awareness of emerging problems and policies such as these (traffic congestion relief, clean air goals, intermodal transportation connections, and population mobility), and of how fast ferries can be used to address them, will be key to the successful initiation of new fast ferry services. Part of the challenge to ferry manufacturers and operators is to understand the dilemmas facing particular areas, regions or nations, to define the moment, to articulate the vision, and to work hand in hand with the public sector to achieve the desired results.

International and National Policies

Words of policy planners in one region are being repeated again and again in other regions around the world where environmental concerns, traffic congestion and growth policies conflict. The recent gathering of nations in Japan which addressed world concern for greenhouse gases, and the need to lower CO_2 worldwide is the latest of a series of initiatives during the latter half of this century to manage and organize resources in a way that will be more environmentally benign. Increasing numbers of automobiles, particularly in city centers, have congested old roadways. National restrictions on emissions have sent manufacturers back to the drawing boards, and new zero-emission vehicles are under construction. Demands of underserved populations are being answered by new requirements for access to transportation. Old highways are undergoing reconstruction, and new highways take many years for construction. Traffic alternatives are required.

In the midst of the traffic congestion on land, there is still great opportunity to provide environmentally friendly, energy-saving , accessible transportation at a reasonable cost, using the natural surface and right of way, the water.

Fast ferries are poised to forge new physical transportation links. At the same time, fast ferries are poised to forge new links to national policy, as meeting or responding to articulated national objectives. National policy centers, such as the Transportation Research Board in the United States, and the International Un-

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ion of Public Transport in Brussels, are among the locations where policies can be found against which fast ferries can be measured, and potentially marketed as a benefit, responding to the issue raised and providing an innovative approach to a solution.

One tool which can be used to measure the value of fast ferries within a policy framework is the lengthy environmental impact process, required by federal law in the USA where new highways or major infrastructure investments are to be made and where federal funds will be spent. Wherever there are coastal facilities planned (including bridges, tunnels or highways, or transit and transportation systems management programs, such as rail variants or high-occupancy-vehicle lanes) ferries should be examined as part of the environmental assessment.

In one instance, a federal environmental impact statement was required where a rail line reconstruction was proposed, along with reintroduction of diesel rail service to a number of coastal communities on Boston Harbor's South Shore. Here, rail opponents pointed out that a less expensive right-of-way, Boston Harbor, existed. Rail corridor reconstruction alone is estimated to cost US$285 million for 17 miles of rail and equipment. The annual operating deficit is anticipated to be US$6 million. 1,700 new transit riders attracted would be drawn from 1,300 automobiles.

Here also, where rail restoration would negatively impact villages, town squares, public safety, and introduce more diesel particulates and emissions than would be removed from the air by the number of automobiles to be diverted from traffic, transit agency consultants analyzed comparative cost-efficiencies, environmental impacts (including air, noise, wetlands impacts), and the ability of the transit mode to meet certain transportation objectives.

Proponents of fast ferries continue to challenge the transit authority's commuter rail program for the region, pointing out that ferries are more environmentally benign than the proposed rail. The existence of successful and expanding ferry operations serving the corridor has not convinced the transit planners that ferry service would achieve the objectives sought, however. The persistence of ferry and bus alternative advocates offers an effective fly-swatter approach, continuing to fend off the rail construction project in court proceedings. Meanwhile, ferry service continues to expand, and new fast ferries are being ordered by route operators.

Among the policies driving United States government public investment in transportation at the moment are the following: intermodalism, mobility and accessibility, clean air, defense conversion, and energy efficiency. The policies of intermodalism, mobility and accessibility and clean air are developed further here, along with comments about the policies of safety and security and sustainable development:

INTERMODALISM

US Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)

ISTEA was the US$156 billion national transportation bill which shaped the investment and philosophy of transportation in the United States over the past six years. At the moment, the successor, ISTEA II, is being debated in the US Congress.

In ISTEA, ferries were eligible for capital funds under a series of programs, both designated for ferries alone, and the broader general transportation programs. For those public agencies aware of the programs, there was significant success in bringing money for ferries to different states.

Three examples of many follow: the state of Rhode Island successfully applied for and received funds for ferry terminals, a fast ferry demonstration and a special program that will provide ferry service between two cities, and national park. In California, the City of Vallejo received a designated sum which enabled it to purchase two 35-knot catamarans. And, in New Jersey, the state successfully competed for US$2 million which will be used to construct a multiple-purpose ferry terminal for NY Waterway.

Ferries as Intermodal Partners

For centuries, transportation trips have been linked. By way of example, even an ancient painting of Marco Polo embarking a small skiff over a wooden walkway for transport to his sailing vessel illustrates this fact. Steamboats on the Mississippi were served both by small ferries and launches, and passengers were brought by stagecoaches. In San Francisco, trains converged across the bay, and tens of thousands of passengers transferred to ferries, in the early years of the 20th century. Before construction of the Bay Bridges, 250,000 people passed through the San Francisco Ferry Terminal each day. Today, major ferry ports, such as Dover and Hälsingborg, offer excellent examples of intermodality.

Federal funds coming through the ISTEA and ISTEA II bills are directed to all modes of transportation, including ferries, with a new focus on intermodal connections. The intent to link transportation modes is clearly stated in Section 2 of ISTEA: "It is the policy of the United States to develop a National Intermodal Transportation System that is economically efficient and environmentally

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sound, provides the foundation for the nation to compete in the global economy, and will move people and goods in an energy efficient manner."

Ferries are presented as partners in intermodal transportation programs in a number of states. Fast ferry operators can find capital funds for park-and-ride lots, for trailblazing signs, for intelligent transportation systems, for access roadways, for terminal and piers, for joint transportation information centers, and for a range of other ferry system elements by understanding and interpreting the intent of ISTEA for transportation planners and decision makers, thereby leveraging private sector funding with public sector support of required infrastructure.

The most striking example of how public funding of infrastructure can alter the transportation picture is that of the Interstate Highway Act of 1957. This Act led to the dominance of truck transport and the demise of rail transportation. It came about as a result of intense lobbying by highway interests. If the new version of ISTEA lacks targeted discretionary funds for ferries, it is perhaps due to the weakness of the ferry lobby in the USA.

On the other hand, under the principles of ISTEA, states and regions can allocate capital investment and spending plans, under which ferries can be funded. Thirty-five states currently have ferry systems, over half of which are operated privately. Innovative ferry programs can be supported state by state where there are waterways, but ferry proponents must compete with other transportation modes, highway and rail, for scarce resources.

MOBILITY AND ACCESS

A recently published report, entitled "Critical Issues in Transportation," issued by the Executive Committee of the US Transportation Research Board, an arm of the National Academy of Sciences, identified what the committee considered to be the transportation needs facing the United States in the new millennium. Among these was the objective of providing both mobility and access to the public, in the movement of goods and people. As defined in the report:

"The concept of mobility implies an emphasis on improving capacity, whereas the concept of access implies an emphasis on providing more choice in mode of travel and linking decisions about transportation spending with land-use policies."

Mobility

Increased capacity is achieved by improving throughput on existing rights-of-way, or by creating new rights-of-way. It is rare that transportation planners consider waterways to be rights-of-way, and yet these underutilized surfaces are just that.

Federal funds are positioned to advance high-occupancy-vehicle (HOV) programs. HOVs can include any vehicle carrying more than two or three passengers. HOV lanes are being designed and constructed to improve traffic management of congested highways. In California, proponents for new fast ferry service from the City of Vallejo to San Francisco pointed out that ferries traveling a water route parallel to [Interstate Highway] I-80 were in fact floating HOVs. A study of construction of a land-based high-occupancy lane meanwhile indicated that it could cost hundreds of millions of dollars to implement the program on land.

The largest high-occupancy vehicle in the world is the Staten Island Ferry, with a capacity of 6,000 passengers. Planners are surprised to realize that this one ferry has a passenger-carrying capacity equivalent to four lanes of an urban expressway at rush hour. The challenge for the ferry industry is to step into the mind-set of the transportation planner, and to translate what ferries are and what they can do into the language of traditional planner.

New ferry services were instituted in San Francisco, in New York, and in Boston to improve mobility. In San Francisco, the Golden Gate Ferry, a US$35 million system constructed in 1975, was designed to attract automobile drivers from the Golden Gate Bridge, and free bridge capacity. This was seen as a less expensive and complex solution than construction of a new bridge, or a double decking of the existing bridge. Gas turbine 750-passenger, 25-knot ferries were constructed, and went into service. Wake wash issues slowed the ferries, which blunted their competitive edge.

However, the same route is about to be served by a 35-knot catamaran ferry. The Golden Gate Bridge Highway and Transportation District has committed itself to strengthening over-the-water transportation links as an alternative to more expensive bridge options.

In New York, the New York and New Jersey Port Authority solicited bids for a trans-Hudson River "seamless" ferry transportation system. The objective was to provide a high-frequency, high-volume ferry system with the capacity to carry up to 4,500 riders an hour. The ferries were to be attractive enough to customers to draw them from automobiles congesting tunnels and bridges. Even though the solution selected was a conventional speed bow-landing ferry, the efficiency of the seamless transfer for passengers from vessel to dock to bus, where there is no wait nor queuing, gives

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the impression of "fast" ferry transportation. Since 1986, the entrepreneur serving the trans-Hudson routes, has grown from one vessel to 16. The ferries are linked with 70 buses. The routes vary, depending upon the time of day, and are designed to serve commuters, tourists, and excursion travelers. Some 26,000 passengers are carried on the NY Waterway ferry/bus system each day.

In Boston, a medium-speed crewboat ferry service was enlarged to serve passengers on an 11-mile route, at the time when transportation alternatives were being sought during reconstruction of a major highway into Boston. The transportation alternatives offered mobility options to the region during a difficult travel time. This was such a popular success that the additional ferry routes have never been dropped. There are now plans by a private ferry operator on the route to bring in two 35-knot catamarans.

Also in Boston, a current highway project, the Central Artery reconstruction, has placed the entire waterfront of the city under continuous building and rearrangement. Ferry transportation has been instituted as "traffic mitigation," and to provide transportation mobility during this period. Although the agencies involved seek ferries offering conventional speed, there are also speed and wake constrictions in Boston Harbor channels. This raises question about whether even a no-wake/low-wake higher speed vessel would be allowed to operate at a faster speed.

Where there are congested highways, tunnels, and bridges, or where there are major highway reconstruction projects underway adjacent to navigable waterways, ferry routes can be incorporated into transportation plans to improve mobility.

Access

Most conversation and planning about access deal with the disabled population, and many conference sessions have focused on accessibility guidelines for vessels and ramps serving those vessels. Fast ferry system designers can meet and exceed accessibility guidelines in access ramps, terminal configurations, rest rooms, vessel entry, and aisle widths, as well as in installation of supplementary sensing materials to assist those who have no sight or hearing.

There are other access issues, which fast ferries can serve well. Improved access for the poor to places of work ("welfare to work"), new and improved access to recreation, including parks and beaches, and better access to national parks are among those desirable public goals.

SUSTAINABLE DEVELOPMENT

In "Critical Issues in Transportation," sustainable development is defined as "striving to meet the multiple needs of the present while ensuring that future generations will have adequate resources to meet their needs." Issues that come within this equation include growth, mobility, consumption of resources, the environment, and social and economic opportunity.

Where ferries can be used to demonstrate that there are cost efficiencies in using the natural right-of-way, a navigational channel, rather than in constructing highways, and where ferries are scheduled flexibly to meet a range of transportation needs and demands, they can be said to offer neatly sustainable transportation. Use of alternative fuels, energy efficiencies, flexible ferry routes, and non-polluting engines (air and water) are key opportunities here. With the growing concern about greenhouse gases, lessening of carbon dioxide has become more central to the international debate and objectives. Where fast ferries can be demonstrated to lead the way in lessening the clean air and greenhouse emissions, they can be marketed as green vehicles.

Ferryboats have received "green" awards. In the United States, by way of one example, those participating in the establishment of the Hingham-Boston commuter boat in the 1970s received clean air awards, including the ferry operator, since the goal of the initiators of the new ferry system was to get commuters out of automobiles and into transit. Now, some twenty years later, 20-25% of the commuters traveling to Boston from the suburban communities take public transit, a high public transit figure for the United States. Most of these use the fast ferries. Based on any comparison with fixed rail and automobiles, ferries consume fewer resources and provide desired transportation objectives. These facts provide grounds for argument that ferries are partners in sustainability.

SAFETY AND SECURITY

People are attracted to transit which is cost-effective, reliable and frequent. Most "modal-split analyses" narrowly define transportation options using these parameters. However, more and more, quality of life issues emerge as key in transit choices. These include perceptions of comfort and safety. In New York City, the principal reason selected as the decision point for commuter's choice of the trans-Hudson ferry was "comfort."

When there are many transportation options, the difference provided by quality of customer service can make the difference in the customer's choice of the service.

Where ferries can be demonstrated to be safe modes of transport, and

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NATIONAL POLICY
(Continued From Previous Page)

where passengers feel a sense of personal security, these needs will be satisfied. Issues like improvements in waterways management will become more important as there are more fast ferries. No-wake ferries will be more important where ferries compete for waterways space with recreational and fishing vessels.

Maintenance of ferries is also key. A recent fire in Boston Harbor on a medium-speed ferry discouraged ridership. The perception of lack of maintenance has moved some ridership to the competitive ferry service.

CLEAN AIR

Congestion Mitigation & Air Quality

The ISTEA legislation of 1991 established a number of innovative programs in transportation. One of these was the Congestion Mitigation and Air Quality program (CMAQ), in which transportation projects meeting clean air objectives were targeted for public investment. The intent of the program was to aid state governments in their efforts to comply with the National Ambient Air Quality Standards (NAAQS). CMAQ programs are intended to reduce emissions of volatile organic compounds (VOC), nitrogen oxide (NOx), and carbon monoxide (CO).

Fast ferries can meet various of the CMAQ categories, which include:

- transit improvements (a new ferry service, or expansion of an existing service)
- demand management strategies (ferry operators can work with employers to shape a transit program)
- bicycle and pedestrian programs (ferries can be linked with bicycle trails, pedestrian ways, and promoted in marketing strategies)
- inspection and maintenance (ferries can be proposed which are powered with alternative fuels)

In the state of Rhode Island, planners were successful in gaining US$1 million for a fast ferry demonstration under the CMAQ program. The procurement process for the vessel is currently underway.

In California, policies articulating Bay Area clean air objectives have been used to encourage investment in fast ferries. According to a regional San Francisco Bay ferry analysis, "The Bay Area must reduce mobile source emissions to meet Clean Air Standards, particularly for hydrocarbons. The Bay Area Air Quality Management District has suggested reducing automobile travel by 35 percent to meet this goal."

It is estimated that there will be more than US$1 billion available each year in the United States to fund the CMAQ programs once the next federal transportation bill, ISTEA II, is passed. Meanwhile, measures of determining actual effectiveness of reducing emissions, and cost-effectiveness of alternatives are being set into place. Fast ferries can be players in the CMAQ programs in the United States.

CONCLUSION

In the USA, clean air and intermodal transportation policies have, in particular, been used to effectively leverage fast ferry investments. There are other policies where fast ferries can help to achieve designated objectives, including energy efficiency, defense conversion and economic development (tourism and jobs). Members of the ferry industry seeking to encourage investment in the industry can lobby the US Congress, or monitor emerging policies to identify where fast ferries can help a region, state or nation meet stated policy objectives.

Meanwhile, fast ferry manufacturers and operators should augment traditional specifications sheets with information which responds to transportation, intermodal, and clean air objectives. It would be advisable, therefore, to develop and apply a performance/policy matrix to vessels and multivessel systems, to demonstrate how fast ferries can help meet desirable objectives articulated in regional, national and international arenas.

[Reprinted with permission of the author and Fast Ferry Int'l, the premier source of information on fast ferries. E-mail to info@fastferry.co.uk or see their website at http://www.fastferry.co.uk -Ed.]

WELCOME TO NEW MEMBERS
(Continued From Page 2)

Corrie Cammack has a ski boat and enjoys boating on local waterways in the Southeast USA. For Corrie, hydrofoils are a combination interest from boating and flying. Corrie was in the US Navy years ago "in the aviation end of it and did not spend much time on surface ships except for aircraft carriers." Corrie does know what it feels like to fly, and also has some boating experience. To combine the two is really a very interesting idea, according to Corrie — IHS tends to agree!

[The diversity and scope of the IHS membership continues to grow, but more members are needed, and so is more hands-on participation by existing members. - Ed.]

IHS E-MAIL ADDRESS

foiler@erols.com

LETTERS TO THE EDITOR

Flotsam & Jetsam

I have been developing a partially hydrofoil supported boat. Where can one find an honest discussion of hazards associated with striking debris?

Roger W. Gallington
Roger.W.Galington@cpmx.saic.com

Data Source

I was motivated to drop you a note by the letter from Sebastian Thellien for data on hydrofoils. We presented data on the *JETFOIL* forward foil system at the 19th American Tow Tank Conference which might be of interest to him.

Robert (Bob) Dixon
3933 SW 109th
Seattle, WA 98146

Design Info

I was searching through the net for some info on the "Aerodynamic and Hydrodynamic Design of a Hydrofoil" and your page came up. I am doing an in depth discussion of the design and operation of a hydrofoil for my aerodynamics course. I have never really looked at hydrofoils until now. They are really interesting machines. If you have any other info not posted on your site that may help me I'd really appreciate it!

Tristan Lee Andrew
tlandrew@learn.senecac.on.ca

Scale Models

When I was a kid (I'm 32 now) I remember flipping through a pile of Popular .* mags and found an article on building an .049 scale tethered hydrofoil. I'm guessing it was early 70s. Any info greatly appreciated as hard searches have yielded nothing.

D. Sprock
DSprock@aol.com

Do you have any information helpful for building a 24" model of a hydroplane for racing? I've been racing hydroplanes in competition for several years, and hold several records, but the yearn for speed has me looking to foils.

Andy Kunz
montana@pop.fast.net

[Both D. Sprock and Andy Kunz should visit IHS member Ken Cook's website: *http://hydrofoil.com*. He offers several radio controlled racing hydrofoil models. It would pay you to join IHS before buying, as he offers a good discount to his fellow IHS members! - Ed.]

Built For Speed

Just greetings, from Chile. I like the [web] pages like this, no graphics that only make me wait, Wait, WAIT ... The information is the important thing.

Juan Fernandez
Roman & Cia. Ltd.
romancia@cmet.net

[For a short autobiography by Chilean hydrofoil pioneer Helmut Kock: http://www.erols.com/foiler/ kockbio.htm]

Science Fair Project

I would like to build a hydrofoil for science class. My grandmother saw a man on TV who was showing a fairly inexpensive project that could support the weight of one person. It used a motor from a vacuum cleaner and required an electrical supply (big extension cord) and 2 plywood circles. She could not remember what else but I thought you might be able to help me with this info or perhaps tell me where I can find it.

R. Fisher, 8th grade
rlfisher@kih.net

[The extension cord sounds dangerous and impractical. You can buy a US$15 set of plans to build a one-person hydrofoil boat from Back Yard Yacht Club, http://www.stevproj.com. -Ed.]

Has Turbines

How would I contact the US Navy inventory manager for the LM2500 gas turbine engine?

Richard Treloar
rtreloar@concentric.net

[The LM2500 inventory manager is Ms. Shirley J. Thompson, Inventory Management Specialist. Her phone is 703-602-0401 x302. Her email address, (if it follows the general format of NAVSEA addresses) should be: Thompson_Shirley@hq.navsea.navy.mil. Mailing address is as follows: Attn: Shirley L. Thompson (Code 03F3, NC3 10W16); Naval Sea Systems Command; 2531 Jefferson Davis Highway; Arlington VA 22242-5171]

Hydrofoil Yachts

I am trying to determine the possibilities and performance capabilities of using hydrofoil boats for personal yachting. I once rode on a trial craft that was to be utilized commercially in the Great Lakes (USA) but it never happened. This particular craft was about 60 feet long and was fast and smooth.

Art Leo
dab1@flash.net

[Presuming that you are speaking of motor yachts rather than sailing yachts: There are many hydrofoils of proven design operating in the size range you mention, though they are designed as ferries or tour boats. There are also several on the drawing boards waiting for someone to bankroll the detail design and development. I believe that one royal personage had a Boeing JETFOIL outfitted as a yacht in Saudi Arabia. On a smaller scale, Harry T. Larson, a Boeing employee, successfully added foils and an automatic control system to his Bayliner. In the links section of the IHS web page

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there are South African and Italian sites that could interest you, also Harry Larsen's site. If you could provide any specifics about your interest... whether you are a the designer or the customer, areas in which the yacht is intended to operate, etc., that might help generate more useful information. -Ed.]

Response...

I don't know of anyone offering a personal hydrofoil for sale to the public. There have been several Jetski prototypes built, and there are a number of one-of-a-kind craft in the 20 to 60 foot range. In general, the control system and unconventional propulsor make a fully submerged hydrofoil somewhat cost prohibitive for personal use. In the 80 foot range, we see a 50% higher cost delta when the fully submerged foil craft is compared with a planing hull.

Mark Rice
mapc@access.digex.net

Hydrofoiler Checks In

I was on the US Navy's PHM hydrofoils from 1991-93; I was on the decommissioning crew. See my photos: h*ttp://home.sprynet.com/sprynet/gone2key/navyhydr.htm*

Merv Turner
turnerm@cs2.barksdale.af.mil

Thunderball

Re: Rodriquez hydrofoil *FLYING FISH* converted to *DISCO VOLANTE*? Last known in Jane's High Speed Marine Craft, 1990. If you have any data, please contact me.

Bobbinish@aol.com

Foils For Catamaran

I want to turn my catamaran into a high flying above-the-water speed machine. Please let me know where I could get more info in this area.

Brent
brent@gator.net

[Your options: (1) Buy an add-on hydrofoil kit. These are available from DAK hydrofoils; their website is http://members.igateway.net/~dakh, email: David Keiper at dvpw98e@prodigy.com. (2) You can design and install hydrofoils yourself, though I don't think this is worth the effort when a kit is already designed, proven, and available for purchase. There is an article in the previous IHS newsletter by Tom Lang who did just this in the 1950s and sold the kits on the open market. There is lots of design info available through reprints and back issues of the Amateur Yacht Research Society and Multi-Hulls magazine. (3) You can trade in your existing boat for one designed as a hydrofoil such as Hobie TRIFOILER *or WindRide* RAVE*. There are links to these web pages from the IHS website: (http://www.erols.com/foiler/linksout.htm)]*

Foils in France

I am a French student in engineering and I am going to make studies about the fences of the foiler catamaran *TECHNIQUES AVANCEES*. So it would be kind if you could tell me where to look for info (websites, books, articles).

http://www.ensta.fr/~dsim/accueil.htm
marly@ensta.fr

[The best source of technical information on sailing foil designs is reprints of articles from the Amateur Yacht Racing Association and Multi-Hull Magazine. See a full index at http://www.webstrand.org/yachts/aindex/index.shtml.
Also, see links page of the IHS website: http://www.erols.com/foiler/linksout.htm]

I'm French, 19 years old, and I'm in a scientific university to become an engineer. To pass my exam, I need your help! With my friend, we want to do some research about hydrofoils. Please, can you give us some technical and scientific research about this.

Julien Mabille
jmabille@nordnet.fr

[Explore the links and bibliography pages on the IHS website. If you go to the site via the Alta Vista search engine at http://altavista.digital.com you can see a machine-generated translation of the web pages into French. -Ed.]

Bob Ripley

I just received your newsletter in the mail about my father, Bob Ripley. I just wanted to say thank you so much for your tribute to him. I remember my first time on a hydrofoil. I think working with advanced ships was the highlight of my dad's Navy career. He loved the Navy and often bragged about the time he spent selling hydrofoils. He would be pleased to know that you thought so much of him to write about his contributions. I miss his deep voice too. God bless.

Martha Lynne Ripley
MLRipley@aol.com

Atlantic Hydrofoil

I'm trying to get some information on Atlantic Hydrofoil, Inc.

Theodore James ("Jim") Raun
ravn@email.msn.com

Response...

Atlantic Hydrofoil was headed by John (Jack) Roper, initially on Long Island NY (ISLIP) then moved to New Hampshire (town on Lake Nubanusit). Their projects included design and fabrication of foils and foil/strut kits as well as prototype craft, some with hybrid features, such as Skicat, and some advanced planing monohulls such as CPIC, a 100-ft, 45-kt navy Coastal Patrol Interdiction Craft. Dr. Dan Savitski, former Director of SIT's Davidson Laboratory, and Messrs. Joe Koeble and Gordon Sammis were key members of Jack's team — this team constituted as fine a body of marine engineering and architectural talent as could be assembled at that time for advanced marine vehicle development.

Jerry Gore
jgore@comclin.net

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LETTERS TO THE EDITOR
(Continued From Previous Page)

HYSWAS

I'm a 2nd Year Naval Architecture student in UCL interested in the control systems for the HYSWAS roll stability. I would be grateful for some references.

Yama
c.seow@ucl.ac.uk

Response...

Our specific HYSWAS control algorithms were developed under US Navy funding and are not available for release. However, I can tell you the following:

- Everything in the transverse direction is driven by the loads that you calculate based upon your hull geometry. For example, your strut area projected in the athwartship direction will have a large influence on the loads.

- Your roll control algorithms must be fast as you want to counter the applied moment before inertial loads become a big factor.

- Calculation of the roll center is critical, and this should include added mass effects.

Mark Rice
mapc@access.digex.net
Maritime Applied Physics Corp.
Laurel MD USA

Hobie Foil Kits

I sail a Hobie 16 on Lake Ontario. I'd be interested to know if anyone has experience of fitting foils to a Hobie, particularly hydrofoils from a kit, and what the results were.

Peter Staadecker
rps@sympa 98

The Best School?

I am going to America in July. I am admitted to Ph.D. program by Univ. of Michigan Ann Arbor (Naval Architecture and Marine Engineering), California Institute of Technology (Mechanical Engineering), UC San Diego (Oceanography), Johns Hopkins Univ. (Mechanical Engineering). Caltech is the most famous, but University of Michigan is very attractive too. Do you know what is the situation in shipbuilding industry in the USA? Could I find a job having a Ph.D. degree from Univ. of Michigan?

Konstantin Matveev
matveev@lili.teknikum.uu.se
http://www.geocities.com/CapeCanaveral/Launchpad/3416

PLAINVIEW

I had the distinct pleasure of being the *PLAINVIEW*'s Chief Engineer during the period Feb 76 to Feb 80 when the vessel emerged from its epic overhaul and conversion and during which it finally lived up to its designers' expectations. I briefly envisioned the *PLAINVIEW* again majestically rising above the waters of the Pacific Northwest and banking into a turn. Then reality set in quickly. I remembered the monumental effort it took to get the ship through that overhaul, to train the crew and to solve the new laundry list of technical, budget and schedule problems that seemed to confront us weekly. I remembered my last glimpses of the *PLAINVIEW* on the mudflats in Astoria, Oregon in a photo sent to me by Dwaine Sorenson of Boeing and in the background of the movie *Short Circuit* filmed in Astoria in about 1985. I quickly concluded, "Not likely to ever see that again!" I am afraid I must agree with Sumi Arima, [that *PLAINVIEW* cannot be restored]. Even if the hardware could be found, I doubt that the technical data still exists or could be recreated. Feel free to contact me.

Greg Bender, LCDR, USN (ret)
glbender@erols.com
gbender@noesis-inc.com

[See the Autumn 1997 IHS newsletter to review Douglas M. McClair's proposal to restore PLAINVIEW *or see http://www.erols.com/foiler/postings.htm#five on the IHS website. -Ed.]*

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.

Buying a Ferry

It would be appreciated if you could inform me on how to find second hand hydrofoil of 200 passenger seat or more made by Rodriquez.

Tasos Anastahas
ntwrkrho@otenet.gr

[Visit the IHS website and read the posted messages and answers on where to buy a new or used hydrofoil (go to http://www.erols.com/foiler/postings.htm). Also, visit the website of Fast Ferry Int'l (http://www.fastferry.co.uk), which is the premier information source for fast ferries of all types. The FFI web site has a "Brokerage Page" that lists used ferries "For Sale" and "Wanted to Buy." FFI publishes an annual directory issue of their magazine, and they also sell a computer database of information on every fast ferry known, including those that are not currently being operated. Names and addresses of ferry operators are included, in case you want to contact some with offer to buy. IHS has a copy of the database and will run custom reports on request for IHS members (within reason). Note that there are several innovative companies with unbuilt or prototype hydrofoil designs who could be viable suppliers, but who would not yet show up in the database, since FFI is oriented towards existing ferries. 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 TN36BW; UK. Their website is http://www.fastferry.co.uk. The Russians are aggressively marketing

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HYDROFOIL NEWS DIGEST

DUESSELDORF '98

By Claus-C. Plaass
plaass@ki.comcity.de

From 19-25 Jan 1998, Duesseldorf on the Rhine River saw the world's largest boat show, attended by 375,000 visitors, among them 50,000 foreign guests from 50 countries. As many as 1,685 exhibitors from 39 countries plus such action centers as a scuba-tower, a 60m x 20m water basin, and show stages could be seen on 200,000 sq m covered area in 15 halls. From Europe's largest scuba-dive show to the 35m motor yacht *GOLDEN EYE* (German built for a director of the Russian gas supplier Gazprom) almost everything imaginable was there.

Topcat's "Catlift"

One of Duesseldorf's highlights (not for monohullers!) was certainly "Catlift." Klaus Enzmann, Topcat's designer and owner, introduced this hydrofoil kit, which fits his own beach cats as well as Nacras, Darts, Tornadoes, etc. Two bow-mounted front foils produce enough lift to prevent submarining and turning over in high winds and gusts. A vertical strut (Staudacher 138-SG) of up to 850mm length holds a lifter (ENZ 96-IV), with the attack angle controlled by a surface sensor, as in the *RAVE* and the *TRIFOILER*. Designed by hydrodynamic specialist Dr. Martin Fischer of Hamburg, the arrangement has a drag of just 11 N at 20 knots, but a lifting force of 460 N (measured at 5 degrees). Easy tacking is not affected because the submerged parts can swing as rudders. "Catlift" can be bayonet-latched on a special socket screwed onto the deck, or using a round-the hull glass reinforced plastic (GRP) band clamp that spreads forces and avoids hull damage. The foils are swiveled vertical by pulling a line

Klaus Enzmann introduces "Catlift," his new hydrofoil kit for catamarans

from the cockpit. Unintended grounding will break just a simple plastic adjustment screw that allows the unit to flip backwards. For shallow waters or light air, the foil is retracted between the bows by releasing the line. Two springs in the socket lift the whole unit until it is locked to prevent pitching damage.

It was some 34 years ago that Enzmann started selling his A-cats from a low-budget booth at one of the first Hanseboot shows. Now, having sold 14,000 Topcats worldwide, his stand, hidden in a corner, was small again. His first foiler came in 1983. That trimaran ran on wedge-like "Zischflaechen" (hissing foils), proposed by German eng. Felix Wankel (inventor of the rotary piston). Recently, Hamburg saw a symposium "100 Years of Hydrofoils." From Moy in 1897 via Baker in the 1940's, Keiper in the 1970's to *LONGSHOT* and *RAVE* in the 1990's: Hydrofoils are a'comin'! *[Contact Klaus Enzmann by e-mail at kenzmann@aol.com.]*

AEROSKIMMER

It was in 1994 that Tom Bakker of Almere designed the *AEROSKIMMER*. Despite being a land-based, oil-prospecting geologist, he built a highly efficient Dacron-Aramide-carbon wingsail with 20 sq m surface, hinged onto a 4.10m mast. Her planing hulls of 4.80m length hold an aluminum frame to seat two crew, thus giving her an impressive overall width of 4.80m. According to chief technologist Erik van den Berg, *AEROSKIMMER* starts gliding at just 10 knots and points as high as 39 degrees upwind. The highest speed is achieved with a vertical wing and 110 degrees wind abeam, giving most forward force. An uncontrolled downward foil on both rudder blades keeps the hulls horizontal, thus acting as a motion damper and reducing pitching. The combination of soft wingsail and reversed "T"-rudders has been patented. After tests on Dutch Ijsselmeer, they won the '97 Weymouth Speed Week with the 0-serial model.

A first batch of 25 *AEROSKIMMER*s is under construction at a Hungarian glider factory, and they will hold their first World's on 1 July 1998. Although the *AEROSKIMMER* brochure claims "First on Wings," a little cat *TACKWING* used a swiveling wingsail at Weymouth Speed Week in '74 — that was 25 years ago! Further info from: Tom's Speed Sail, phone and fax +31-3653-60063, email: info@speedsail.nl.

More News Items on Next Page

LETTERS TO THE EDITOR
(Continued From Page 14)

passenger hydrofoils at good prices,so you may want to consider purchasing a new vessel if you cannot find a suitable used one. -Ed.]

Brokers

I am interested in purchasing a hydrofoil boat 30-40 feet in length. Do you know any hydrofoil brokers? I find them very hard to locate now, and I was wondering if you could help me.

Matt Rak
mrak2@ignatius.wju.edu

[Unfortunately IHS has no participation by the yacht brokerage community, so we don't know of one to suggest. If you find some good ones, let us know. A quick search of the web yielded one hydrofoil broker, T & T Yacht & Ship Int'l at http://www.marine-world.com/brokers/TT.html. -Ed.]

Build It Yourself

I am looking for the plans to build the Solo Hydrofoil that was in the Sep 67 issue of *Mechanics Illustrated* magazine. It is a 1-man Hydrofoil; foam-filled fiberglass hull by Italian designer Renato Castellani. I now have about a 1/4 page line drawing of this craft that is just wild looking. Have others built this that you are aware of? Is there a more modern design? I'm dying to make one but no one seems to know of him or this craft.

George Faulknor
gfaulknor@corp.home.net

Foil Kits

I have a 17' ski boat with a 115 hp Mercruiser I/O. Can it be retro-fitted with foils and if so how do I do it or who does this kind of thing. It will go about 45 mph at wide open throttle of 4,500 rpm but ride is rough when the wind brings up swells and waves make ride miserable going across the lake or for a long ride. It is a deep V and rides well when trimmed up in moderate clean water; give some waves and it is rough.

Corrie Cammack
corriec@cybertron.com

[A major benefit of hydrofoils is a smooth ride in rough water. In the 1950s there was a bolt-on hydrofoil kit available but market demand did not support the product, so it was discontinued. There are a few hobbyists around adding foils to speedboats, but no foil kits that we know of available "off the shelf" as a commercial product. There are foil kits available for sailboats, and these might be adaptable, but unless you are a skilled tinkerer, you probably wouldn't want to mess with anything not designed specifically for your use. To learn about what is involved in designing a kit, see the Winter 97/98 edition of the IHS newsletter. -Ed.]

Response...

Note that IHS member Ken Grina (grina002@tc.umn.edu), who used to work for Boeing Vertol and whom I knew when I worked there over 25 years ago, has *done* what Corrie wants to do.

John Meyer
jmeyer@erols.com

New Website

I work with Sam Bradfield at HydroSail, Inc. We are sailing hydrofoil designers (although we put foils on power boats, too). We have started a web page: http://members.aol.com/HYDROSAIL. It has a few photos, and I will continue to add info about our designs and work.

Mike McGarry
hydrosail@aol.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.

NEWS DIGEST
(Continued From Previous Page)

SLICE TEST RUN

In a colorful article by staff writer Mike Gordon, the Honolulu *Advertiser* reported on 1 Mar 98 that a new US$14.5M SLICE vessel designed by Lockheed and built by Pacific Marine for the Office of Naval Research got a test run from Honolulu Harbor to Hanauma Bay and back the day before. Transportation officials and legislators boarded the SLICE for a three-hour underway tour to get a feeling for how the high tech SLICE might work as a commuter ferry. The vessel sailed at nearly 35 mph into strong headwinds and swells "as tall as minivans," according to Gordon. The *Advertiser* quoted Pacific Marine VP John Ball as saying, "If we can demonstrate its success, we can market it all over the world. Hawaii is the perfect place for it. We have the sea space to test things. We're in the middle of the ocean. But we would have to develop the work force." Pacific Marine believes SLICE is the perfect ferry for Hawaii's usually rough waters, according to Gordon. *[IHS last reported on SLICE in the Autumn 1997 newsletter, page 11.]*

The article stated that the Hawaii Dept. of Transportation wants to test the feasibility of a commuter ferry, possibly as early as Sep 98, and quoted Kazu Hayashida, State Transportation Director, as saying, "A ferry system from Leeward Oahu to downtown Honolulu could pull 600 to 1,000 cars off the most congested Oahu streets and highways. No matter how small the alleviation, we need to do it. The highways are full."

NEW BENEFIT

IHS provides a free link from the IHS website to members' personal and/or corporate site. To request your link, or to suggest other links, contact IHS at foiler@erols.com.

EXTRA - EXTRA - EXTRA

LETTERS TO THE EDITOR
(Continued From Page 16)

Checking In

I found IHS while surfing the web and will be joining shortly. Didn't know there was such a group. Short Resume:

» Plank Owner & Chief Engineer of *HIGH POINT*. 1962-66

» Plank Owner & Chief Engineer of *TUCUMCARI*. 1968-69

» Employed by Sea(3) Boeing 929 Jetfoils. 1974-78

» Employed by Turismo Margarita, Venezuela. (2) Boeing 929 Jetfoils. 1978-79

I probably qualify as a hydrofoiler.

Ken Plyler
Kfppfk@aol.com

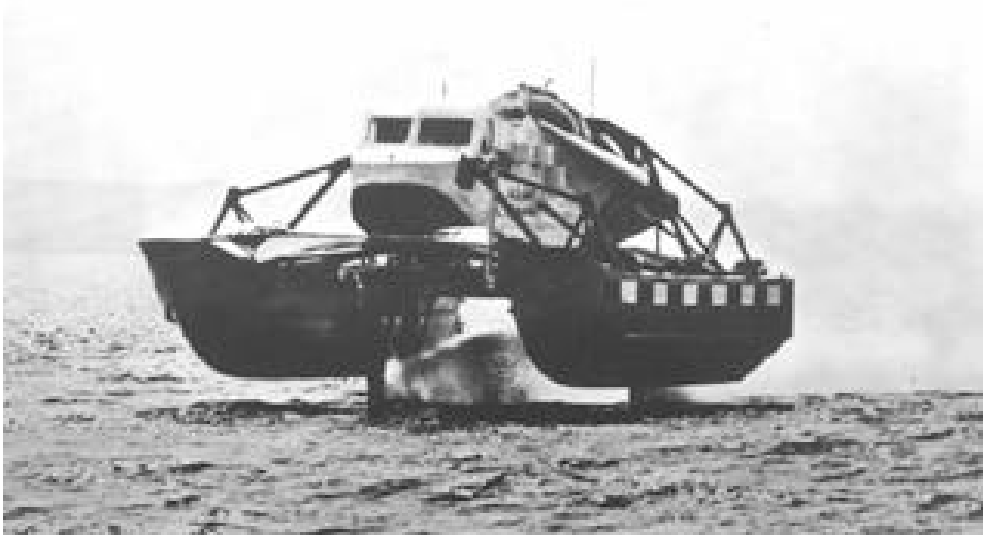
Turbine Source

We are looking for a source of former Navy surplus LM1500 engines. Do you have an idea where we might find some? I deal with the manufacturer of the gas turbines used in the former Soviet hydrofoils, air cushion craft, and many military ships. They make a 20,000+ HP marine gas turbine that has a reversible power turbine. From full forward to 60 % of forward in reverse in 10 seconds. I saw it doing it. Was it ever smooth!

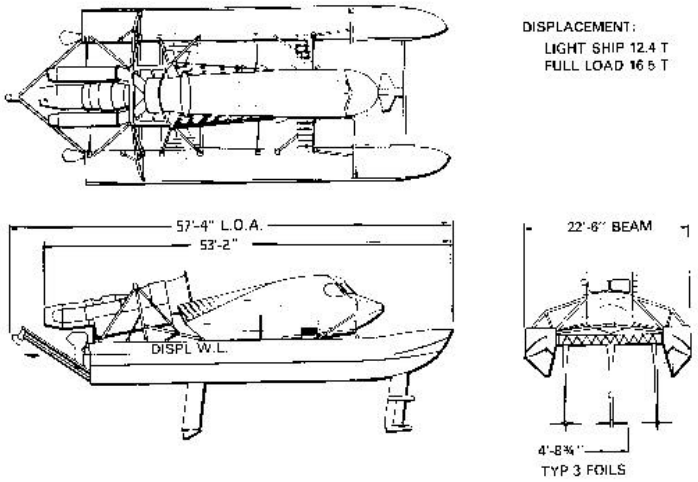
C. Kenneth Kennard, V.P.
kennard_k@juno.com
Florida Pump Service, Inc.
1365 Braman Ave
Fort Myers FL 33901 USA
941 332-4416 Phone and Fax

Continued on Page 18

***FRESH-1*, Continued From Page 4...**



The catamaran configuration of the 15 ton *FRESH-1* provided great flexibility for exploring and testing various strut/foil arrangements at high speed. After some successful initial Acceptance Trial runs in July 1963 at 50 to 80 knots, the ill-fated craft completely capsized.



IHS BOARD OF DIRECTORS

1995-1998	1996-1999	1997-2000
William M. Ellsworth	**Jerry Gore**	**Mark R. Bebar**
William J. Erickson	**Jim King**	**William Hockberger**
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Peter Squicciarini	**Ken Spaulding**	**Ralph Patterson**

LETTERS TO THE EDITOR
(Continued From Previous Page)

Waterjet Technology

I am Associate Professor in Gazi University, Department of Machinery and consultant in Turk Tractor Factory in Ankara. I am teaching about cutting techniques and CNC in our department and consult about this subjects in the factory. Waterjet cutting and waterjet equipment technology is one of my special interests, and I am covering this technology in my teaching program. I want to be efficient in my teaching and consultancy activities. I am refreshing my information on current technologies, continuously. Now, I am interested in your products that are related to my subjects. I'll be glad, if you send me brochures, CD-ROMs, video cassettes, shapes, tables that I can show my students and factory managers.

Assoc. Proff. Dr. Adnan AKKURT
aakkurt@cna.com.tr
Dicle sokak No: 13/4
06170 Yenimahalle
ANKARA - TURKEY

Good Work

Keep up the good work; no need to change the Newsletter. I like it just the way it is. Some technical contributions e.g.; how to analyze certain hydrofoil-related engineering problems or assess performance) would be welcome. I may send something in on this theme related to simple calculations of surface piercing hydrofoil transverse stability.

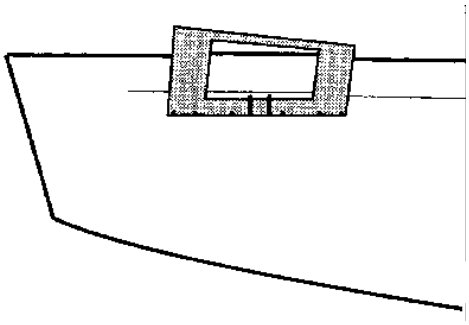
Martin Grimm
martin_grimm@nmr.defence.gov.au

No Frills

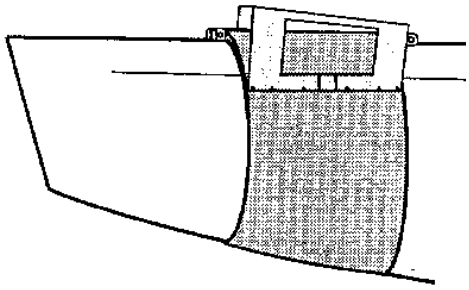
I really like the looks of the IHS home page -your no nonsense style gives exactly what I want almost instantly.

Dr. ing. Erling Lunde
el@dynamica.no

CATLIFT FOIL KIT
(Continued From Page 15)



Catlift Foil Base — Screw-Mounted To the Hull



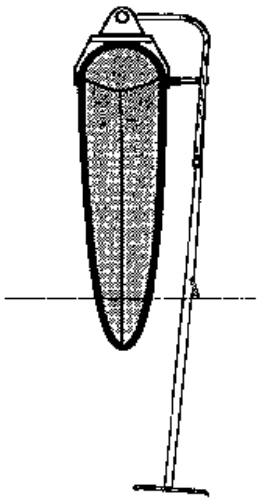
Catlift Foil Base - - Attached To the Hull Without Screws By Means of a Band

BIBLIOGRAPHY

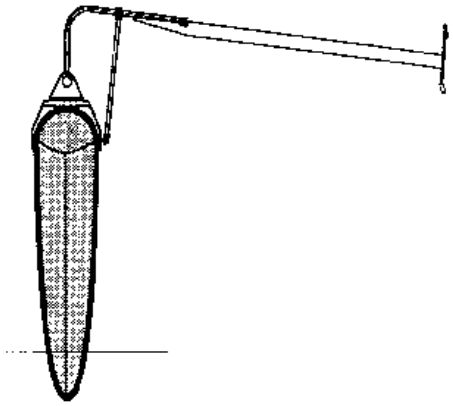
A search for "hydrofoils" in the Barnes and Noble Co. website at http://shop/barnesand noble.com yielded one book, *US Navy Hovercraft & Hydrofoils: a Bibliography* by A. Lani Low and James F. Muche, published by Fathom Eight in June 1987, available for US$25.

DODECANESE HYDROFOILS

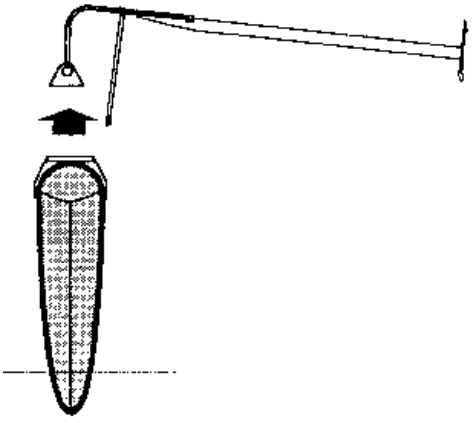
The Mamidakis Group's fleet of six *KOMETA* type hydrofoils has been operating for 15 years. See their website at http://www.mamidakis.gr/hydro/eng.html.



Catlift Foil in Submerged Position

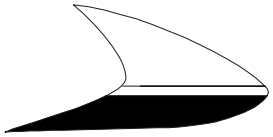


Catlift Foil in Retracted Position



Catlift Foil Detaches From Base Via a Bayonet Closure

The NEWSLETTER



International Hydrofoil Society

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

Editor: Barney C. Black | SUMMER 1998 | Co-Editor: John R. Meyer

Adapted From the FOIA Handbook...

U.S. FREEDOM OF INFORMATION ACT QUESTIONS & ANSWERS

The FOIA governs how requests will be processed within the US Department of Defense (DoD). DoD Regulation 5400.7-R, "Department of Defense Freedom of Information Act Program," can be found at Part 286 of Chapter 32 of the Code of Federal Regulations, available in libraries, or on the Internet at http://www.defenselink.mil/pubs/foi. It can also be purchased from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161 USA, for US$12.50.

The DoD's FOIA program is decentralized among the several "DoD Components," which operate their own FOIA offices and respond directly to the public for their own records [address for the US Navy FOIA office is: Dept. of the Navy; Chief of Naval Operations (Code N09B30); 2000 Navy Pentagon; Washington, DC 20350-2000]

Q - What is the FOIA?

The FOIA is a US Federal law that establishes the public's right to request existing records from Federal government agencies.

Q - Who can file a FOIA request?

Any "person" can file, including US citizens, foreign nationals, organizations, universities, businesses, and state or local governments.

Q - Who is subject to the FOIA; what type of info can be requested?

The FOIA's scope includes Federal Executive Branch Departments, agencies, and offices, Federal regulatory agencies, and Federal

See FOIA Q & A, Page 3

NAVY HYDROFOIL DATA LANGUISHES IN ARCHIVES

The US Navy spent millions of dollars from the 1950s into the 1990s to design, test, build, and operate hydrofoils. Navy-financed prototypes ranged from the sailboat *MONITOR* to the ultra high speed *FRESH-1*, to the research and development vessel *HIGH POINT*, all of which effort culminated in the production hydrofoil patrol craft PHM. When a down-sizing US Navy scrapped the PHM fleet in 1993, most of the information developed over nearly five decades went into archives, of no use to anyone and destined for eventual destruction.

Hydrofoil design is still alive today, if not exactly thriving. IHS receives many requests for design and operating information from around the world. For the present, these requests are answered by directing them to people who "were there"

See ARCHIVES, Page 2

INSIDE THIS ISSUE...

EDITOR'S COLUMN

I was honored and grateful to receive a citation recently from the IHS Board of Directors in appreciation for my work on the Society's website and newsletter. I am too humble to reprint it here, especially since any hydrofoil achievements of mine are not in the same league as those of the other citation recipients, however the text of the citation is accessible from the IHS website for anyone who is interested. The contributions of our photo archivist Malin Dixon and of the many experts who provide technical and historical answers to the incoming correspondence are invaluable. The sharp eye of Sumi Arima can be credited for keeping errors in the newsletter to a bare minimum.

The International Hydrofoil Society suffered a blow five years ago when the US Navy decommissioned its entire class of hydrofoil patrol craft, the PHMs, at a single stroke. The future for hydrofoils appeared so uncertain and even bleak at that time that the Board of Directors seriously discussed proposals to merge IHS with other Advanced Marine Vehicle organizations or even to disband IHS altogether.

However, any defeatist urges were short lived. A rapid and largely unexpected turnaround in IHS's prospects began with establishing a presence on the World Wide Web and dedicating the effort to respond promptly to all inquiries:

- The new IHS home page generated truly international interest and a surge in membership. The diverse backgrounds and interests of these new members expanded IHS's scope well beyond the US ferry market and the military hydrofoils that were the preoccupations of the recent past.

- The surge of new information arriving via the Internet provided the material and impetus to upgrade and expand the newsletter, which has generated even further interest and membership.

Success has brought some problems, primarily the volume of work associated with the website and newsletter. Volunteer help is needed; articles are needed for the newsletter, and people are needed to "adopt" and maintain some of the website pages.

But overall and for now, IHS is in good shape, and the Society is more fully living up to its mission to promote hydrofoils of all types, sizes, and applications.

Thank you, and anyone who has not yet paid their annual dues for 1998, please send in your check!

IHS membership costs full-time students only US$2.50 per calendar year. If you are a student, why not join now?! Or if you are not a student, but know someone who is... please suggest to them that they join.

IHS OFFICERS 1998 - 1999

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

ARCHIVES

(Continued From Page 1)

to participate in and even lead US Navy and commercial hydrofoil programs. But most of these individuals are retired or near retirement. And without access to their Navy files, these individuals are limited in the detail they can provide with their answers.

How will IHS answer the questions of the new hydrofoil developers in the future when the pioneers of the 1950s are gone and their archived files are destroyed? One answer may be to get as much of the archived documents as possible into the public domain through use of the US Freedom of Information Act (FOIA). IHS would like to see a university or museum library search out hydrofoil data systematically, obtain copies through a series of FOIA requests, and make the information permanently available. To supplement that effort, individual hydrofoilers should also file FOIA requests, seeking to "zero in" on their specific areas of interest. Businesses also are eligible to submit requests, though they may be charged higher fees than requesters with no commercial purpose.

The time to file your FOIA request is now, before crucial archived data is destroyed routinely to free up storage space for newer files. Excerpts from the US Department of Defense Handbook are reprinted here to get you started. How do you know what to ask for? The bibliography of hydrofoil sources on the IHS website will offer some clues. Or, your first FOIA request can be for a list of documents on a specific topic. Or, IHS may be able to help narrow your search... just ask. Happy hunting, and please let IHS know about your FOIA efforts, whether they succeed or fail.

FOIA Q & A
(Continued From Page 1)

corporations. Congress, the Federal Courts, and parts of the Executive Office of the President are *not* subject to the FOIA. State/ local governments are likewise not subject to the Federal FOIA, but some states have equivalent access laws for state records.

Q - What is a record?

A record is the product(s) of data compilation, i.e. all books, papers, maps, and photographs, machine readable materials, inclusive of those in electronic form/format, or other documentary materials, regardless of physical form or characteristics, made or received by an agency of the US Government under Federal law in connection with the transaction of public business and in Department of Defense possession and control at the time the FOIA request is made.

Q - Can we ask questions?

The FOIA does not require Federal Agencies to answer questions, render opinions, or provide subjective evaluations. You must ask for existing records, such as those mentioned above.

Q - How do I file a FOIA request?

- Label your request "Freedom of Information Act Request," preferably within the request letter and on the envelope, and address the request to the DoD Component(s) likely to have the information you seek *[See sample letter on page 4]*. If you do not know which Component is likely to maintain the information you seek, you may call the Directorate for Freedom of Information and Security Review, OASD(PA) at (703) 697-1160, or write for help to: Office of the Assistant Secretary of Defense (Public Affairs); Director, Freedom of Information & Security Review; 1400 Defense Pentagon (Room 2C757); Washington, DC 20301-1400.

- State your willingness to pay applicable fees. If you seek a fee waiver, provide a justification.

- Describe the specific records you are requesting in enough detail so that they can be located with a reasonable amount of effort. Provide sufficient file-related info (type of document, title, subject area, date of creation, originator, etc.) or enough event-related info (date and circumstances of the event that the record covers) to permit an organized, non-random search.

Q - What are the reasons for not releasing a record?

There are seven reasons why the Office of the Secretary of Defense/Chairman of the Joint Chiefs of Staff may not release a record when a request is made under the FOIA:

- The request is transferred to another DoD Component or Federal agency.

- The DoD Component determines through knowledge of its files and reasonable search efforts that it neither controls nor otherwise possesses the requested record.

- A record has not been described with sufficient detail to enable the DoD Component to locate it by conducting a reasonable search.

- The requester has failed unreasonably to comply with required procedures, including payment of fees, imposed by this Regulation or DoD Component supplementing regulations.

- The requester withdraws the request.

- The information requested is not a record within the meaning of the FOIA and the DoD Regulation.

- The record is denied in whole or in part per procedures set forth in the FOIA and the DoD Regulation.

Q - What are the FOIA exemptions?

Records will be disclosed unless that disclosure harms an interest protected by a FOIA exemption. The nine FOIA exemptions are:

- records currently and properly classified in the interest of national security

- Records related solely to internal personnel rules and practices, which if released would allow circumvention of an agency function

- Records protected by another law that specifically exempts the information from public release

- Trade secrets and commercial or financial information obtained from a private source which would cause substantial competitive harm to the source if disclosed

- Internal records that are deliberative in nature and are part of the decision making process that contain opinions and recommendations

- Records which if released, would result in a clearly unwarranted invasion of personal privacy

- Investigatory records or information compiled for law enforcement

- Records for the use of any agency responsible for the regulation or supervision of financial institutions

Continued on Next Page

FOIA Q & A
(Continued From Previous Page)

- Records containing geological and geophysical information (including maps) concerning wells.

Q - How long will it take for my request to be processed?

DoD processes requests in order by date of receipt and according to their complexity. When possible, an initial determination to release or deny a record is made within 20 working days after receipt of the request by the official designated to respond. However, due to the thousands of requests received annually, the DoD is unable to answer all of them within the statute's time requirements. Therefore, requests will have to wait their turn in the Components' queue.

Expedited access may be granted if there is a compelling need, such as a threat to life and safety, if a person engaged in disseminating information has an urgency to inform the public on actual or alleged Federal Government activity, an imminent loss of substantial due process rights, or a humanitarian need.

Q - Must I pay for a FOIA request?

The FOIA allows fees to be charged to certain types of requesters, but it also provides that waivers or reductions in fees be given if disclosing the information is in the public interest. Public interest is defined as information which significantly enhances the public's knowledge of the operations and activities of the DoD. Requesters are placed into one of these categories:

- *Commercial*. Requesters who seek information for a use or purpose that furthers their commercial, trade, or profit interest are considered commercial requesters. Commercial requesters pay all fees for search, review, and duplication.

- *Educational*. Institutions of education, including preschools, elementary or secondary schools and institutions of higher learning, qualify as educational institutions. The records must be sought to further scholarly research. Educational requesters pay only duplication fees, unless it is determined that fees are waived or reduced in the public interest. The first 100 pages are provided free.

- *Non-Commercial Scientific*. A non-commercial scientific institution is operated solely for conducting scientific research. The records must be sought to further scientific research. Like educational requesters, these requesters pay only duplication fees, unless it is determined that fees are waived or reduced in the public interest. The first 100 pages are at no cost.

- *News Media*. A representative of the news media is a person actively gathering news for an entity organized and operated to publish or broadcast news to the public. News media pay only duplication fees, unless it is determined that fees are waived or reduced in the public interest. Again, the first 100 pages are provided at no cost.

- *Other Requesters*. Requesters who do not qualify in another category are considered "other" requesters, and normally request agency records for personal use. Other requesters receive two hours search, all review costs, and the first 100 pages at no cost.

All requesters should state their willingness to pay fees regardless of the fee category, but this does not necessarily mean that you will be charged fees. Except for commercial requesters whose fees total more than $15, waivers are always considered. Fee waivers may be granted when disclosure of the records is in the public interest because it is likely to contribute significantly to public understanding of the operations or activities of the government. The following factors are weighed in making a fee waiver determination:

- The subject of the request

- The informative value of the information to be disclosed

- The contribution to an understanding of the subject by the general public likely to result from the disclosure

- The significance of the contribution to public understanding

- Disclosure of the information is not primarily in the commercial interest of the requester

- The ability of the requester to disseminate the information

The World Wide Web address for the DoD home page and the DoD Government Information Locator Service (GILS) is: http://www.defenselink.mil. If you have questions, you may call (703) 697-1160 and ask for a FOIA officer.

SAMPLE FOIA REQUEST LETTER

Dear FOIA Officer:

This is a request under the Freedom of Information Act (5 U.S.C. 552). I request that a copy of the following document(s) be provided to me: *[identify the documents as specifically as possible]*.

To help you determine my status for the purpose of assessing fees, you should know that I am *[insert one of the descriptions below]*

...affiliated with an educational or noncommercial scientific institution,

Continued on Next Page

SAMPLE FOIA LETTER
(Continued From Previous Page)

and this request is made for a scholarly or scientific purpose and not for a commercial use.

...affiliated with a private business and am seeking information for use in the company's business.

...an individual seeking information for personal use and not for a commercial use.

...a representative of the news media affiliated with the _____ newspaper (magazine, television station, etc.), and this request is made as part of news gathering and not for a commercial use.

I am willing to pay fees for this request up to a maximum of $___. If you estimate that the fees will exceed this limit, please inform me first.

[optional] I request a waiver of fees for this request because disclosure of the requested information to me is in the public interest because it is likely to contribute significantly to public understanding of the operations or activities of the DoD and is not primarily in my commercial interest. *[Include details about how you will disseminate the requested information to the general public.]*

[optional] I also include a telephone number at which I can be contacted to discuss my request.

Sincerely,

Name; Address; City, State, Zip Code; Phone *[optional]*

IHS E-MAIL ADDRESS

foiler@erols.com

CHARLES SANT NEEDS HELP

In the web-enmeshed modern era, even the most arcane technical information is accessible on the Internet. A little-known example: Charles Sant has perhaps the largest international collection of air sickness bags ("barf" bags, in the vernacular of at-sea specialists). He has dedicated a major website to disseminating knowledge, facilitating professional discussions, trading with other collectors.

Uncirculated to Good condition is preferred by serious collectors; value is presumed to drop sharply for bags in poor condition.

An entire section of Charles Sant's website (The Sea Section) is devoted to the subspecialty of passenger hydrofoils. The Charles Sant collection includes barf bags from the most sophisticated hydrofoil designs achieved by man to date. Conclusion? Perhaps the ride is not quite as smooth under all conditions as was promised by the Hydrofoil Design Section and the tourist agency.

Hydrofoilers are invited to visit (and help expand) Charles Sant's unique collection at http://dungeon.netlink.co.uk/users/gnarly/bags/book4/sea.htm. Admission to this unique website is free to the public and available 24 hours.

MEMBER NEWS

CDR H. Lowe Pruitt, Jr. reports that all is going well for him since he left David Taylor Research Center nearly three years ago ("the best job I'll ever have"). He is currently living with his family about an hour east of London in a little village in Buckinghamshire. His current job is that of Fleet Maintenance Officer/Supervisor of Salvage (Europe). He recently went to Namibia to run a salvage job for six weeks, which he thoroughly enjoyed. Lowe says that, "My request to retire in Jan '99 has been approved. I am not sure what my next career will entail, but I hope to do something that I have never done before." CDR Pruitt's email address is 106201.30@compuserve.com.

Konstantin Matveev has arrived in the USA to become a graduate student at the California Institute of Technology. He provided extensive information for the IHS website about the types and costs of Russian hydrofoils. He is currently preparing a paper on stability of air cavity craft in rough seas and has asked for recommendations as to which journals he should contact for possible publication of this paper. His new email address is matveev@cco.caltech.edu. We congratulate him on his arrival in the USA but regret "losing" our one Russian member!

WELCOME TO NEW MEMBERS

Gregory L. "Greg" Bender is a retired Navy engineering duty officer. His shipboard duty included a tour as the *USS PLAINVIEW*'s engineering officer during and immediately following its successful overhaul and conversion in 1975-77. In 1986 he was named the Naval Sea Systems Command's Engineer of the Year for his efforts in resolving a number of design issues with the US Navy's Landing Craft, Air Cushion (LCAC). Following his retirement from the Navy in 1988, he was employed by then Textron Marine Systems as Director, Advanced Design & Technology working on the design and construction of hovercraft and surface effect ships. In that capacity he was the Technical Director for the repowering of the SES-200. Since leaving Textron, Mr. Bender has taught physics, started a small manufacturing business in Louisiana, and served as an industry consultant in the metal trades manufacturing arena. He returned to Washington to head the office for a division of Westinghouse before it got out of the defense business. He is presently employed by Noesis, Inc. of Arlington, Virginia, USA as a program manager.

Brent Johnson, is a student at the Univ. of Florida in Gainesville. He has worked with Dave Keiper's DAK hydrofoils on kits for beach catamarans. He has a lot of sailing experience and is looking for a possible career in hydrofoils.

Dr. Erling Lunde, in Trondheim, Norway, earned his doctorate in Engineering Cybernetics, with a thesis on robot learning control systems. He is now working as an independent consultant in cybernetics, with a special interest in motion control and sensor systems for marine vessels, both surface and underwater. Also, he has been involved in several projects on heave motion compensated lifting equipment; flight control system design, control algorithms and real-time programming for the Westamarin FoilCat 2900. Dr. Lunde is currently involved in design of automatic docking systems for ships and developing Remotely Operated Vehicle (ROV) dynamic positioning and autopilot systems.

Eren Ozsu is a student in Ankara, Turkey where he is designing a deep-V monohull high speed craft and has read about hydrofoils. Although he has not started his diploma thesis yet, it will probably be about one of the advanced marine vehicles. He expects to graduate in February 1999. Mr. Ozsu has been at Atelier et Chantiers du Havre, le Havre, France for summer practice for 2 months in 1996; also at Fr. Lurssen, Bremen, Germany for 2 months in 1997 for the same practical training work. He is interested in fast ferries, and is trying to learn about high speed freight transportation alternatives.

Kenneth Plyler, of American Marine Consultants in Charlotte, North Carolina, USA specializes in vessel acquisitions, marine projects management and serves as owner's representative for vessel new construction, conversion and repairs. He has had a varied background including serving as a US Navy Master Chief Petty Officer for new construction of both *TUCUMCARI* and *HIGH POINT*. Ken served as owner's representative for the construction of two, Gas Turbine/Waterjet, Boeing 929 hydrofoil passenger boats. Construction site was Renton, Washington, USA. He assisted in setting up passenger service organization and facilities in Puerto La Cruz, Venezuela. Likewise he assisted in setting up inter-island passenger service organization and facilities in Honolulu, Hawaii, and was employed as Maintenance Manager for the same hydrofoil.

Hanno B. Smits, in Leersum, the Netherlands, became interested in hydrofoils when he converted a Flying Dutchman to a hydrofoil sailboat. He became interested in Gordon Baker's historic sailing hydrofoil *MONITOR*, and has been trying to obtain as much information about it as possible. Mr. Smits' professional career has been in shipping. He has worked at Royal Huisman shipyards, the Maritime Simulation Centre the Netherlands, training, design and simulator sales, and the development of a whale type propulsion system. He has an interest in optimizing designs for human-powered craft such as his high speed recumbent bicycles. He has built numerous windsurfboards and surfboards, designed catamarans and all kind of hydrofoil craft e.g. personal hydrofoil, hydrofoil sailboards, hydrofoil human powered vehicle, built all kinds of dirigible kites, etc. He has published numerous articles about hydro- and aerodynamics of windsurfing, including maneuvering principles. Mr. Smits' website is well worth a visit. Please go to URL: http://home.worldonline.nl/~hbsmits/hydrofoi.htm.

Russell Sylvia, in New Bedford, Massachusetts, USA is interested in designing and building his own hydrofoil. He is anxious to obtain technical information and advice. Members are free to contact him at PO Box 50466, New Bedford, MA 02745.

David Symington, in Seattle, Washington, USA purchased the ill-fated ultra-high speed hydrofoil test vessel *FRESH-1* in November 1987. He reports that the craft is still "OK," and that he has the foils that Grumman made, which are still in crates.

1998 DUES ARE OVERDUE

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.

TRANSVERSE STABILITY OF SURFACE PIERCING HYDROFOILS

Martin Grimm

The stability criteria presented in the IMCO Code of Safety for Dynamically Supported Craft, [1] now superseded by the International Maritime Organization (IMO) High Speed Craft Code, provides an equation for assessing foilborne metacentric height (GM) of surface piercing hydrofoils in the design stage:

$$GM = n_B \left(\frac{L_B}{2\tan(l_B)} - S \right) + n_H \left(\frac{L_H}{2\tan(l_H)} - S \right)$$

Where:

n_B, n_H = ratio of craft weight borne by front and aft foils respectively (as opposed to "percentage of weight" indicated in the IMO code)

L_B, L_H = width of front and aft foils respectively at foilborne waterline

l_B, l_H = angles at which the front and aft foils respectively are inclined to the horizontal where they cut the waterline

S = height of the center of gravity above the foilborne waterline

The equation is derived based on the assumption that the lift distribution over the span is uniform and thus it does not take into account effects of spanwise variations in chord length or foil submergence depth. The equation is only intended to provide an indication of the stability of the foil at small heel angles.

An alternative method which addresses these limitations has been implemented in a short computer program. The

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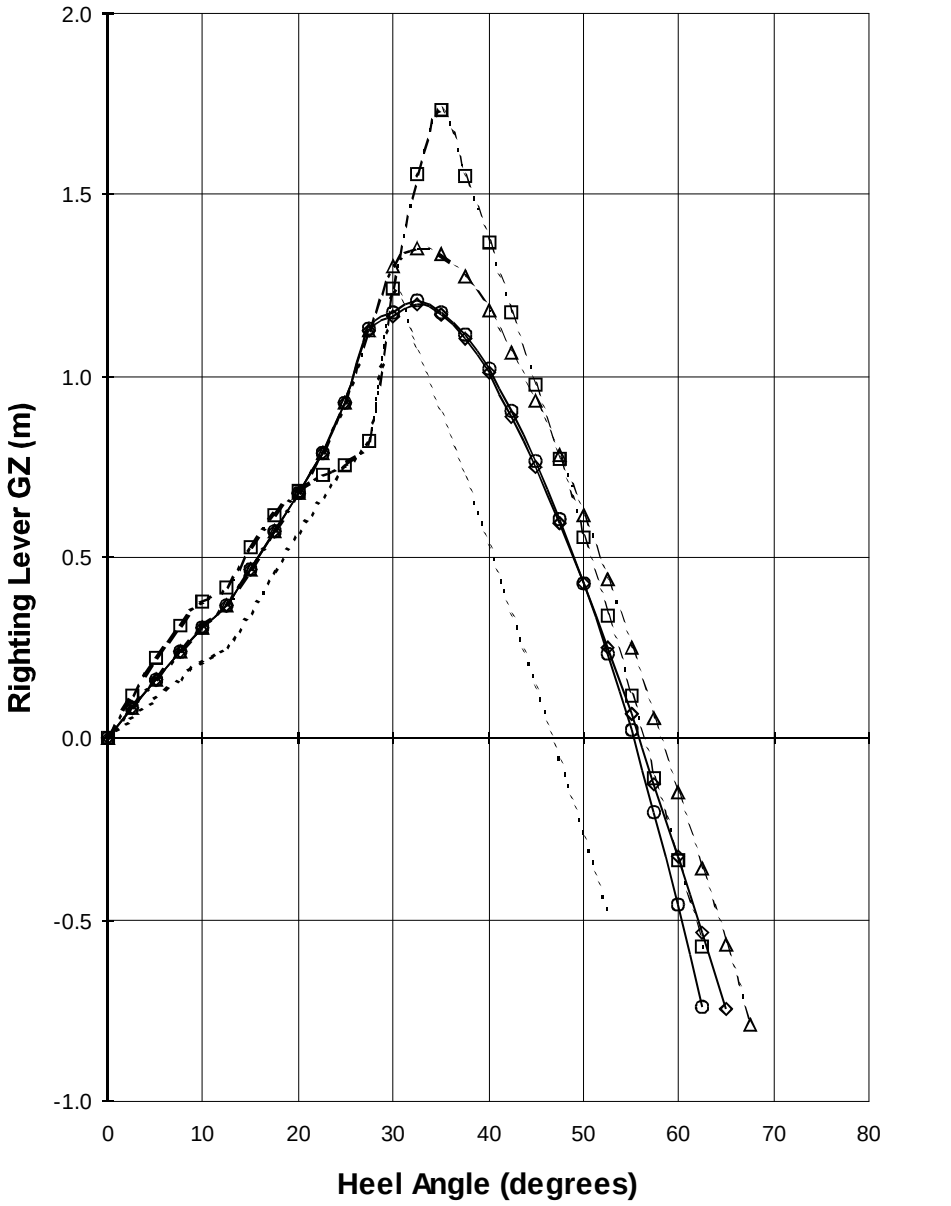

Transverse Stability, Figure 1
Righting Lever (Arm) Curves For a Representative Surface-Piercing Bow Foil

methodology used enables a flexible definition of the foil system geometry be it of a dihedral, ladder, or shallowly submerged configuration. While by no means rigorous, the program should be useful for preliminary design purposes. The main assumptions made in the program are that the lift generated at any spanwise element of the foil is:

- Proportional to its chord length,
- Related to the local submergence depth-to-chord ratio as proposed by Tsarev [2], and
- Is assumed to fall off elliptically towards the tips of submerged foils due to 3D flow.

To investigate the influence of various parameters on the righting arm, results from the program are presented for several variations of calculation method and foil geometry. The baseline geometry selected represents a bow foil typical of the RHS-140 hydrofoil series. These have narrow chord sections with a dihedral of ~17^o at their base increasing to a wider chord and a ~33^o dihedral angle at their outboard sections. This geometry will subsequently be referred to simply as a "Bi-V foil."

INFLUENCE ON CALCULATED TRANSVERSE STABILITY OF METHODOLOGY

The cases of foil definition and calculation method examined presented in Figure 1 include:

- Foil with constant chord and without submergence depth effect
- Foil with increased chord at tips but without submergence depth effect
- Foil with increased chord at tips and with submergence depth effect included
- Increased chord at tips, submergence depth effect and lift loss at tips included
- Increased chord at tips, submergence depth, lift loss at tips and strut lift all modeled

To aid in interpreting the results, the curves are presented for a single foil rather than a mixed pair. A representative vertical center of gravity has also been included.

Although it is not possible to review the various effects in this brief presentation, it can be seen that the areas under the righting arm curves differ significantly with the assumptions made regarding the lift distribution.

INFLUENCE ON TRANSVERSE STABILITY OF FOIL GEOMETRY

The IMO guidance equation suggests that GM is only dependant on the shape of the foil at its foilborne waterline. To examine the influence of the submerged foil geometry on stability characteristics, the shape of the baseline foil was modified to obtain derivatives with variations below the design foilborne waterline but which remain unchanged about it. The two cases examined are:

- A foil system with a constant dihedral angle of about 33^o representative of the earlier Schertel-Sachsenberg hydrofoils; this geometry will be referred to as a "Pure-V"
- A foil system with a submerged horizontal foil element between the inclined outer foil elements which retain their dihedral angle of 33^o; this is representative of a stern foil on the RHS-140 series; this geometry will be referred to as a "_/ foil."

Figure 2 presents a comparison of the righting arm curves for the Pure-V, Bi-V and _/ foil geometries. Two calculation methods are applied to each of these three arrangements, one being the more approximate, the other being more refined. It can be seen that regardless of whether foil chord, submergence depth, or tip lift loss effects are considered, the Pure-V foil geometry exhibits the poorest stability characteristics of the three geometries examined, while the _/ foil has the greatest transverse stability.

ASSESSMENT OF OVERALL FOILBORNE STABILITY OF A HYDROFOIL CRAFT

The discussion to this point has been limited to considering a single foil system. If the interaction between the foils can reasonably be neglected, then the total righting arm can be calculated as follows:

$$GZ = (n_B)(KN_B) + (n_H)(KN_H) - (KG)[\mathrm{Sin}(\theta)]$$

where:

n_B , n_H = Ratio of craft weight borne by front and aft foil

KN_B, KN_H =Righting arm of front and aft foil relative to craft baseline (m)

KG=Center of Gravity above craft baseline (m)

θ =Heel angle (radians)

A more extensive assessment of the results and listing of the program and example input files is available from Martin Grimm; 9 Fishburn Street; Red Hill, ACT 2603; Australia for those willing to examine this subject in further detail and report back on their findings.

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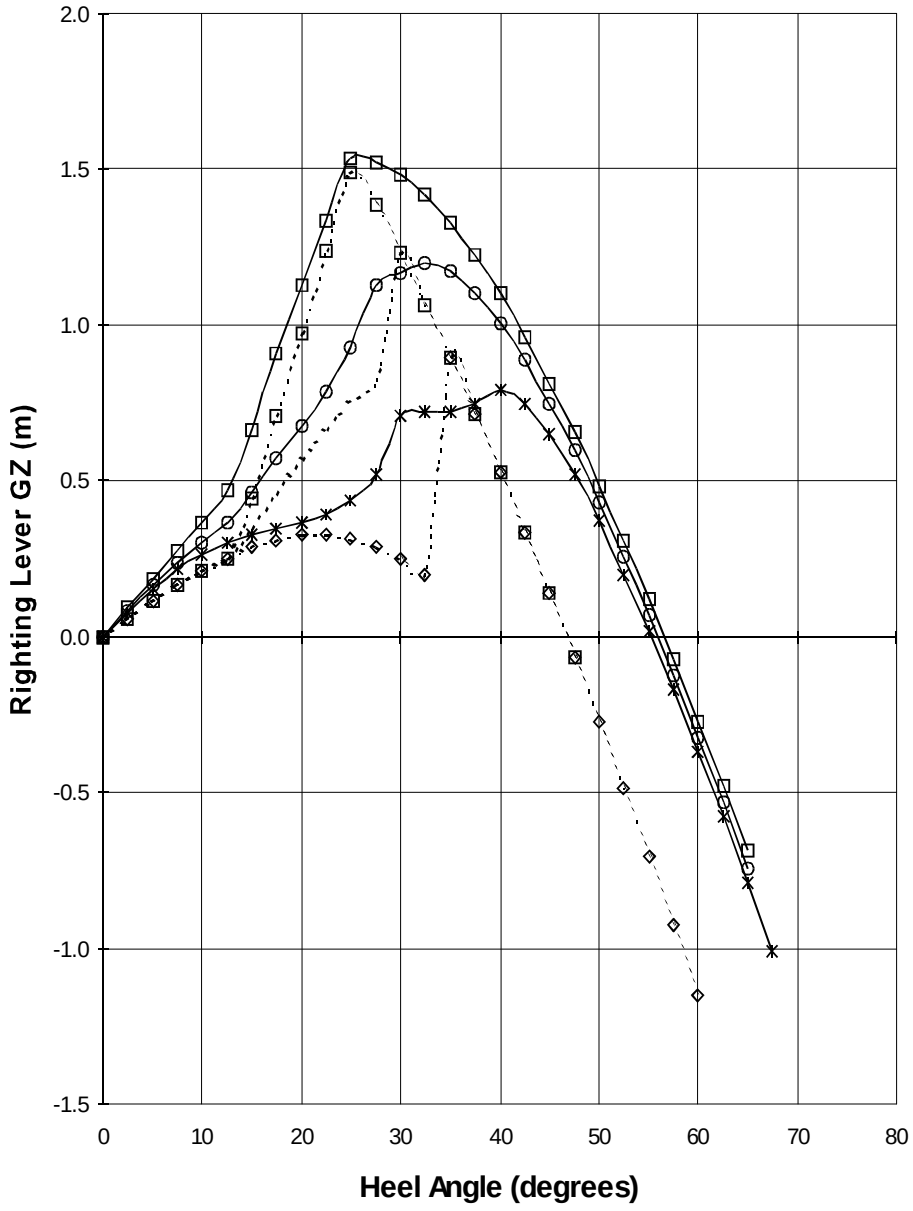

Transverse Stability, Figure 2
Righting Lever (Arm) Curves For a Series of Surface-Piercing Foil Geometries

REFERENCES

1.IMCO Code of Safety for Dynamically Supported Craft, 1978.

2.The Determination of the Stability of Vessels on Shallow-Submerged Foils Engineer B.A. Tsarev, Hovering Craft and Hydrofoil, Vol. 4, No. 1, Oct 1964.

IN MEMORY OF

CAPT RONALD M. FRASER

Sumi Arima
arimas1@juno.com

CAPT Ronald Fraser died of a stroke on 1 Apr 98 in Portland, Oregon, USA. He is most known to IHS as the owner of *HIGH POINT* after the US Government disposed of it in 1990. He was actually the second owner, where the original bid winner took possession of the ship to remove the turbines and resold the ship to CAPT Fraser.

Ronald had visions of getting the *HIGH POINT* operational hullborne, and setting sail to Alaska. In the process, he installed new diesel generators, anchor windlass, rebuilt the head facilities, and drydocked the ship for a complete bottom refurbishment.

CAPT Fraser was born in Portland OR on 19 Feb 20 and was well known in the 13th Naval District where he skippered over 200 ships for the Contractor to conduct Builder's and Preliminary Acceptance Trials.

The executor of CAPT Fraser's estate is planning to dispose of *HIGH POINT*. If anyone is interested in taking over the restoration of this historic hydrofoil ship, please contact IHS so we can put you in touch with the executor.

LETTERS TO THE EDITOR

Oil Patch Crew Boat

As a result of my conversations with IHS members, I have started looking at my *TUCUMCARI* files. This little boat was probably the least complicated and best all around vessel that Boeing ever built. We proved that we could out run, out maneuver and out shoot the competition. After a full day's operation, the Engineering Dept. could leave the boat safely tied to the dock and go home. They didn't have to stay up all night getting the boat ready for the next day's operation. After returning from Vietnam, *TUCUMCARI* was the hydrofoil selected to do the NATO cruise and showed really well. The unfortunate accident that eventually took her life was not due to any fault of the vessel. I never hear any talk about the Swordfish class Italian Navy missile boats built on the *TUCUMCARI* design. What happened to them? I know that the Navy owns the *TUCUMCARI* design. How would a company, individual or group get this design to build a civilian version as an offshore crew boat for the oil industry? It would cost about the same as a helicopter, and the operating costs would be the same, or less. My experience with the offshore oil business suggests that there is a place out there for just a vessel. Crews hate crew boats and helicopters for different reasons: The speed of a 20 knot crew boat deteriorates as the seas start to kick. An offshore drilling rig/production platform can now be well over 100 miles offshore. The conventional crew boat will beat you to death in a heavy sea before you get to the rig. On the other hand, crews are just plain scared of helicopters. Unlike a crew boat, when *they* have an accident, it is serious. Every drilling crew member working offshore can relate stories that will curl your hair. Of course, crew boats also carry water, fuel, pipe, tools groceries and garbage boxes. They also carry helicopter fuel for transfer to the rig to get the bird back to shore. A hydrofoil with the same mission as a helicopter would work great. Carry nothing but crews and light cargo such as a quart of milk and the Sunday paper (*New Orleans Times Picayune*) for the Tool Pusher. A hydrofoil that could carry 25-30 passengers would work just fine. A Bell 220 carries 10. *TUCUMCARI*, though light weight, had a fairly robust hull structure. The aluminum boatbuilders on the gulf coast could build the hull and superstructure at a fraction of Boeing's price. The foils and struts were expensive to build. However, when building for the commercial market I am sure the costs could be reduced considerably.

Ken Plyler
Kfppfk@aol.com

Response...

We used to maintain a complete file of specifications and drawings for *TUCUMCARI* (back in the late 70s/early 80s),but the files have long since been trashed since the ship was stricken from service. Agree it was a very successful boat and led the way for selection of waterjet propulsion for PHM. The idea of a hydrofoil crew boat could have some potential, depending on a rigorous assessment of additional operability as compared to a conventional monohull on a year-round basis. If the operating area has higher sea states a good portion of the year, then the hydrofoil could show an advantage. Also you need to look at the time to transit to/from the offshore platform. For very short trips, the seakeeping advantage of the hydrofoil may not be sufficient if seasickness incidence isn't significantly improved. The crew boat operators will want a simple, rugged platform that can take heaps of abuse. Vulnerability of foil systems to banging into offshore structures may be an issue. As a practical matter, it would be very hard to "duplicate" *TUCUMCARI* even if we had the specs and drawings, since Boeing design had numerous proprietary process specs and parts which are no longer in use.

Mark Bebar
NAVSEA 03D1
Bebar_mark@hq.navsea.navy.mil

Why Not Hydrofoils?

After researching hydrofoils, I conclude that they are far superior in handling, performance, and comfort than a normal displacing hull. So why then are they not used much anymore? I can only find one reason that sticks out: the foils can only be so big due to stress factors and drag. A huge ocean liner can carry much more than a hydrofoil, yet it is slower. Do you know of any other reasons, perhaps design drawbacks or facilities, that the hydrofoil is becoming a pre-historic way of transport?

Tristan Lee Andrews
tlandrew@learn.senecac.on.ca

Response...

First, regarding size, the foil lifting capacity is an area function, increasing with the square of the speed. So in the practical speed range of 40 to 50 knots with the size of the hydrofoil craft increasing by a cubic function, the foil dimensions become relatively quite large. A Navy study concluded that a 2,000 ton hydrofoil was about a limiting size. Range is another consideration. Hydrofoils can be shown to compete commercially with aircraft up to about 300 miles on a time basis for downtown to downtown routes. This takes into consideration time to and from airports and the ability of the hydrofoil to go downtown to downtown. Hydrofoils have demonstrated their ability to provide superior rough water passenger comfort. So in adverse sea conditions, sea state three and above, their ride quality and speed are

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better than other high speed sea craft. The real problem is that hydrofoils have a high first cost on the basis of cost per seat mile. It has been determined that the acquisition cost is the driving factor in most acquisition decisions. To increase the use of commercial hydrofoils, studies that I have been involved with indicate that there is a market for small, 100 to 300 seat capacities, at speeds in the 40 to 50 knot speed range, with submerged foils and automatic control systems. But the first cost has to be made more attractive than available hydrofoils on the market today. I would like to see some concentrated design effort put into this area by a responsible designer and builder.

Robert J. Johnston
Rjohns0199@aol.com

Supercavitating Racer

My good friend V. H. VanBibber passed along to me your email of 26 Feb 98 to Andy Kunz. As Van and I understand the email, Ken Cook might want to obtain designs of racing hydrofoils to produce models in kit form. Van and John Bader designed a racing hydrofoil in the late 1950s that might be of interest to him. Enclosed is an artist concept of the supercavitating hydrofoil boat design. Van's drawings show the design LOA was 28 ft 3 in. If Mr. Cook, or anyone else, is interested in pursuing this design, Van can be contacted by phone at 850 234 5020; by mail at V. H. VanBibber, 4201 Mariner Drive, Panama City Beach, FL 32407. Van made a 14-inch model of the design some years back. I had the good fortune to work with Van for several years on various hydrofoil projects and got to ride on the AGEH, PCH, and a PHM. We had loads of fun ranging the craft to determine if they would be useful in mine countermeasure efforts.

Thomas C. Watson
229 Woodlawn, Drive
Panama City FL 32407 USA

An Artist's Rendering of the 28'-3" LOA Supercavitating Hydrofoil Racing Boat Designed by V. H. VanBibber and John Bader in the 1950s

Response...

I met Van in San Diego in the late 70s and again in Panama City. He is one really genuine great guy! He had a fabulous inboard hydrofoil that he was working on at that time. If I had a problem or question on high speed hydrofoils he would be on the top of my list.

Ken Cook, Hydrofoils, Inc.
Kencook@hydrofoil.com

Suggestion Box

As one of the very first life member of IHS, I congratulate you for your efforts in maintaining the Society alive and for making available the Newsletter on the web. I offer a number of comments:

Accessing the newsletter directly from the web can be in some areas a long process. Not always the web (I do mean the backbones) are free enough to permit a fast file transfer. I suggest that the Newsletter should be sent by e-mail. In so doing it will be easy to download the same from our provider, and no password is necessary.

I have the impression that the Newsletter is strongly focused on US attempts, both past and present, in the hydrofoil field. A wider coverage and a more international content is needed.

I am also under the impression that interest in the hydrofoil is fading. Very few shipyards are pursing this concept. Rodriquez itself seems not to be interested in developing new ideas. Is there anything that can be done to foster a new breed of hydrofoils? A few ideas:

- An agreement between IHS and Fast Ferry Magazine
- Make available all studies carried out in the USA on the field via the web
- Disseminate the hydrofoil ideas to all shipyards building fast ferries
- Pool interested members to built a task force available to sell their knowledge

The hydrofoil history area of the IHS site gives little information about the Surface Piercing Hydrofoil System or the Italian and Russian design, which is simple to build. As a retiree of Rodriquez Shipyard where I have been working in the technical field for over 25 years and 6 years as Sales Manager I have a number of pictures you might be interested in.

Diego G. Mazzeo
dmazzeo@mbox.vol.it

FRESH-1

As for the "The Fate of *FRESH-1*," Bill Ellsworth's article [*Spring 98 Newsletter*] is not clear as to the cause of the accident. I, being Pete Sias's assistant on this project as well as the *HIGH POINT* construction project, was assigned to the accident investigation board. It was determined that the

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cause of the accident started from the foils ventilating to the extent that the trailing edge flaps were working in air rather than water. Previous to the accident, Bob Hubbard in the co-pilot seat would see the upward drift on height and manually increase the flap angle to regain fluid flow over the foil before full ventilation occurred. The traces from the telemetered data revealed after study that all the foils were ventilated with the flaps in full up position. The rudder was out of the water due to the broached flying height. The helm was being moved back and forth when both the port foil and the trailing edge rudder rewetted while the rudder happened to be in a hard over position. The starboard foil continued to be ventilated. This caused the *FRESH-1* to hook, causing the rollover due to inertial forces and no counteracting foil. The board concluded that if the helm was held steady and throttles were chopped, the ship would most likely have landed on the hull without the roll over. Other safety features were recommended and incorporated, including an escape hatch and push-to-release door locks.

Sumi Arima
arimas1@juno.com

PHM News

The *PEGASUS* restoration project pushes on, albeit slowly *[the restoration is of ex-*ARIES *(PHM 5), renamed* PEGASUS. *- Ed.]*. We have had many inquiries as to what we expect to do with the ship but few suggestions. Our main goal is to get the ship restored to fly just once. We will worry about keeping her flying after that. If sponsorship could be established, what is the feasibility of setting the all-time record for circling the globe for a marine vessel? Since we lost approx. 100 tons of weapon related equipment, fuel containers could be built to replace them. Would this give the range necessary for the longest part of the journey? I understand this record is currently held by a sailing vessel known as "Sport-Elec"... 71 days I believe.

Eliot James
Esjames@cvalley.net

[For information on the latest around-the-world speed record attempt, crank up your web browser and go to: http://www.revolution98.com/index.htm. The last news we heard was that the ship had struck a submerged reef or rock. -Ed.]

Lift/Drag Equations

I am looking for a simple equation to estimate lift and drag for a submerged hydrofoil and possibly one to determine lift and drag as the foil lifts out of, and finally off, the water. This is for a seaplane application. For example: Coefficients of lift and draft as a function of aspect ratio, angle of attack, and velocity. I would be very pleased to get some links or other references to tests or research related to this application.

Tom Croswell
Tom@avcon.net

SEALEGS

In sorting through old belongings, I came upon the enclosed slides of *SEALEGS* being tested on Staten Island in March 1957. At that time, I was working at the David Taylor Model Basin. For, about 18 months, it was my job to visit Gibbs & Cox monthly and monitor this development project. In August 1957, DTMB sent me to school for two years, and my association with hydrofoil projects ended. Now I have retired, and I am about to move to Arizona, which is hardly a center of activity on hydrofoils.

T. Francis Ogilvie
Arlington MA

[The hydrofoil test craft SEALEGS *made its first flight in 1957, showing excellent seakeeping performance in rough seas at speeds up to 27 knots. Literally hundreds of important civilian and military visitors received demonstration rides on* SEALEGS*, a significant factor in encouraging the US Navy to pursue further hydrofoil development. Photos of* SEALEGS *and other hydrofoils are in the IHS Photo Gallery at http://www.onspec.co.uk/ihs. -Ed.]*

***PEGASUS* Remembered**

I served aboard the *USS PEGASUS* (PHM-1) as the Combat Information Officer/Intelligence Officer during the early 1990s until the squadron was decommissioned in July of 1993. I have a lot of great sea stories about a wonderful class of ship. Did you know that the PHMs had the highest operational readiness level of any class of US warship, 98.5% while the fleet average was 70% percent? And the squadron made every operational commitment.

During assignment in Key West, Florida the squadron mainly conducted counter-narcotics operations. The PHMs had a successful record in this mission, a higher number of drug busts than any other vessel and successful in the shutdown of drug traffic in the Gulf of Mexico, forcing the cartels to ship overland. Think about the PHM's capabilities: what an average destroyer travels in an hour, we could travel in 11 minutes.

PEGASUS was the lead ship of the class and was unique: her main reduction gear was smaller than the later models, and her displacement was lighter. If you look really close at the photos *[in the IHS photo gallery]* you will see that her metal

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

LETTERS TO THE EDITOR
(Continued From Previous Page)

skin is rounded off at the seams; the other boats are squared off (cheaper to build). *PEGASUS* also had two glass portholes in her bottom; they were just forward of the after struts. Boeing used them for filming the water flow over the aft foil. Yes, a glass bottom hydrofoil warship.

The hydraulics systems were from Boeing 747s, and the bridge was out of a Boeing 707. Any time we needed a part we would have to go to the local airbase or a hardware store. *PEGASUS* was also laid out differently from the other PHMs. Her combat center was set up in reverse arrangement; her officers/crews was smaller to allow a ships office just aft on the port side. We also had an extra head aft on the starboard side. This was great when had plumbing problems. Most of the other fellows on the other PHMs boats favored our set-up.

The crews operated an extremely highly professional manner. Unit pride was always high, due to highly skilled senior enlisted, and officers. Everyone had to know all duties on board. But we actually acted like "McHale's Navy."

We were in St. Thomas, US Virgin Islands. The skipper was poolside at the Hilton Hotel, when boats came up with the idea, "Let's water ski!" We put the RIB (Zodiac) boat in the water, put on a US Coast Guard life jacket we acquired, and went skiing. BUT! We forgot to remove the dye marker from the life jacket. Well, at the first fall into the water, the dye breaks open, turns the entire harbor lime green. OOOPS… We stealthily sneaked back (FULL SPEED) to the ship. You think we got away with it? WE DID! … well the skipper did take away our water skis for the rest of the summer.

We once ran out of fuel 100 yards from the refueling pier. Commodore was really upset on that one. Then there was the time the skipper calls down and asks, "Where are we? Well, I thought that was odd…. I told him just southeast of Miami. He's up on the bridge calling in an order for PIZZA! In Ft. Lauderdale, we fly in, put the boat over with US$40.00, get the pizza, and fly out of the harbor.

Stephen J Novell
sjnovell@mindspring.com

TRAMPOFOIL® MODEL A1 IS DELIVERING

The first human-powered hydrofoil bike is now commercially available in an improved design and is shipping to customers. According to the company's website at http://www.trampofoil.se, "Optimized hydrodynamic design reduces the drag compared with earlier models and allows the rider to go faster and stay on the water for a longer period. The new A1 design allows the TRAMPOFOIL® to be easily transported (the main structure of the the bike is extruded aluminum with couplings that make it easy to disassemble). The weight is 12kg. The bowsprit, with tailored flexibility, is made in high-quality glass-fiber composite. All parts are easily replaced if damaged."

The quoted price to European Common Market countries is 9,300 SEK (about US$1,200). Customers from other countries should contact the company for price and cost of freight. Photos and movies of TRAMPOFOIL® are posted on the company's website.

HYDROFOIL MYSTERY

The Franklin W. Dixon book *Mystery of the Flying Express* published by Grosset & Dunlap in 1970, may be of interest to young hydrofoilers. In this book of the venerable Hardy Boys series, a new hydrofoil is stolen while being guarded by the two young detectives. To solve this mystery, the intrepid Hardy brothers face frequent danger as they go up against criminals who operate by signs of the zodiac.

"TROIKA" MEETING DISCUSSES FAST SHIP PROGRAM

A joint meeting of the International Hydrofoil Society, the US Hovercraft Society, and the Society of Naval Architects and Marine Engineers SD-5 Panel (the "Troika") took place on 18 June1998 at the Fort Myer Officers' Club, Arlington VA. Dr. Theo Kooij presented an overview of the Fast Ship program at the US Defense Advanced Research Agency (DARPA).

To move heavy equipment rapidly from the USA over global distances requires fast delivery to port, fast loading, fast maritime transport, fast unloading, and fast means of cargo distribution to the points of final destination. DARPA is involved in two of these elements: the Advanced Logistics Program (ALP) and the Fast Ship Program.

The Fast Ship Program addresses technology required to build and operate long-range, fast, big ships. The talk addressed the top-down requirements for fast ships, which leads to the lift/drag ratio (L/D) as the crucial factor. Some of the results from DARPA studies on hydrofoils and hybrid foils (which combine buoyant and hydrodynamic lift), and recent test results from manned models were presented. Dr. Kooij also described a potential roadmap for a research program in drag reduction for a specific military Fast Ship application.

Theo Kooij was born in Dordrecht, the Netherlands. He received an MS degree in Mechanical Engineering at the University of Technology in Delft, Netherlands, in 1961. In 1977 he obtained a Ph.D. in Electrical Engineering at Catholic University of America. Currently a Progam Manager at DARPA, his programs include active and passive ASW detection and classification; the Center of Excellence for Research in Ocean Science (CEROS) in Hawaii; and Fast Ship studies.

HYDROFOIL NEWS DIGEST

MYSTERY FOLLOWS HONG KONG JETFOIL ACCIDENT

Fast Ferry Int'l June 1998

The Hong Kong Marine Department is currently investigating, why the aft foil of a Far East Hydrofoil Boeing Marine Systems (BMS) Jetfoil 929-100 collapsed in an incident on May 2. The resulting accident resulted in 120 injuries to the 236 passengers and eight crew on board. Twenty-nine passengers, one of whom suffered head injuries and was described as being in critical condition, were detained in hospital over-night. The condition of another six passengers was described as poorly. One passenger died of her injuries two days after the incident.

The Jetfoil *FLORES,* launched by BMS in 1974, had left Hong Kong for Macau at midday on the bad weather track to the north of Lantau Island - the normal routing is to the south. Just over 20 minutes later, the aft foil sustained damage when *FLORES* was off the northwest coast of Lantau. The captain reported the position of the incident as being 1.7 nautical miles off the island.

The first two vessels to arrive at the scene were Incat Designs 35m rescue catamarans that were recently delivered by Greenbay Marine for operation at Hong Kong's new airport at Chek Lap Kok. Although this was not due to open until July, all rescue services were on alert on May 2 for the first test landing, by a Boeing 747, later that afternoon. Ninety passengers were rescued from the Jetfoil by the catamarans, and the four most seriously injured were lifted from them by helicopters and flown to hospital. Reportedly, the last person was not taken off the vessel until two hours after the incident. Initial dives at the site discovered no submerged object that the Jetfoil may have struck. However, some passengers claimed that the vessel was traveling at reduced speed and on an erratic course shortly before the accident, and local fishermen later said that they had seen it directly above the site of a wreck. Although indicated on charts, the wreck is no longer marked by buoys. It lies in just over 6.0m of water and breaks the surface at low tide, but it is also off the normal ferry track and 1.5 nautical miles from the reported location of the accident.

AIR CHAIR (HYDROFOIL WATERSKI) CHAMPIONSHIPS

The 1998 *Flight* World Championships of Hydrofoiling will be held 17-20 September 1998 at Lake Elsinore CA, USA. Over US$3,000 in cash and prizes will be awarded. *Flight* editor Tony Klarich invites all to "Come ride with the best." For rules, tricks list, cost, and other information on the Internet, go to http://airjunky.com/worlds. Submit questions by e-mail to hopro@ez2.net. Or call 909-674-7900.

FAST '99 CONFERENCE

In August of 1999 the FAST conference will bring owners, builders, designers, suppliers, service providers, and policy makers from around the world to Seattle, Washington, the thriving shipbuilding and design center of the USA's Pacific Northwest. Full details may be found on the Society of Naval Architects and Marine Engineers (SNAME) web site: http://www.sname.org/sections/pacific_northwest/FAST99/announce1.htm.

LAST CALL FOR PAPERS

Fast Ferry '99 Boston

The l5th Fast Ferry International Conference and Exhibition will take place at Hynes Center, Boston MA, USA on 16-18 Feb 99. 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 31 Aug 98. Authors selected will be informed by 30 Sep 98;completed papers should be received by 4 Dec 98.

While papers covering all aspects of the industry will, of course, be welcome, FFI is focusing on commercial operating experience, passenger safety issues, revenue generation and ticketing, and ferries as part of the urban transport infrastructure. Papers should be original and not have been published previously.

Please send abstracts to the following address: Attn: Denise Clifford; Fast Ferry International; Milroy House; Sayers Lane; Tenterden; Kent, TN30 6BW; United Kingdom. Tel: +44 1580 766960 or fax: +44 1580 766961. E-mail: info@fastferry.co.uk. Web site: http://www.fastferry.co.uk.

More News Items on Next Page

INTERNATIONAL CONFERENCE ON COASTAL SHIPS AND INLAND WATERWAYS

February 1999, London

Presented by the Royal Institution of Naval Architects in association with the Permanent International Association of Navigation Congresses (PIANC). For information, contact: Conference Department; RINA Ltd.; 10 Upper Belgrave St; London SW1X 8BQ, UK; fax: +44 (0) 171 259 5912

Coastal and inland transport is an essential part of the transport infrastructure. Some major river and waterway systems most famous for trading are the Rhine, the Kiel Canal, the Dutch waterways; the Great Lakes of the USA/Canada, and the Chinese river systems.

Inland waterways are already important, but some believe that they could be developed further. Although coastal and inland transport is slower and generally not as flexible as land transport, it does have the advantage of carrying greater payloads. If the advantages are maximized, and road transport becomes more congested in the future it could be considered as a more viable alternative to road transport in some instances. The Japanese Techno-Super Liner project has studied coastal transport around Japan, which has very congested roads. There is currently European research into the transport possibilities offered. When considering coastal or inland transport, the economics, time constraints and logistics are vital factors. It must be considered as a part of the larger supply train, so that integration between land, sea and air transport is complete.

The design of vessels is an important factor, with each area of service having its own specific problems. For example: size or draught constraints, speed restrictions, wash restrictions, and other regulatory requirements. A vast array of commercial vessel types operate around the world's coasts and on its inland waterways, (see "vessel types" below). Many of these craft are unique, and have evolved to fill specialized niches on a particular stretch of water. The conference will feature some of these craft, focusing on their design and operation, and will debate the future opportunities to develop coastal and inland waterways.

Papers will be presented on the following topics:

- **Vessel Types:** feeder ships: coastal and inland bulk carriers, tankers, container ships; passenger ferries, fast craft, "split ship" concepts, barges, pusher tugs, refuse lighters, dredgers, waterway maintenance vessels, pollution control and other special service vessels.
- **Design:** low wash, low emissions, low noise, environmental constraints, cargo and passenger loading, height/width/draught restrictions.
- **Operation:** economics of cargo transport, problems of high speed.
- **Regulation and Legalization:** wash and speed restrictions, pollution
- **Coastal and Inland Waterways:** Future development/opportunities, infrastructure/intermodality.

Deadline for proposed papers was 19 Jun 98. Registration Forms will be available near the end of 1998. Exhibition space and sponsorship opportunities are available.

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

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.

A PROVEN HYDROFOIL FLIGHT CONTROL SYSTEM

Erling Lunde and Georg Brustad, Dynamica AS

During the spring of 1992 Dynamica AS finished the sea trials for a fully automatic hydrofoil flight control system on the Westamarin West vessel Foilcat 2900 (120 ton, 140 passengers). Vessel performance was excellent in 4 m waves and speeds up to 50 knots. The vessel ran in commercial service in Denmark and Indonesia. In 1997 it was acquired by Hawaiian Navatek Ships Ltd.

To achieve the best safety, passenger comfort and operational flexibility, Dynamica has integrated a number of useful features using state-of-the-art control theory and technology:

- The control algorithm is based on multivariable, model-based control theory. High bandwidth feedback loops ensure stable operation and fast and precise compensation of wave induced motion.

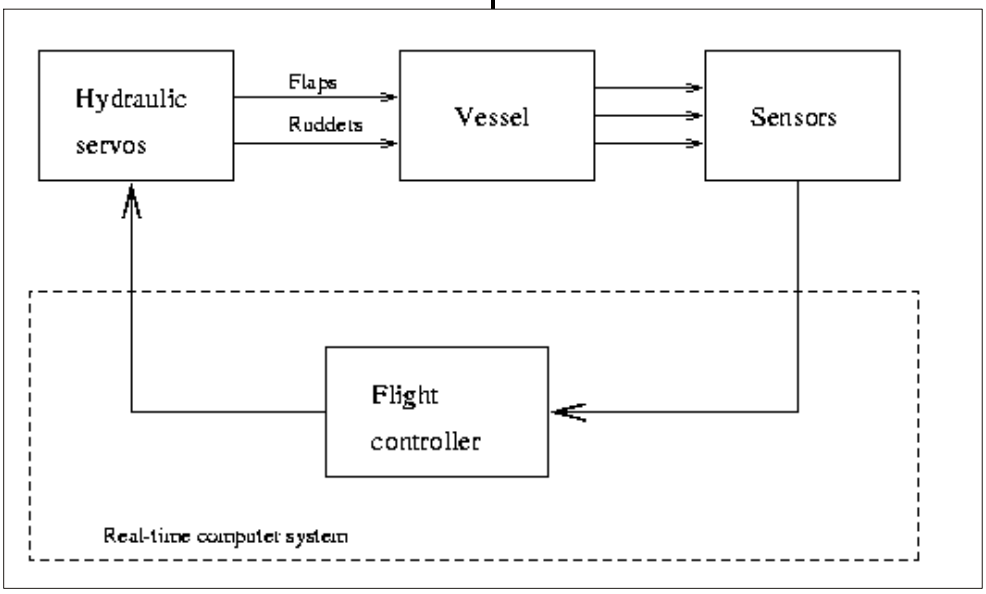
- Optimal utilization of available foil forces is achieved by an algorithm for control allocation -- also taking into account saturation of flap angles and velocities. Servo failures are compensated as far as physically possible.

- Motion sensors are duplicated to the extent needed for performing real time fault diagnosis and isolation. The system tolerates a failure in any sensor.

A dynamic vessel simulator was the main development tool. The simulator contained hydrodynamic models of foils and hulls, models of sensors and hydraulic servos, and a complete duplicate version of the control software. The vessel can be programmed to run in any sea state. Simulation results (a simulated failure mode effect analysis) were accepted as partial documentation for the certification of the vessel.

The control system is the result of a successful fusion of hydrofoil experience and hydrodynamics theory; mechanical systems theory; recent results in robotics; and modern control theory. A main advantage is that the system has become fairly general and easy to adjust to any hydrofoil configuration. As far as we know, this is the only hydrofoil flight control system commercially available from an independent company.

For more information, contact Dynamica A.S; Pirterminalen; N-7010 Trondheim; Norway. Phone: +47 73 92 91 60; email: gb@dynamica.no; website: http://www.dynamica.no.



IN MEMORY OF DAVID KEIPER

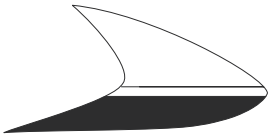
David Allen Keiper, 67, died of heart failure on 27 Jun 98 at a Cape Girardeau MO, USA hospital. He is best known and honored for having pioneered and developed the world's first hydrofoil sailing yacht, *WILLIWAW*. More recently, he is known to IHS members and correspondents as an expert on sailing hydrofoil design who gave freely and frankly of his advice and professional opinions. He loved the sea and designing smoother, faster sailing vessels.

"If some one 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 own story of how he designed and built the 31' - 4 " sailing yacht *WILLIWAW*, then logged almost 20,000 miles of mostly solo cruising around the Pacific Ocean in the 1960s *[Reviewed in the Summer 97 IHS Newsletter]*. The book is part adventure, part how-to manual; exciting to read and full of hard-earned technical advice.

Recently Dave had revived his business of providing add-on hydrofoil kits for sailing catamarans. His brother Frank is executor of the estate, and he may be contacted at Dave's email address, DVPW98E@prodigy.com. According to Frank Keiper, he plans to refund any deposits made on undelivered kits after probate of the estate. He is also looking for anyone interested in taking over and making a go of the hydrofoil kit business.

Dave often began his letters and email with "Ahoy!" and he often said, "Happy Sailing to all of you." His ashes will be sprinkled on the Pacific Ocean where he sailed for many miles. IHS salutes a good friend and a true hydrofoil pioneer.

The NEWSLETTER



International Hydrofoil Society

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

Editor: Barney C. Black | **AUTUMN 1998** | Co-Editor: John R. Meyer

When in Greece, Try This...

ISLAND HOPPING BY HYDROFOIL

By deTraci Regula

Before the arrival of water-skipping hydrofoils on the choppy waters of the Aegean, travel between islands was a time-consuming, stomach-churning experience. But now these modern vessels cut travel time and (usually!) provide a smooth trip. The two hydrofoil lines depart from the port of Zea, part of Piraeus near Athens, and Raphia, a short trip from Athens. A schedule of departures from Zea is on the Greek National Tourist Organization's (GNTO's) website at http://www.odysseas.com/hydrfl1.html. Remember that hydrofoils and catamarans don't run in late fall or winter.

Here are some hints to make the most out of your hydrofoil travel: Generally, the pace of life in Greece is languid, with few people, other than the occasional taxi driver, pushing the clock. However, the hydrofoils are exceptions. These swift ships depart promptly, and on two occasions that I experienced, a little bit ahead of schedule. Be there at least 30 minutes ahead of time, and make reservations in advance when possible. In rough weather, the hydrofoils may be canceled. The rough trip I mention here was the last ship allowed to travel that day -- the hydrofoil lines try to keep their reputation for smooth travel, but when Poseidon gets frisky, what do you do?

If you are traveling with luggage, the hydrofoils are minimally accommodating. Expect to handle your own bags. Crowded voyages mean baggage stuffed in every corner, another hazard if the trip is a little rough. For those prone to seasickness, be aware that these journeys are not always glass-smooth, at least on the smaller hydrofoils. Rough water will make itself felt. You may want to avoid sitting in the forward cabin of the vessel on the yellow Ceres vessels, particularly during late spring, early autumn, and whenever storms are in the area. Stay inside the broad, flat rear cabin.

See Traveling in Greece, Page 3

WHERE ARE YOU IN CYBERSPACE?!

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

1999 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 1999 dues as soon as possible. We regret that high bank fees make it impractical for IHS to accept payment by credit card or check drawn on a non-US bank or by other than US funds. Overseas members with no easy way to send US funds, please read the letter on this topic, page 8 inside.

INSIDE THIS ISSUE...

PRESIDENT'S COLUMN

30TH ANNIVERSARY EVENT PLANNERS WANT YOUR INPUT

At a recent Board of Directors meeting it was proposed that IHS consider recognizing, in the Year 2000, the 30th year since the founding of the IHS. The 25th Anniversary Celebration and Conference that we held in the Washington DC area in June 1995 was highly successful. Many IHS members feel that if a similar event in the year 2000 could be even half as successful, it would be worth doing. It was decided to poll the membership to determine the support for such an event. A questionnaire will be distributed to all members and placed in the Announcements section of the IHS website. We urge everyone to respond.

If we do hold a 30th anniversary event in 2000, what kind of program should we arrange, and when and for how long should it be held? Should it be primarily a social gathering, perhaps an afternoon and/or evening? Should it be a day-long or a two-day (or even a three-day) technical program as in 1995?

The meeting could focus on either technical or social events, or a combination of the two. A key determinant then would seem to be whether or not there have been enough significant technical developments or new applications of hydrofoil technology to provide material for the papers we would need. In your response to the questionnaire, please comment on any such developments you are aware of — and, if you can propose to write and present a paper on that or any other suitable topic, please let us know!

Tentatively we are thinking that our IHS Year 2000 event would take place in the latter part of May or early June. A one-day event might be on a Friday or Saturday; a two-day event could be on both those days. Or it could be Thursday and Friday, with Saturday available for doing other interesting things in the Washington area or for old friends to get together. The questionnaire presents several alternatives and asks you to indicate the likelihood that you would attend, as you now see it. Your answers are in no way binding; this is simply to give us an idea of what the membership wants.

John Meyer, President
jmeyer@erols.com

IHS BOARD OF DIRECTORS

1996-1999	1997-2000	1998-2001
Jerry Gore	Mark R. Bebar	Stephen Duich
Jim King	William Hockberger	John R. Meyer
Mark Rice	George Jenkins	Frank Peterson
Ken Spaulding	Ralph Patterson, Jr	Peter Squicciarini

WELCOME TO OUR NEW IHS MEMBERS

Frans van Walree is professionally involved in hydrofoil craft at the Maritime Research Institute Netherlands (formerly NSMB), mainly in software development and model testing for hydrofoil craft and foil-assisted craft. Most work deals with powering and seakeeping predictions. Also, the use of foil systems with ride control in simulation programs and for model testing gets a lot of attention. He is currently working on a thesis on computational models for hydrofoil craft in steady and unsteady flow conditions. He hopes to finish this work early next year at the Delft University of Technology. Mr. Walree plans to be also involved in hydrofoil design as a hobby.

CAPT Charles W. Luck graduated with a BS degree in International Business Administration and Foreign Affairs and was commissioned in 1974 through the NROTC program. CAPT Luck's naval career, starting with an initial assignment to *USS BARBEY* (DE-1088), included duty as an Operations Officer in *USS O'BANNON* (DD-987), an Engineering Officer of *USS HARLAN COUNTY*(LST-1196), and an Executive Officer for reactivation of *USS SPHINX* (ARL-24) in Bremerton, WA. CAPT Luck attended the Armed Forces Staff College from Aug 86 to Feb 87, then was assigned to *USS STUMP* (DD-978) as Executive Officer. In Apr 89, CAPT Luck was assigned to the staff of the Assistant Chief of Naval Operations, Surface Warfare (OP-03), Washington DC, as the platform sponsor for the DD-963, DDG-2, DDG-37, DDG-993 and PHM-1 *PEGASUS* Class ships as

Continued on Page 4

TRAVELING IN GREECE
(Continued From Page 1)

The outside areas of the hydrofoil are tempting if you have a still or video camera, but once the ship hits full speed, you may be at risk outside. Even when the water is relatively calm, the wind may be surprisingly strong. I spent a cold half-hour outside because I didn't think I could make it back into the cabin one-handed, and if I let loose of my camera, either the wind or the jolting caused by high waves were sure to smash it into the steel sides of the ship. I finally leapt through the open door when someone stepped outside, and my camera and I both survived as the ship lunged and I nearly tumbled into the baggage hold.

The reward for these efforts is the smooth, powerful sense of flying on water, like some semi-divine mythical personage. The nickname "Flying Dolphin" is well-earned.

Larger hydrofoils offer amenities such as full bars and "in flight"movies. On a journey from Rafina to Mykonos, the movie was "The Big Blue, " which included many scenes of hydrofoil travel. It was surrealistic to glance at the television monitor, see speeding water, then glance out the windows beside the monitor, and see the same speeding water. Fantasy. Reality. Greece always seems to combine both seamlessly.

Hydrofoils are a fun, efficient way to maximize your time on the delightful islands, not on the deck of a slow ferry. From the Greek National Tourism Organization, here are web pages for are a few of the many wonderful island destinations reachable by hydrofoil:

Thassos: www.odysseas.com/thassos.html
Syros: www.odysseas.com/syros.html
Kos: www.odysseas.com/info_kos.html

Flying Dolphins — the get-up-and-go ferries of the Aegean. Vroom!

Photo by David Christie

NEW ROUTES AND NEW TONNAGE IN PIRAEUS

Fast Ferry Int'l, Sep 98

Hydrofoils have long been part of the Greek ferry scene, but fast ferries have until recently been something of a rarity in the country's premier port of Piraeus. Although Ceres Hydrofoil bases almost two-thirds of its 30 Kometas and Kolkhidas, plus two catamarans, in the Argosaronic region, these have traditionally been operated out of the nearby marina at Zea. Except, oddly, for the two hydrofoils allocated to the route serving the island of Aegina. Oddly because this is the company's shortest trip, scheduled crossing time is 40 minutes, and the transit of the Great Harbor off foil takes approximately 10 minutes.

A few other fast ferries have appeared in Piraeus from time to time, notably a pair of Cirrus 120P surface effect ships operated by Piraiki Naftiliaki during the early 1990s and a Meteor hydrofoil that appeared in 1994 on a local route sponsored by the Municipality of Piraeus, but none have remained in service for longer than a couple of years.

Even now, the numbers and capacities of the fast ferries operating out of the Great Harbor are small compared with the surrounding fleets of conventional tonnage. However, there has been a significant increase during the past two years, despite the licenses of three of the country's newer operators (Ilio Lines, SeaJet Shipping and Goutos Lines) specifying Rafina, a newly developed port northeast of Athens, as the mainland end of their routes.

Aegina Services

The first catamaran to be introduced on a route serving Piraeus was Westamaran 86 Keravnos. The then 18

Continued on Next Page

NEW IN PIRAEUS
(Continued From Previous Page)

year old vessel was imported from Norway by Paraskevas Naftiliaki Eteria in 1990. For the past five years, it has been based in Angistri and operated to the neighboring island of Aegina and then on to Piraeus. Frequencies between Aegina and Piraeus increased in 1996 when Sea Falcon Lines introduced a pair of Meteor hydrofoils, *FALCON I* and *FALCON II*. A third, *FALCON IV*, has since entered service, although just one vessel is required to maintain the basic schedule. Services are operated to Suvala on the north of the island, with some being extended along the coast to Agia Marina.

Ceres Hydrofoil

Last year marked the beginning of an expansion of Ceres Hydrofoil services, when the company introduced three Rodriquez RHS 160s, acquired from other companies in the Mediterranean. These are being marketed as "Mega Dolphins" to differentiate them from the Soviet built "Flying Dolphins." Two were introduced last August on a pair of new routes from Piraeus to the Cyclades islands of Kythnos, Serifos, Sifnos, Kimolos and Milos; and on a connecting inter-island network from Milos to Sifnos, Paros, Naxos, Mykonos, Tinos and Syros. As on most of the medium distance fast ferry routes in Greece, one return journey a day is scheduled, increasing to two during the peak months of June-September. The third RHS 160F is allocated to Ceres Hydrofoil's Sporades network in the northeast of Greece and is operating from Volos to Skiathos, Skopelos, Alonissos and Thessaloniki.

Expansion of the company's Piraeus services has continued this year with the introduction of Austal Ships 48m catamaran Flying Dolphin 2000 alongside the Kometas operated on the route to Poros, Hydra, Spetses and Porto Heli. Also, another hydrofoil service from Piraeus to Kea introduced last year has recently been extended to the island of Andros and some services to Aegina carry on to Epidavros or Methana.

Fast Ferry International, Milroy House, Sayers Lane; Tenterden, Kent TN306BW; United Kingdom. Reprinted with permission. Visit FFI's website: www.fastferry.co.uk or contact them by email at: info@fastferry.co.uk]

A Pair of Ceres Kometa Hydrofoils Passing Through Piraeus Harbor at Reduced Speed (photograph FFI Int'l)

WELCOME TO NEW MEMBERS
(Continued From Page 2)

well as other Advanced Naval Vehicles. Captain Luck served as Surface Operations Officer, and later became the Operations Officer for the *USS JOHN F. KENNEDY* Battle Group until Apr 1997. In May 1997, CAPT Luck reported to the Commander, Military Sealift Command in Washington DC as the Director, Operations and Plans, where he now serves.

Adrian S. Onas, from River Ridge LA, is a research assistant and graduate student in the School of Naval Architecture and Marine Engineering at the University of New Orleans. He is interested in learning more about hydrofoils.

Joseph W. Gilling has been interested in hydrofoils since 1965 when he did his thesis in Mechanical Engineering on this topic. He will be moving to Plymouth, England where he will have the opportunity to work on some hydrofoil ideas. His particular interest now is in building a two-person water-jet driven hydrofoil along the lines of the Interflight Hydrofoiler featured in the Autumn 1997 IHS Newsletter.

Clifford Sojourner is interested in building some David Keiper-style foils for his Hobie 16. He also has a Hobie *TRIFOILER;* see his *TRIFOILER* web page at www.employees.org/~cls/trifoiler.

Peter Venema currently operates 4 Russian-built Voskhod and 1 Meteor hydrofoil in Holland. His company, Fast Flying Ferries, is in the third year of operation and has many questions unan*s*wered. He just received his internet connection recently, and found he IHS Home Page just a while ago.

Other new members – *Sean Healey, Constantino Makohon, and Thomas Schneider* – provided no information for the Welcome section.

MEMBER NEWS

Australian member *Jerry Fry* is operating the PT20 *MANU WAI*, which Sea Flight Cruises bought in New Zealand a few years ago, as a charter for corporate entertaining. "The vessel has been repaired and reinstated in class with ABS but will have to be relocated elsewhere in Australia if we are going to work it successfully which will be probably also involve having to purchase another vessel or vessels, (probably RHS 160 F) because a single 50 passenger vessel of this vintage (1964) has limitations," Garry says. Another alternative under consideration is simply to sell the vessel, so anyone interested in buying should contact Garry now while the option is open.

Hydrofoils were a common sight on Sydney Harbor carrying millions of commuters and tourists between Circular Quay and Manly for 26 years from 1965 to 1990. The PT20 was a forerunner of today's vast and impressive array of large, high speed ferries. The prototype was built in 1956 and was the first hydrofoil approved by classification societies for coastal services. Today, more than 40 years after the design was introduced, numerous examples still operate in diverse areas of the world. *MANU WAI* was built as a 72-seat ferry in 1964 and operated as a commuter and tourist service between Auckland and Waiheke Island. She was completely rebuilt and modernized in 1989 as a luxury corporate cruiser with a reduced seating capacity of 50 to optimize passenger comfort.

Jerry Fry can be contacted by email at: rae@zip.com.au or as follows: 6/84 Wellington St.; Bondi, NSW 2026; Australia; phone: 61 2 91306591; fax: 61 2 96983952.

IHS E-MAIL ADDRESS

foiler@erols.com

FAST SHIP PRESENTATION FROM JUNE 1998 "TROIKA" MEETING RELEASED

Dr. Theo Kooij has obtained a release on his Fast Ship Program presentation given at the June 1998 joint meeting of the IHS, US Hovercraft Society, and the SNAME SD-5 Panel ("Troika"). A summary is presented here. All IHS members may obtain a full copy either from the Publications Section of the IHS Website www.erols.com/foiler/ihspubs.htm or, at no cost, send a request for a hard copy to: Mr. Ken Spaulding, 3131 Rittenhouse St., NW, Washington, DC 20015. Non-members may obtain a copy by mail for a US$5.00 handling charge.

Summary

DESIGN CONSIDERATIONS FOR FAST, LARGE, LONG-RANGE HYDROFOIL SHIPS by Dr. Theo Kooij, Program Manager, Tactical Technology Office, Defense Advanced Research Projects Agency (DARPA/TTO), 3701 North Fairfax DR, Arlington, VA 22203-1714; phone: 703-696-2333, email: tkooij@darpa.mil.

Dr. Kooij first describes a requirement for future overseas deployments of the Army After Next (AAN) to quickly move equipment from the continental USA (CONUS) to faraway shores. This quick response is aimed at defusing an adversary's early threatening moves and discouraging any adventurous overtures by "operating within his decision cycle," as the Army expresses it. The Army attains this objective now with expensive prepositioned forces: cargo ships, deployed at several strategic locations (Diego Garcia for one), loaded with equipment and ready to sail on short notice. A possible cheaper alternative is fast sealift transportation from CONUS.

In a July 1997 message, the Army Chief of Staff announced his intention "to plan toward a next generation fast sealift ship that can close an AAN battle force with accompanying support elements within 120 hours." For example, to get from the USA to Southwest Asia in 5 days will require a speed of somewhere between 70 and 100 knots (From Savannah GA to Ad Damman is 8,700 nmi., or, if the Suez Canal becomes inaccessible, 11,800 nmi). Besides the speed/range requirement, the distance must be covered without underway refueling, and the draft must be such that the vessel can enter most ports. The CSA plan translates to approx. 10 ships of 5,000 to 10,000 tons on both coasts.

In summary, the Fast Ship technical requirements are: Speed: 70-100 kt; Unrefueled range: 10,000 nmi; Draft: shallow to enter most ports; Offloading: Over the Shore; Size range: 5,000 - 10,000 tons. Dr Kooij notes a constraint in installed propulsive power: 260,000 shp (about that of an aircraft carrier).

To put these requirements in perspective, Dr Kooij provides an analysis based on fundamental relationships of speed, range, weight (or lift), drag, power, and other related parameters to show the degrees to which drag must be reduced (or lift-to-drag ratios must be improved) to achieve these objectives. He gives a variety of equations, tables and plots, and he mentions a DARPA-sponsored project to assess the potential of a hydrofoil High Speed Ship in the 5,000 ton size category. Drag reduction through the use of polymer injection and air/microbubble lubrication are mentioned. Also Dr Kooij describes an Office of Naval Research (ONR) sponsored project (SLICE), and the MIDFOIL concept sponsored by the Center of Excellence for Research in Ocean Sciences (CEROS). Dr. Kooij finally mentions ongoing work in drag reduction dealing with Lifting Body Ships, boundary layer ingestion, and base blowing as subjects of future articles.

-- Summary by John Meyer –

LETTERS TO THE EDITOR

High School High Tech

I am the Technology Instructor at the Topeka Education Center in the Topeka Public School System. The Center helps kids at risk. In the 5 years since we opened the technology program, we have done some exciting activities. For the 1998 - 99 school year we are planning to build a hydrofoil sail boat. If your organization would could offer technical help or materials it would be appreciated. We have in the past taken on such projects with success; check it out at http://www.networksplus.net/elliott/jetengine. Our student population is made up of inner city youth, many of which have had a brush or two with the law, and many of the females are parents or are pregnant. Our goal is to help these students become useful people in today's society. Thus a lot of time is spent on teaching social skills, not only that it is important to get along with others but to be responsible for yourself. This includes holding down a job and paying taxes. Many of our students receive social assistance, and it is also our goal to help them become self supporting. We have started a program in which students are paid by local companies to work 2-3 hours a night to gain experience. When a student has a meaningful job, usually we see a jump in the student's morals and quality of school work. Though many of these students are not college bound, it is important to help them be all that they are capable of being.

James Elliot
elliott@networksplus.net
Technology Instructor
Topeka Education Center
Topeka, KS 66604 USA

[The notes of David A. Keiper, recently deceased, may be of help to you. Ordering information can be found in the announcements and publications sections of the IHS website. -Ed.]

Dissertation

I am doing a dissertation at Liverpool John Moore University on hydrofoils. I would be grateful for any info, contacts, or advice you may have. The following is a draft proposal:

Summary of Aims. 1. Investigate current practice in assessing strength, stability, and performance of sail powered Multi-Hulls. 2. Compare and contrast design and performance of sail powered Multi-Hulls and Monohulls. 3. Determine possible influences of recent European Community Recreational Craft Directive. 4. Examine legislation's assessment of requirements for different EC categories, e.g. Ocean, Offshore, Inshore. Assess the advantages and disadvantages of safety requirements specific to Multi-Hulls, e.g. means of escape after capsize. Look at key variances between standards and assumptions used for sail powered craft and commercial vessels. Examine the rational behind these variances. 5. Examine how European, USA, and other nations' standards may vary, and the implications of this. 6. Many Multi-Hulls are built by amateurs for their own use. Determine what influence legislation may have on them.

Chris Edgar
ETMCEDG1@livjm.ac.uk

Student Will Help

Can a student cooperate with you? I am an Italian student of mechanical engineering at the University of Modena. During my five years of study I have been concentrating on structural mechanics, and in this last year I have been dealing with fluid dynamics. In particular I have been working with the software package FLUENT. For my thesis I would be very interested in working with a project of yours. If there are projects that could be developed and carried out by a young and enthusiastic student, please just send me some more information.

Paolo Levoni
levolevo73@hotmail.com

Foil Sections

I need to find the proper foil section to use for a strut section . . . my experience is all with Aerodynamics, not Hydrodynamics, so am out of my comfort zone (Reynolds number wise). Issues: (1) Maintenance of fully attached flow throughout range of 10-60 MPH; (2) Essentially zero degrees angle of attack (strut); (3) Very small chord (in the range of 1/4 to ½ inch)

Scott Kelley
scottk@iccom.com

Response...

I recommend that you contact David Taylor Research Center (now Naval Surface Warfare Center - Carderock Division) to obtain the following report: Rothblum, R. S., D. A. Meyer and G. M. Wilburn, "Ventilation, Cavitation and Other Characteristics of High Speed Surface-Piercing Struts," Report NSRDC 3023, July 1969. This is the most comprehensive test report on strut hydrodynamics that I encountered in my previous work on hydrofoil loads criteria. The strut dimensions you cite seem bit unusual. For a chord of 0.25 in. and a representative 10% thickness, this would result in a max. thickness of 0.025 in.

Bill Buckley
wbuckley@erols.com

2nd Response...

The old Hydrofoil Design Data Log (DDL) had foil section shapes for all of the US Navy's hydrofoils. It should be in the Advanced Ship Data Bank at

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CDNSWC, and I don't think that kind of data is classified.

Mark Bebar
Bebar_Mark@hq.navsea.navy.mil

[See Summer 98 IHS newsletter for complete instructions and sample letter for requesting information under the Freedom of Information Act -Ed.]

3rd Response...

The main considerations for using a small chord (~½ inch) strut at high speed (60 knots) are endurance and providing smooth flow around it. These tasks are opposite in some sense. The thicker the strut, the more durable, but it reduces the speed at which cavitation begins. I think it is necessary first to calculate the thickness at which endurance will be guaranteed, then choose the profile for the smoothest flow.

1. Endurance. In your design, you should consider the strut as a rafter with one attached end or both attached ends or as a frame with certain shape. The maximum value of forces acting on the strut must be taken when calculating the bending moments. The calculation is made by standard methods of elasticity theory or some empirical expressions. The thickness of strut paneling is determined from condition of providing the endurance at the maximum bending moment. The maximum contracting stress cannot be more than Eulerian stress with endurance reserve 2.5. (The thickness of the strut cannot be less than the thickness of strut paneling.) If flow is non stationary (for example wave impacts take place), then it is necessary to check the dynamical endurance of the strut by means of experiment or complicated calculations.

2. Choice of the Profile. If the smoothest flow is needed, you can try a profile with circled bow edge and sharp stern edge something like NACA-0009 (sometimes used as a rudder), it must work until high speed without cavitation. You can estimate the speed at which cavitation will start using expressions given on my website http//www.geocities.com/CapeCanaveral/ Launchpad/3416. But usually in hydrofoil systems other strut profiles are applied. The bow edge is circled or sharp, the stern edge is obtuse (like a wedge). It enables to diminish the resistance at some speed range (so-called effect of resistance crisis), in spite of flow estrangement.

Konstantin Matveev
matveev@cco.caltech.edu

[IHS's single Russian member, Konstantin Matveev, has now moved to the USA to study at the California Institute of Technology. -Ed.]

4th Response...

To answer you I had to get hold of Abbott and Von Doenhoff's book on "Theory of Wing Sections." I recommend a very simple section; namely NACA 0012. A thicker section would normally lead to cavitation at a given high speed, so it is a trade-off between cavitation and structural adequacy. As in most things it's a compromise!

John Meyer
jmeyer@erols.com

Powerboat Foils

[This is an unsent draft, found on Dave Keiper's computer, composed June 23, the day he started feeling ill before his death. -Ed.]

Because there is some interest in powerboat hydrofoils in IHS, I thought I should spell out some of the details of such installations. At present we can only outfit powerboats of about 1000 to 1200 pounds all-up weight, using our 3"-chord hydrofoils. We outfitted several small powerboats with foils back in the 1970s. To our knowledge, they were all successful. With our larger foils, of 3" chord, we can outfit somewhat larger craft. A powerboat of 1000 pounds +/- all-up weight would be suitable (about the same as for sailing catamarans). We figure a lower take-off speed on the powerboats, because their hulls are rather draggy compared to cats. On the powerboats, both ladder foils are fully lifting, so that results in a lower take-off speed than with sailing catamarans. Only one stern stabilizer fin is needed. Best if it is located just above the prop, to help keep the prop in the water all the time.

Many previous powerboat foil designs were only good in fairly flat water, and their foils could never be used on sailboats. The ladder foils for a sailboat must perform well in rough water, and they are excellent on powerboats in rough water.

The main foils on a powerboat should be located around the center of gravity of the boat. Sailboat main foils are located a bit further forward, because of the forward sail pitching moments, and lack of engine thrust that would tend to bring the bow up.

If you want a top speed of 40 kt, our standard foil kit should do very well for you. It uses the Clark-Y lifter section, which may suffer cavitation around that speed. The Clark-Y is an excellent foil section for multihull sailing hydrofoils, which are mainly sailing in the 10 to 35 knot range. It is probably also an optimum foil section for power boaters operating on rough waters, such as found on San Francisco Bay. If you are seeking to get to 50 knots, we would want to modify the main foils slightly, installing a 3"-chord NACA 16-510 lifter in the lowest rung of the ladder foil. (Our standard strut section is NACA 16-008, which is good for 60 knots.) At this point, we are not making the capital outlay for the 16-510 lifter extrusion, but it is likely in the next year or so, when sailors want to try breaking sailing-speed records, or when several power boaters approach us

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for foils. It would be easy to retrofit the high-speed foil on the foil units.

Yes, that was me in the aluminum dinghy, but it was Auckland Harbor, NZ. The company interested in foils was too cheap to put a shaft extension on the engine, so I had to sit fairly far aft to keep the prop in the water. It was fall, and the water was getting cold. Sitting aft unloaded the main foils, which reduced lateral stability. Stern foil had no lateral stability. Made a turn, and surprise, I found myself in that cold water.

Dave Keiper
(deceased)

Microhydraulics

I'm interested in microhydraulics. Do you know who has info?

Nat Kobitz
Hynat@aol.com

Payment From Overseas

I would like to remit 1997-1998 dues for IHS membership. Please inform me of how to remit dues and of a bank information (bank name, address, accounting number) of IHS.

Various People

[Unfortunately IHS, which is headquartered in the USA is not set up to accept payment by bank transfer or check from overseas bank, or by credit card. The bank charges for such small transactions are higher than the cost of membership! Accordingly, we are lenient with our overseas members as to when during the calendar year they pay their dues. Perhaps the easiest way is to obtain traveler's checks of US dollars in the proper amount, endorse them to IHS, and mail them. Some people simply send cash... we have never had a payment lost or stolen in regular mail, but it is safer to use registered mail if sending cash. Finally, some people have an associate in the USA pay on their behalf, whether that associate is traveling here or lives here... or they wait until business or vacation travel takes them to the USA. Please contact IHS with any further questions. -Ed.]

HYDROPTÈRE

See my *HYDROPTÈRE* website (http://perso.wanadoo.fr/terrasse.web). It's a famous French hydrofoil built by Eric Tabarly and Alain Thébault. Please send me your comments!

Gabriel Terrasse
gabriel.terrasse@wanadoo.fr

PHMRON TWO Reunion!

Hi, Shipmates. Any former US Navy Hydrofoil Mariners from PHMRON TWO interested in a reunion in our old home port of Key West? or you're looking for old shipmates? Hopefully we can get a reunion going for the old gang, or at the minimum get in touch with an old buddy?

Steve Novell
USS PEGASUS (PHM1)
ffg50_phm1_exnavy@yahoo.com

R/C Model

We have managed to get a model radio controlled hydrofoil working. I think that it is the smallest fully submerged hydrofoil ever, but that's only because I've never heard of a smaller one. Here is a description, and the website is: www.onspec.co.uk/ihs/model.htm

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

The boat took a long time to develop. What we ended up with was something like this. This is from memory, so there might be small errors. Motor and drive: Model car motor, about 11 turns, driven from 8 C-cell NiCd batteries and electronic speed controller. 6:1 gearbox and 55mm pitch propellor, 32mm diameter. Gives about 3kg thrust when stationary. Hull is from a model planing craft, but the total weight is now 3.8kg. Wings are made from the front wing of a Trampofoil A1 (www.trampofoil.se) cut into several pieces. Span is about 250mm and chord about 60mm both ends. Take off speed is about 1.5m/s. Top speed is much faster, but we haven't measured it yet. Controls: Standard radio control gear controls motor power and rudder. Rudder is on trailing edge of front strut and is not very responsive. Turning radius is several meters. All that is the easy part. Here is the difficult part: The boat is unstable in height and roll, so control systems have been fitted for both of those. Height: Capacitive level sensor fitted in front of front strut measures ride height and controls angle of attack of the whole front wing. High speed servo motor (100ms) is used. There is no driver input. We still have some problems. What we think is happening is that as the rear takes off, this causes the front angle of attack to fall, and the height control system is too slow or has too little gain to stop the front falling. When the front is low, it starts to rise, but when the front is low, the rear is pointing down (it has a fixed angle to the boat), so the rear falls just as the front rises, and the cycle starts again. Roll: The rear wing is in 3 parts, separated by the rear struts. The middle part is fixed, and the two outer parts, about 70mm of span each side, move in opposition for roll control. A pendulum angle sensor is used for slow roll control, with a gyroscope for fast roll control. These control a fast servo motor which moves the outer wing parts. There is also an input from the rudder, to alter the angle as a turn is started. This seems to work well,

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but there were a lot of pieces to get working. The boat is not difficult to drive. Without the control systems it would be impossible. Battery life is about 5 min.

Malin Dixon
malin@onspec.co.uk

High Tech Sailing

Anybody interested in a joint venture? I have developed what I believe will be the fastest sailing craft yet.... and, of course, it is a foiler. It is pretty high tech, and designed to break records by wide margins. It's not your "regular" kind of boat! The innovations that make this craft unique have not been patented, yet (at least, not by me), and I have done some preliminary research on that front. I'm not sure if that is the direction I want to go, but I'm open to suggestions. My love is for the concept... the vision of it flying across the water...(I've sailed it so many times, in my mind); I don't really want to get into the boat building business. But somebody might. If anybody has any thoughts about any of this, send me a note. I would love to be more descriptive, but I'm sure you understand my reluctance, at this point. In fact, if anybody has any thoughts about protecting ideas while still allowing discussion of them, I would really be interested. I would really like to share ideas with IHS folks.... it is such an incredible resource... and the potential for collaborative advances is so great... I look forward to your comments.

Tyler Ahlgren
tallgreen@earthlink.net

Hydrofoil Jetski™

I think Jet Ski™ riders want to cut, jump, and have a lot of control. I'd appreciate any suggestions... I am initially working on a towable hydrofoil with basically 3-axis aircraft-like control to allow the craft to jump without a wake to cross. (Jumping another boat's wake can be dangerous and illegal). Additionally, long rides in choppy water will really beat you up. Especially if you are 40+ like me. An adjustable foil would allow you to use your energy when you really want to perform vs. travel. I am working on a recumbent seating system with dual front foils having individual spoileron controls and a separate rear skeg (rudder). The spoileron controls should allow bank control, counteract tow forces and control the height. The rudder should control yaw. If this works out well enough, the next version will be powered. I'd appreciate any suggestions. Such as: The front foils need control, should I rotate the entire horizontal surface of the foil? Can I instead have trailing control surfaces like an airplane's flaps? I'm planning on building the foils from flat aluminum.

Barry Steele
bsteele971@hotmail.com

A Taller Foiler

I wish to build a very tall foil vessel for extremely rough water conditions. Can you tell me if you think it possible to get a 20 to 30 passenger vessel flying as high as 15 or 20 ft. off the surface?

Kahanu
cornelius3rd@hotmail.com

Response...

There are two problems: 1. The mass of the foil system will be very big for this rather small ship. This give results in significant increasing of propulsion. 2. It will be necessary to apply deeply immersed foils and automatic control system. So the cost of this ship would be very high!

Konstantin Matveev
matveev@cco.caltech.edu

2nd Response...

Another problem might be the transmission of propulsion power to the water. If it is propellor or waterjet driven, the shafting or water intake piping would add considerably to the weight. (This was the problem for the early Jetfoil design - longer struts meant more water, which added to the weight, which in turn increased the power required, etc.) If reaction jet (gas turbine) powered, that would not add a lot of weight, but these tend to be power limited for take-off, and of course the noise is a factor.

Ralph Patterson
RAPatterson@compuserve.com

3rd Response...

The first question is whether the tall strut is necessary. All the US Navy hydrofoils were designed for sea state six or less. One needs to study the sea condition data and the odds of encountering the situation where longer struts would enhance the ride. Some hull contact with the waves does not necessarily degrade the ride quality. Naturally, the longer struts has to be traded for increased structural and hydrodynamic forces.

Sumi Arima
Arimas1@juno.com

4th Response...

I concur with Konstantin Matveev. Also, there will be serious stability problems, even with active control.

Nat Kobitz
Hynat@aol.com

Thesis Help Needed

This is a request for help on behalf of Dimitri Lehner, who is currently writing his thesis at the University of Sports at Cologne. His topic is "Sailing on Catamarans," especially "Offshore Sailing and Cruising on Beach Cats." To get deeper into the matter – and to experience himself – he sailed from Scharbeutz (North of Luebeck) to Saint Petersburg in Russia in May/June this year. He converted a serial Nacra 6.0 to meet all expected circumstances, as strengthening of hulls, bulkheads, adding wings, reefs, safety and navigation aids as used in cruising. Dimitri needs more info on

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cruising and long distance sailing with beach cats, beach cats used for extreme tours, and converting of beach cats to meet the above requirements. So far his research as turned up the following:

- Crossing the U.S. North-West Passage on a Hobie 18 in 1986-88,
- Duncan Roos sailed to the Amazonas source (no literature found),
- Charity race on HC 16 from Durban to Cape Town in '96 (no literature)
- Atlantic crossing of Bourgnon-Giraldi in 1986 (no literature found)
- Several "raids" in France and the annual "Worrell 1000" race.

His theory is, that cat sailing is subject to ongoing variations, as cat-safaris, club-races, freestyle sailing as the "Bacardi Blast" during the Tornado Worlds on the Bermudas, etc., similar to canoeing on rough waters, oceans, para-gliding, cross-country skiing, etc. According to Dimitri, there's very little specific literature, videos, and reports available on the above topics. He will receive Multihull Magazine's book and video catalog, and the list with every article published since MM began in 1975. I am sure, more has happened than the multihull press has ever heard of! On behalf of Dimitri, I kindly ask you to check your mind, files, archives, and computer hard disks for info on his studying subject "Cruising and Long-Distance Sailing on Beach Cats." His address is: Dimitri Lehner; Gutenbergstrasse 2; 50823 Koeln, Germany; Phone and Fax +49-221-522 457. I shall be very pleased, if the worldwide multihulled community could give Dimitri a little help to reach his study's aim.

Chris Plaass
plaass@ki.comcity.de

Hydrofoil Source

Are you still interested in Russian hydrofoils? Our company - Interfinance CIS - is an investment bank operating in the countries of the former Soviet Union. We have recently been retained by the largest manufacturer of hydrofoil and ekranoplan craft in the world. Until recently this Russian company worked exclusively for defense projects. Now it wants to be able to design, produce, and sell its wares for civilian markets. My client's range of products is truly immense, and some of the production is well known in many countries.

Gregory J. Grushko, President & CEO
ggrushko_intercis@co.ru
Interfinance CIS
6/1 Sechenovsky Per.
119034 Moscow, Russia

[Yes, the International Hydrofoil Society is alive and well, and we are still interested in hydrofoils (as required by our charter). IHS does not endorse products and services, but we are happy to publicize the facts of your representation and any other newsworthy hydrofoil related information in our newsletter. If you want to contribute to the content of the IHS website, here are some suggestions as to where we need your help: 1. Please take a look at the photo gallery area of the website. If you have any historical or current photographs that will fill in any gaps, please provide them. 2. Please look at the posted messages and frequently asked questions section. There is quite a bit of information there about types, sizes, prices, and delivery schedules for Russian hydrofoils. If any of this information is inaccurate, out of date, or incomplete, please furnish information to correct the problem. 3. Please review the history and pioneers section of the website. IHS presents awards to recognized pioneers and achievements in the field of hydrofoils. We also publish articles about hydrofoil development. Despite Russia's eminence in this field, I don't believe that there have been any Russian recipients of the IHS award, probably due to lack of information. We are particularly interested in first-person recollections from people involved in hydrofoil development in the 1960s and earlier. Many of these people are now deceased or retired, and those who are still happily alive will not remain so forever. We would like to hear from them or about them. -Ed.]

Volga Hydrofoil

I am restoring the old Russian hydrofoil Volga, which was built in1970. I would like to ask you to share with me your experience on that matter. Could you be so kind to send to me any kind of information (for example, how to repair aluminum hull, how to change the drive unit, how to install seats, lights, etc.)?

Edvardas Leskevicius
hidrostatyba@gargzdai.omnitel.net

Foil Retrofit

I have a 17' ski boat with a 115 hp Mercruiser I/O. Can it be retro-fitted with foils and if so how do I do it or who does this kind of thing? It will go about 45 mph at wide open throttle of 4500 rpm but ride is rough when the wind brings up swells on a local lake. 2 foot waves make ride miserable going across the lake or for a long ride. It is a deep vee and rides well when trimmed up in moderate clean water, give some waves and it is rough.

Corrie Cammack
corriec@cybertron.com

Response...

The Winter 97/98 IHS Newsletter has a long article by Tom Lang with many design tips on the subject of adding foils to small motorboats. He did extensive experimenting in the 1950s and ultimately perfected an add-on kit design that was manufactured and marketed by the Upright Scaffolding Corp (the kit was not a huge commercial success and was discontinued). If anyone thinks there is a

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better market today, you may be able to get the rights to manufacture his design.

Barney C. Black
foiler@erols.com

2nd Response...

IHS member Ken Grina (grina002@tc.umn.edu), who used to work for Boeing Vertol and whom I knew when I worked there over 25 years ago, has DONE what you want to do. Corrie, you may want to write to Ken and get some info.

John Meyer
jmeyer@erols.com

3rd Response...

I work with Sam Bradfield at HydroSail Inc. We are sailing hydrofoil designers (although we must admit to putting foils on power boats too). We have recently started a web page at http://members.aol.com/hydrosail. It has a few photos, and I will continue to add info about our designs and work.

Mike McGarry, HydroSail Inc.
hydrosail@aol.com
(407) 723-0733

Who Makes Them?

I am interested to find a Listing of Hydrofoil Manufacturers.

[There is quite a bit of information in the Posted Messages and Frequently Asked Questions section of the IHS website about who is offering to build hydrofoils today, what they cost, and what their specifications are. IHS members who don't have access to the internet can request that a hard copy of this web page be sent to them by postal mail. - Ed.]

Response...

You asked for a list of companies that have built hydrofoils in the past. But the real answer is that there are many boat and ship builders who can build hydrofoils, if a customer should want one. All they need is a design. The foils themselves, and certain other subsystems of a specialized nature, would have to be obtained from companies that specialize in them, but a good boat builder per se could put it all together and turn out a very suitable craft. A listing of just the companies that have built hydrofoils in the past, we would miss most of the real candidates and include some that no longer exist. Also, some of the former builders were building for the US Navy or some other government customer and might be fundamentally incapable of building for a commercial customer who cares about operating at a profit.

Bill Hockberger
hockberg@erols.com

Hitting Logs

[The following replies to a request for info on the hazards of striking debris published in the Spring 98 NL. -Ed.]

Information on the AGEH-1 log impact is given in my paper entitled "Hydrofoil Ship Load Criteria Development, A Retrospection," pp. 107-125 of the IHS Proceedings of the 25th Anniversary Celebration and Conference, 14-16 June 1995. *[A few copies are still available from IHS. -Ed.]* This paper also summarizes most of what is known about hydrofoil load criteria for US Navy vessels. This info should be made available to hydrofoil designers. Incidentally, Ref. 3 cited in my paper also has full-scale hydrodynamic foil and strut data and flow photos unavailable in the general literature. That report (DTNSRDC-85/042, June 1985) should be available from the Naval Surface Warfare Center – Carderock Division's Technical Information Center.

Bill Buckley
wbuckley@erols.com

[See Summer 98 IHS newsletter for instructions and sample letter to request information under the Freedom of Information Act (FOIA.) -Ed.]

Titan Marine

Titan Marine International of Fort Lauderdale FL and Newport RI has received the North, Central and South American marketing rights for the Russian "Alexeev" Design Bureau's foil and air cavern vessels. They are pursuing both commercial and yacht business. Also, they have used vessels in North America for sale and for charter. Their principals are Bob Bolderson and Carl Meyer, reachable at 984-917-2370 or 781-397-1389 or through us (InterMar) at 812-537-0609 or by email to us. Is it possible to get a list of members with contact information including phone, email, addresses and occupations?

Tom Schneider
img@one.net

[The mailing list policy adopted by the IHS Board of Directors is as follows: "To facilitate communication among members, the Society will compile and maintain a mailing list of members, including name, address, telephone number, fax number, e-mail address, and website URL. This list will be made available to members in a "locked" (members only) portion of the IHS website or mailed to members at their request. The mailing list will not be distributed outside IHS unless it would clearly support the Society's goals and objectives. All requests for external distribution must be approved by a majority of the Board of Directors. In general, transmission of lists approved for external distribution will be accomplished electronically. Postal costs will be charged if a mailing is required. Recognizing that this policy is new, the Society will afford members the opportunity to exclude themselves from the list." -Ed.]

Hydrofoil Designer

I'm designing a hydrofoil primarily for fun and recreation. The design is very light and maneuverable, and prom-

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ises high speed. It has minimal drag, uses a very simple method of function and it shouldn't be expensive to produce. However, so far the idea is only on paper, I don't have the capital or time to produce it myself. As yet I've not had my design patented or published. I'm looking for people who'd be interested to go into partnership in designing and marketing my idea. Could you also enlighten me to other web pages with new and interesting designs?

Etienne Volschenk
9833358@firga.sun.ac.za

[There is an extensive set of links to hydrofoil related web pages in the "Links" section of the IHS website awaiting your exploration. If you want to see your design become reality, you are likely to find lots of goodwill and encouragement plus some sound technical advice; but the hard work of developing, testing, and paying is something that will mostly fall upon you, with no guarantee of any rewards other than the satisfaction of the labor itself and the sympathy of your fellow hydrofoilers. So don't do it for the money or the fame. Like the famous movie boxer "Rocky," do it "for the beauty!" -Ed.]

Need Therapy?

I discovered IHS's listing in the library of Wagner College here in Staten Island. My interest is to explore the possibilities of establishing a commercial business using hydrofoil craft.

Del Eberhardt, M.A.
Certified Psychotherapist
Staten Island NY

[Two suggestions: First contact Bill Hockberger c/o IHS for a copy of his paper "Defining a Ferry Business," which he presented at the SNAME 1997 Transportation Operations, Management and Economics Symposium at the Meadowlands Hilton Hotel, May 14-15, 1997. According to the abstract, "This paper develops an overall framework for defining a ferry business and choosing the right ferry craft for it. That framework includes all of the major elements of the business: routes and terminal locations, ferry craft, what customers to serve and how many, connections with the existing transportation network, competition with other transportation modes, supporting facilities and organization, subsidies and supplementary money-making services, total business revenues/costs, projected profitability, and interactions with area governments." Second idea is to look at the US Dept. of Transportation's "Regional Ferry Plan For San Francisco Bay" for more insight into the issues and tradeoffs involved, not the least of which are political. There is a link to this report on the "Links" page in the IHS website. -Ed.]

Back To the Future

I have a history question has any hydrofoil circumnavigated the world?

Tom Speer
tspeer@gte.net

[We don't think so. -Ed.]

Let's Party

Congratulations on the 25th Anniversary Proceedings in 1995. I read the papers with great interest. There was a good mix of hydrofoil history, state of the art, and future prospects. The idea of a 30th anniversary in year 2000 sounds good. If I have anything new worth publishing, I will keep this meeting in mind.

Tom Lang
tglang@earthlink.net

[A few copies of the 25th Anniversary Proceedings are still available from IHS. We have already starting thinking about the 30th anniversary. When you receive your copy of a questionnaire about your interest in and opinions on this subject, please fill it out and return in promptly. -Ed.]

Fast and Big

A while ago, you mentioned to have me to give a talk on "Hydrofoils For High Speed Hydrofoil Craft" some time next spring. Is this still in the plan?

Young Shen
shen@oasys.dt.navy.mil

Response...

Yes, this is in our plans. I would like you to think in terms of "ships" rather than "craft." This means large foils carrying several thousand tons of load. DARPA and the US Army are thinking in terms of large, fast, long range sea lift.

John Meyer
jmeyer@erols.com

2nd Response...

The largest/fastest hydrofoil study we ever did was during the ANVCE effort. The "HYD-7" study by Boeing was roughly 700 tons and had a design speed of 70 knots with variable geometry, base vented foils, and a mechanical transmission system. I vaguely recall total foil system Lift to Drag Ratio (L/D) value of around 8 at 70 knots.

Mark Bebar
Bebar_Mark@hq.navsea.navy.mil

3rd Response...

You are correct about Boeing's ANVCE HYD-7 study. There was another high speed hydrofoil study by Grumman at the same time. Both reports are in the Data Bank at Naval Surface Warfare Center, Carderock Division They were published in early 1977. Young Shen published papers since then (1981, '85, '89, and '93) on foil shapes for high speed, but to my knowledge have never been tried. We think his input would be useful and enlightening to the community that is trying get L/Ds many times the value of 8 you mentioned.

John Meyer
jmeyer@erols.com

TEA-21 GIVES FERRIES A LIFT

US$220 Million Authorized For Building Ferries and Terminals

by John Snyder, Senior Editor
©*Marine Log* June 1998

The massive 6-year, $203-billion Transportation Equity Act will do a great deal more than fix a few potholes and paint a few bridges. If President Clinton signs the legislation into law, it could provide as much as $220 million for the construction of ferry boats and ferry terminals over the next six fiscal years. *[The bill was signed into law. -Ed.]* The Transportation Equity Act for the 21st Century (TEA-21) replaces the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. ISTEA, which expired last year, established a ferry grant program under section 1064 for the construction of ferries and terminals. Section 1064 allowed the US Dept. of Transportation to provide grants of up to 80% of the construction costs of new publicly owned ferries and terminals. The remainder of the costs would be funded by the recipient. From 1992-97, about US$95M in grants was awarded.

"This certainly achieves some of the objectives that we had sought," said Ed Welch, the Passenger Vessel Association's (PVA's) legislative director. The PVA is the national trade group for owners and operators of excursion, cruise, and dinner boats, river boat casinos, and ferries. Its associate members include shipyards and suppliers that support the passenger vessel sector.

Welch told *Marine Log* that the objectives sought by PVA included not only continuing the ferry grant program, but also expanding it. This involved making the funding of certain projects more flexible. Whereas ferry grants were previously restricted to publicly owned ferries, TEA-21 amends the language to read "publicly owned or operated" or "majority publicly owned." This, said, Welch, opens the door to more public-private partnerships. For instance, a privately owned vessel that is chartered to a public entity would be eligible to apply under the ferry grant program. Conversely, a publicly owned ferry operated by a private company for public service would also be eligible.

In addition, in the case of a majority-owned publicly owned ferry or ferry terminal, TEA-21 allows the Secretary of Transportation to determine if they "provide substantial public benefits."

Under section 1101 of TEA-21, US$30 million is authorized to be appropriated out of the Highway Trust Fund for construction of ferries and ferry terminals in fiscal year 1998. For each fiscal year 1999-2003, US$38 million is appropriated. Of the US$38 million, US$20 million is marked for Alaska, New Jersey, and Washington State. This leaves US$18 million available for other grants.

Section 1602 of the Transportation Equity Act also lists some 1,850 "high priority" mass transportation projects. These range from bicycle paths to high-speed rail service to bridge refurbishment. There are also about two dozen marine-related projects, including several ferry and ferry terminal construction programs. The largest of these is the US$30 million earmarked to replace 1960s-built Kennedy Class car ferries that provide commuter service between Staten Island and Manhattan. Funds are also authorized for the replacement of the Plaquemines Parish ferry in Louisiana, a new Midtown intermodal ferry terminal for New York City, design and construction of a Belford, NJ ferry terminal, and a new passenger facility for Southworth, Seattle, WA. Highlights are detailed in the accompanying table.

"We also like the ferry study that is included in the legislation," said Welch. "It will focus the Department of Transportation's attention on ferries and the considerable role they play in mass transportation," he added.

TEA-21 directs the Secretary of Transportation to conduct a study that will seek: (A) to identify existing ferry operations, including: (i) the locations and routes served; and (ii) the source and amount, if any, of funds from Federal, State, or local government sources supporting ferry construction or operations; (B) to identify and develop information on potential domestic ferry routes in the USA and its possessions; and (C) to identify the potential for use of high-speed ferry services and alternative-fueled ferry services. The study results are to be submitted by the Secretary to the Committee on Transportation and Infrastructure of the House of Representatives and the Committee on Environment.

Highlights from TEA-21

- Replace ferry in Plaquemines Parish, LA -- (US$1.61M)
- Upgrade access to Weehawken, NJ waterfront and ferry -- (US$2.0M)
- Capital improvements to Intermodal freight and passenger facilities servicing the Alaska Marine Highway and other related transportation modes in Seward, Alaska -- (US$4.5M)

Continued on Next Page

NEWS DIGEST
(Continued From Previous Page)

- Construct Midtown West Ferry Terminal, New York City -- (US$3.5M)
- Construct Southworth passenger ferry facility, Seattle WA -- (US$3.75M)
- Construct Coffman Cove ferryboat -- (US$2.25M)
- Design and construction of Belford Ferry Terminal in Belford NJ -- (US $3.45M)
- Improve marine dry dock and facilities in Ketchikan, Alaska -- (US $0.75M)
- Replace Kennedy Class car/passenger ferries for Staten Island NY--(US $30.0M and US$2.0M)

GOLLY! WHAT SHOULD WE DO WITH ALL THAT MONEY?

The Surface Transportation Policy Project (STPP) offers a 75-page TEA-21 User's Guide. Through helpful charts and graphics, the Guide explains and interprets the complexities in this reauthorization of 1991's Intermodal Surface Transportation Efficiency Act (ISTEA). It explains major features, points out key opportunities, and explores potential pitfalls in the new law.

The Guide has direct TEA-21 citations and funding charts by program and by state, and is accompanied by an online companion on STPP's TEA-21 transportation policy website." Cost of the guide, which may be ordered from the STPP site: www.istea.org/guide/guideonline.htm, is US$15.00 plus shipping (US$4.00 in the USA). For more information, contact Surface Transportation Policy Project; 1100 17th Street, NW (Tenth Floor); Washington, DC 20036 USA; Phone: 202-466-2636; Fax: 202-466-2247.

SAVING HIGH POINT

The time for someone or some group to step forward and restore *HIGH POINT* is now because the future may be too late. While he was alive, Ron Fraser chose to pay moorage in Portland OR to keep the ship in fresh water, but his executer will have to move HIGH POINT to the family owned pier in Astoria (salt water). This will save the monthly moorage costs pending a decision to sell or scrap the vessel. Based on current condition, *HIGH POINT* is probably a better candidate for restoration than *PLAINVIEW*, which is also of historical interest. But the move to salt water will definitely hasten *HIGH POINT*'s deterioration, and the point may soon be moot if the vessel is scrapped. The time to act is now.

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

More News on Next Page...

SAVING FLAGSTAFF

A partnership will restore the 1968 Grumman 75' hydrofoil *FLAGSTAFF* (PGH-1). The refurbished vessel, to be renamed *CLASSIC THUNDER*, is presently the only complete large hydrofoil in the USA. The vessel, which served in Vietnam, was designed to give the US Navy a stable, fast gunboat. Built by Grumman in Stuart FL and launched on 9 Jan 68, she originally cost US$4M.

The *CLASSIC THUNDER* project consists of restoring and re-powering the vessel to seaworthiness with the ultimate goal of cruising the Eastern Seaboard Coast, and entering the vessel in shows, races and other events that will generate revenue through sponsorships and corporate advertising. Partners in the project will have various privileges including riding the vessel at no cost.

For more info, including how to become a partner, please see the website: www.nexgn.com/classicthunder or contact John Altoonian; PO Box 80; Rio Grand NJ 08242, USA (friis@bellatlantic.net)

The CLASSIC THUNDER Partnership Proposes to Restore and Repower ex-*FLAGSTAFF* and Employ Her in Commercial Endeavors.

FOILMASTER UPDATE

by Diego G. Mazzeo

The *FOILMASTER* shown below was sold to Siremar (an Italian State owned Company serving Sicily and the outer island). Another unit of the same type was sold to Ustica Lines (a co-owner of Rodriquez Shipyard). To my knowledge a further unit is being fitted out at Rodriquez for an undisclosed owner.

The 31.4 m *FOILMASTER* is a technologically advanced variant of the RHS160 surface piercing hydrofoil with a marked touch of Italian design in both the shape and interior layout. Increased speed in any sea state and passenger comfort have been the prime goal of this new design. Fully appointed spacious passenger saloons and bar ensure maximum comfort on any sea route. Among other things, improvements incorporate resilient mounting of engines and reversing gearboxes, exhaust gas silencers, the use of carbon fiber components in the construction of the foils, and more powerful engines. The surface-piercing foils are in a tandem configuration. A set of trailing edge flaps is placed on both foils. Two flap rudders are fitted to the aft foil, strut while a single flap rudder is fitted to the forward foil. There are two coupled MTU diesel engines. A Seakeeping Augmentation Controller designed and built by the Rodriquez Electronics department is provided. Two generating sets consisting of diesel engines and brushless alternators at 220V, three phase, 50 Hz, are installed. Steering is hydraulic. Flap movements are also hydraulically controlled. The hydrofoil is equipped with all the necessary systems such as fuel, sea water, fresh water, lube oil and bilge system to comply with current regulations. Full load displacement is 107 t. Cruising speed is 38 knots.

Mitsubishi Super-Shuttles

MITSUBISHI'S 2nd SUPER-SHUTTLE

By Naoji Toki
toki@ngsrdc.mhi.co.jp

Mitsubishi Heavy Industries, Ltd. (MHI) completed the 2nd Super-Shuttle 400, the *RAINBOW 2* at its Shimonoseki Shipyard, and delivered her 19 June 1998 to Oki Shinko Co. Ltd., which has operated the first Super-Shuttle 400, the *RAINBOW* since her completion in March 1993. *RAINBOW 2* went into service on July 1st as a high-speed passenger ferry on the same route as *RAINBOW* (between Oki-islands and Honshu, the Japanese main island). Oki island is located in the west side of the Japan Sea, an area famous for the severity of waves and wind, especially in winter time.

Mitsubishi Super Shuttle 400 is a hydrofoil catamaran, equipped with two same-size hydrofoils at fore and aft in tandem configuration. She is propelled by two water jet propulsors powered by four high-speed diesel engines (output is 2,850HP each), two engines for each water jet. Water jets and diesel engines are also made by MHI at its Takasago Works and Sagamihara Engine Works.

Details of the RAINBOW's design and development were presented by T. Kitamura et. al at the 25th anniversary meeting and conference of the International Hydrofoil Society *[copies of the Proceedings available from IHS -Ed.]*

The appearance of *RAINBOW 2* is exactly same as her predecessor, except for the paintings of squid on her funnel (Squid is quite commonly observed around Oki islands). But the ride control system is completely re-designed, and habitability is greatly improved. The interior design is also revised; passenger seats are widened with a little decrease of passenger capacity from 341 people of the *RAINBOW* to 317 people.

Foilmaster

UPPING THE KNOTS AND REINING IN THE RISKS

http://marinelog.com

As high speed ferries break new records, there are concerns about how best to manage the risks associated with high speeds. When the Buquebus fast ferry *CATALONIA* broke the Transatlantic speed record last month to claim the Hales Trophy for the "Blue Riband," it marked another milestone in the development of High Speed Craft. The 91 m, 400 dwt vessel, capable of carrying 900 passengers and 260 vehicles, completed the 3,125 miles (5,029 km) crossing from Manhattan to Tarifa, Spain, in 3 days, 9 hours and 55 minutes. Its average speed was 38.1 knots.

To some people, the last "true" Hales Trophy winner will always be the *SS UNITED STATES* which captured the Blue Riband on its maiden voyage in 1952, averaging 35.59 knots. That record remained unbroken until 1990 when the *HOVERSPEED GREAT BRITAIN* — built, like *CATALONIA*, by Incat Australia — achieved the crossing at an average 36.65 knots. Now *CATALONIA* appears to have broken another *SS UNITED STATES* record by becoming the first commercial vessel to sail more than 1,000 nautical miles in a 24 hour period, covering 1,015 nautical miles (1879.8 km) at an average of 42.3 knots (78.3 km/h). The previous record was the 868 nautical miles sailed by the *SS UNITED STATES* over the period 6-7 July 1952.

What is particularly significant about *CATALONIA's* success is that the fast ferry is, in every way, a commercial vessel. Indeed, the Blue Riband crossing was made as one leg of its delivery voyage from Tasmania to Spain. The vessel is now in commercial service between Barcelona and Palma de Mallorca, making the 150 mile run in 3.5 hours. The 91.3 m wavepiercer, has a beam of 26 m and a draft of 3.7 m. Speed at maximum lightship condition is 48 knots (553 miles/h) and at full 450 dwt displacement is 43 knots (49.5 miles/h). Its four Caterpillar 3618 diesels, developed with Bazan Motores of Spain are each rated at 7,200 kW at 1,050 rpm.

From Germany to Indonesia

Shortly before *CATALONIA* made its assault on the Hales Trophy, another hi-speed ferry embarked on a lengthy delivery voyage. This was the first of five FPF 62-010 passenger ferries being built in Germany for Indonesia's ASDP by Lurssen Werft, of Bremen in partnership with the PT Pal shipyard in East Java.On North Sea trials, the 69.8 m, 925 passenger vessel exceeded its 38 knots contract speed with a full passenger and baggage load, 100% provisions and 50% fuel. Its four MTU main diesels, each rated 3,805 kW, enabled the vessel's four Kamewa waterjets to easily push it to 40 knots. Indonesia, a nation of islands, offers many opportunities for today's ferry technology, but larger and faster ferries are finding increasing favor worldwide.

How Safe?

The rather unmomentous way in which *CATALONIA* succeeded in smashing transatlantic records underscores the fact that these vessels are exceptionally seaworthy. Still, they have ushered in an era of sea transportation that brings with it a fresh set of safety concerns.

The UK Marine and Coastguard Agency has now completed a trial FSA (formal safety assessment) of high speed catamaran ferries. In forwarding its findings to the IMO Correspondence Group on FSA, the agency's Jim H. Peachy noted that "the predicted risk level for passengers and crew on HSC ferries is not only higher than previous accident experience indicates, but is high in relation to generally accepted limits of tolerability."

In fact, the study predicts a total risk for the accident categories that it studied (which did not include groundings) to be 0.077 "equivalent fatalities" per vessel. What's an equivalent fatality? The study assumes that 100 minor injuries or 10 major injuries are equivalent to a fatality. A major injury is one where the injured person requires treatment in hospital. The 0.077 number apparently translates statistically into one equivalent fatality on every ship every 13 years , but "the probability is that most vessels will not experience any fatalities, but some vessels may be involved in a serious accident with multiple fatalities." In reaching its conclusions, the UK study seems to have come to conclusions reached by the High Speed Commercial Craft Safety Board. The HSCCSB was established in August 1997 as a way for operators of fast commercial vessels in the New York area to get together and develop processes to reduce risks associated with these operations. The Board comprises senior operational or managerial personnel from six firms, and representatives of three regulatory agencies in the New York area (New York City DOT, the Port Authority and the US Coast Guard).

The UK study states the risk is greatest from "collision accidents at high speed in confined waters." According to Claude McKernan, who founded and chaired the HSCCSB before retiring from the Coast Guard, this was "the same conclusion that was drawn at the first meeting of the HSCCSB in New York City. The Board ranked Human Element and Congestion as the two highest risk factors confronting operators of high speed vessels. The UK study provides confirmation to the conclusions that were earlier drawn by a group of experienced operators brainstorming around the conference table."

EXTRA - EXTRA - EXTRA

LETTERS TO THE EDITOR

(Continued From Page 12)

PLAINVIEW

Back in the 1960s I worked as a Manufacturing Engineer for Lockheed Shipbuilding & Construction Co. of Seattle Washington. At that time they were building the *PLAINVIEW*, which was 220' long. My role was to design the process that welded the master butt lines from one side only. Curiously, the designers did not consider shrinkage of the welds at each butt: *PLAINVIEW* turned out 6" too short! They had to shift the center of balance to accommodate that error by moving some diesel engines.

Ray Edwards
rayandpat@earthlink.net

Response...

Great anecdote! You may recall that they had to move one of the SSDGs an entire bay in the ship to get it to balance and load the foil system properly. The 6"difference you cite may have aggravated the problem.

Mark Bebar
Bebar_Mark@hq.navsea.navy.mil

2nd Response...

They did a lot of re-arranging of components to get *PLAINVIEW* to balance. I designed the stationized slab concept for Lockheed, which was my own idea in my more tender years. It reversed the concept of bringing machines to material and instead brought material to machines. This was also the first time a private yard used Tellerex reduced scale lofting and cut the plates directly from the drawing.

Ray Edwards
rayandpat@earthlink.net

Early Dawn Images (EDI). This is a "still" from Carl Early's computer animation project to show a radical sailing hydrofoil catamaran in motion. This artwork may be purchased as a signed print from EDI. A short segment of the animation can be viewed from his website; go to http://members.home.net/edi/pelican.html.

US NAVY ADDRESS BOOK AVAILABLE FREE

The Standard Navy Distribution List (SNDL) is a directory of all Navy commands. It is produced by the Office of the Assistant Vice Chief of Naval Operations, Shore and Fleet Organization Branch at the Washington Navy Yard.

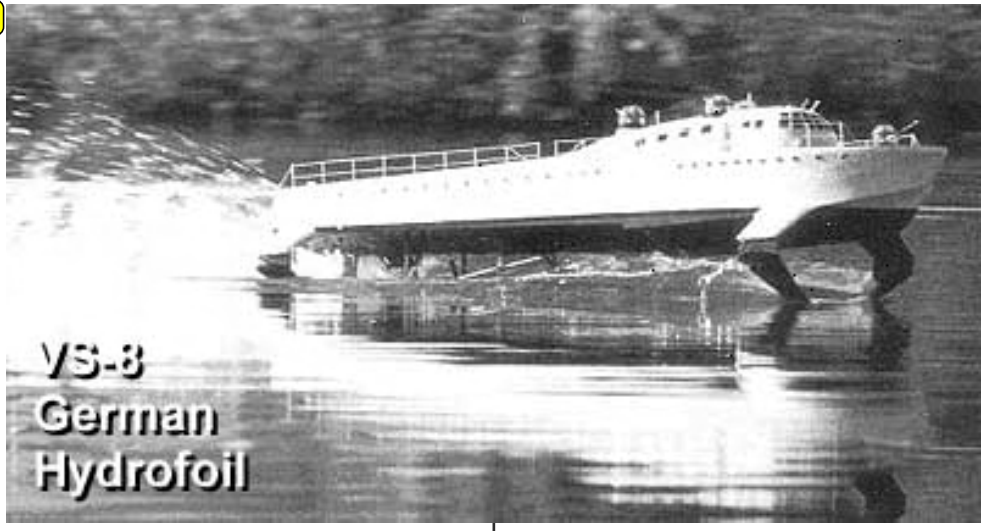
Government contractors and members of the public can obtain the SNDL on diskette, in either WordPerfect or dBase, by sending a formatted 3.5-inch diskette with a self-addressed, postage-paid envelope to:

Chief of Naval Operations
Code N09B22
2000 Navy Pentagon
Washington DC 20350-2000

WARNING: Be sure to specify your choice of WordPerfect or dBase!

Early Dawn Images (EDI). Cruising Trimaran Hydrofoil; another computer generated image from the EDI gallery. Contact EDI by email: edi@home.com or visit their website at http://members.home.net/edi.

VS-8 COMES BACK TO LIFE WITH RADIO CONTROL



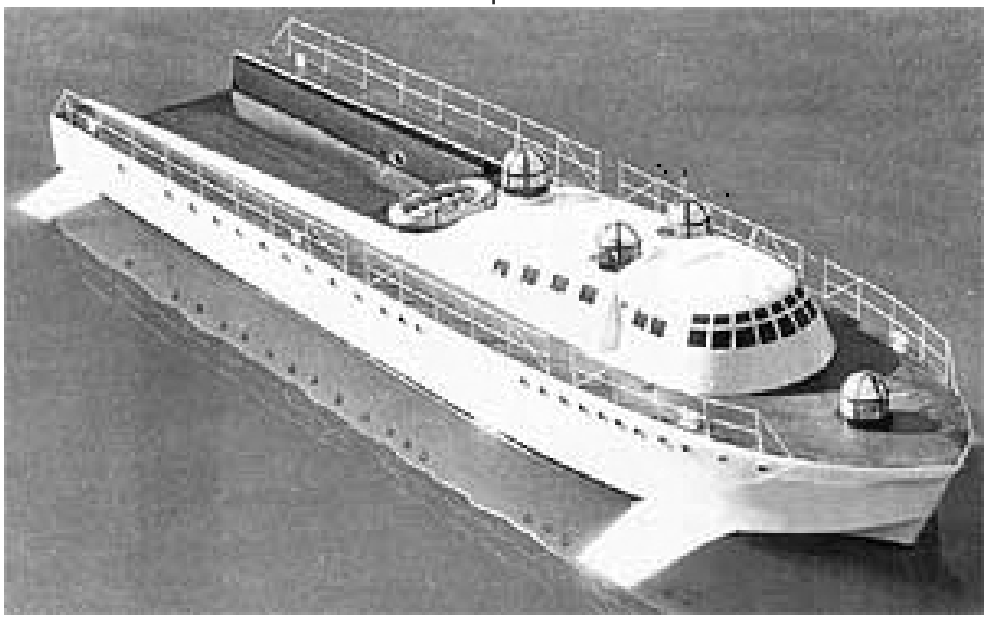
In 1939 the German Navy became interested in hydrofoil vessels whose short turning radii, high speeds, and stable platform in moderate seas made them seem to be promising candidates for escort, mine-laying, and coastal patrol duties. Throughout World War II, hydrofoil pioneer Baron Hans von Schertel and the shipbuilder Sachsenburg collaborated in the design and construction of a number of hydrofoil boats for the German Navy.

In 1943, Germany launched *SCHELL-1*, an 80-ton, 150 ft. hydrofoil, the world's largest at the time. This sleek craft, designated VS-8 and named for her spiritual father General Schell, was the prototype for a series of fast transports to be used to supply Rommel's army in Africa. Intended to make the crossing from Sicily to North Africa and return in one night, the VS-8 could carry a payload of a single 26-ton tank, crew and spares.

Although designed for a top speed of 45 knots, the ship was actually limited to 37 knots because the only engine that could be made available at the time was a Mercedes Benz diesel with 1,800 horsepower. The underpowered vessel was stable in head seas, but came off the foils in some tests in following waves.

In 1944, *SCHELL-1* suffered a casualty from sabotage and was eventually beached. After WWII, it was forbidden in Germany to build to build boats with speed in excess of 12 knots. This led von Schertel to move to Switzerland, where he continued his hydrofoil work.

32nd Parallel Corp. has recreated VS-8 as a kit that accurately reproduces this unique craft in 1/32nd scale (3/8 inch equals 1 foot). The prototype is faithfully rendered right down to the surface piercing, sand-cast aluminum hydrofoil blades. The hull is of hand-laminated 2-ply polyester fiberglass and is finished in a medium gray primer surfacer gel coat. The deck and superstructure are molded of ABS plastic and incorporate window details, deck planking, and recesses for the molded turrets. The kit includes a complete fittings set with all 4 A-A turrets and guns, railing stanchions, portholes, and deck fittings.



Specifications:
Length: 38.5 in. (98 cm.)
Beam: 9.5 in. (24 cm.)
Weight: 11 lbs. (5 kg.)
Patrol Range:15 minutes

The basic kit contains everything needed to build the vessel as a static display, including the Kriegsmarine Fast Boats War Badge. To complete the VS-8 as a fast operating R/C craft, add the running hardware (two electric motors, a set of 1300mah NiCad batteries, a 2-channel radio, and an electronic or rheostat type speed control).

According to the manufacturer, 32nd Parallel kits are " all designed, engineered, and produced at our California facility, so if you need assistance with the assembly of your kit or just have questions concerning our products, you can call or email and talk to people who build, run and love model ships. For current pricing and many more details, contact 32nd Parallel; PO Box 804; Pismo Beach CA 93448; phone: 805-481-3170, fax: 805-481-1037.

email: simon32@aol.com
website: www.32ndparallel.com.

The NEWSLETTER

International Hydrofoil Society

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

Editor: John R. Meyer **WINTER 1998-99**

Summary of a Paper from FF Conference, Boston, MA

HYSWAS EXPERIENCE .....

Summary by John R. Meyer

A paper entitled "HYSWAS Experience With A 12-Ton Demonstrator and Its Application To 300 And 800-Ton Ferry Designs", by W. Hu, D. Jordan, M. Perschbacker, J. Meyer and M. Rice was presented at the Fast Ferry Conference in Boston in February. Hydrofoil Small Waterplane Area Ships (HYSWAS) were conceived in the early 1970s by the United States Navy at the David Taylor Research Center (now Naval Surface Warfare Center - Carderock Division). The HYSWAS concept grew out of a search for increased range, superior seakeeping characteristics, and high payload fraction for high-speed ships. A HYSWAS technology demonstration program led to the design, construction and test of a 12-ton HYSWAS vessel through a U.S. Navy research contract.

Testing of the 12-ton HYSWAS vessel has validated design tools and vessel performance predictions. These test results led to funding for additional design work on both military and commercial variants at 300 and 800-ton displacements. Maritime Applied Physics Corporation (MAPC) is now engaged in design work on an 800-ton naval vessel for the U.S. Navy, Naval Sea Systems Command. Variants of this design appear to be well suited for use in the offshore ferry and coastal cruise markets. The vessels offer 40-knot speeds, very low motions at high speeds through sea state 5, low wake, relatively high payload fractions, low

HYSWAS Demonstrator QUEST U.S. Navy Photo

See HYSWAS, Page 3

WHERE ARE YOU IN CYBERSPACE?!

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

1999 DUES ARE DUE

IHS Membership is still only US$20 per calendar year (US$2.50 for students). Your renewal or new membership is critical. Please remit 1999 dues as soon as possible. We regret that high bank fees make it impractical for IHS to accept payment by credit card or a check drawn on a non-US bank, or by other than US funds. Overseas members with no easy way to send US funds, are advised to send money order to IHS or US Dollars cash.

INSIDE THIS ISSUE

PRESIDENT'S COLUMN

IN MEMORIUM

Dott. Ing. Leopoldo Rodriquez, A Tribute....

We were deeply saddened to learn of the death of Dott. Ing. Leopoldo Rodriquez 0n 16 November as reported from Messina by Diego Mazzeo.

Leopoldo was a true pioneer in the development and production of hydrofoil craft and a dear friend of many members of the IHS. He was a strong supporter of our Society from its inception, meeting with Cdr. Mark Thornton RN (Ret) and Countess Juanita Kalerghi to offer his services to the Society. He subsequently served as IHS President from 1977 to 1981. In recognition of his many contributions, he was given a Hydrofoil Pioneer Award at the Society's 25th Anniversary Celebration and Conference, held in Washington, DC in 1995.

Leopoldo received his Doctoral degree from the University of Genoa's School of Naval Architecture. Upon graduation, he joined the family shipyard, Rodriquez Cantieri Navali, in Messina, Sicily as the shipyard's Naval Architect. At the time, his uncle Carlo Rodriquez was Managing Director. In 1953 he took the bold step of building hydrofoils of the Supramar design under license. Carlo's efforts brought success to the shipyard and Supramar. As the production of these PT-type hydrofoil craft expanded, so did Leopoldo's role in the shipyard. He advanced to Technical Director based on his origination of significant improvements in hydrofoil design and production methods.

In the early 1970's, Leopoldo sought and received Carlo's approval to develop a new improved hydrofoil design using an electronic seakeeping system and modified foils. The objective was to build a series of hydrofoil ferries with improved passenger comfort for longer sea routes and with larger seating capacity. Working with the American company Hamilton Standard, they perfected an electronic control system that met these requirements. Leopoldo also contributed to the design modification of surface-piercing V-foils to W-foils with hydraulically actuated trailing edge flaps on both forward and aft foils. With the launching of the RHS-160 in 1976, Rodriquez Cantieri Navali achieved their development objectives. This new design provided passenger comfort on sea routes once considered too severe for surface-piercing hydrofoils. This successful design, with its improvements over the years, has kept Rodriquez Cantieri Navali in the forefront of hydrofoil producers.

Leopoldo will be sorely missed by his many friends and will always be remembered as a member of the exclusive small community of true hydrofoil pioneers. We extend to his wife Alda and others of his family our deepest sympathy for their loss.

John R. Meyer, President
[Note: William Ellsworth and Robert Johnston contributed to this column.]

WELCOME NEW MEMBERS

Brian Ballou - Brian is a Senior Account Manager for Motorola's radio communications in New Mexico. He has had a fascination with hydrofoils, and more recently his interest is in a towed hydrofoil. He experimented with a fully submerged four foil contraption last summer that actually lifted two adults three feet above the water. He received foil stock from Dave Keiper's estate and will start work on a surface piercing foil design. He looks forward to a long term membership in IHS and the expertise and experience of other IHS members.

Thomas Blevins - A boatbuilder in Edgecomb, Maine, with wide design interests, Thomas' first close-encounter with hydrofoils was with Matt Wall and Decavitator, then John Slattebo with his StiltFoil, both through the Amateur Yacht Research Society. His early boatbuilding was primarily traditional wood boats and mostly sail, while today it is custom, high-performance multihulls in advanced composites.

Andrew W. Brown - Andrew is from West Yorkshire, England, and a commercial pilot flying medium sized jets in Europe. Interested in sailing since childhood, he has an ongoing project to develop a 17ft sailing hydrofoil trimaran to combine good performance with stability. He is looking forward to learning from Society fellow hydrofoilers.

Del Eberhardt - Del is from Staten Island, N.Y. His first interest in Hydrofoils was during the

Continued on Page 5

interior noise levels, a high propulsive coefficient, low fuel costs, and large passenger areas. The principal constraints on the application of these designs are: relatively deep draft, an estimated 10 to 20 percent first-cost premium over competing catamaran designs, and the risk associated with building and demonstrating the first vessel.

The paper summarized performance results obtained with the 12-ton demonstration vessel and outlines the characteristics of 300 and 800-ton vessels that may be applicable to the ferry and coastal cruise markets. A sponsor is sought for construction of the first 800-ton commercial design.

HYSWAS DEFINED

HYSWAS vessels are hydrofoil craft that receive a portion of their lift from a single buoyant, slender body or "lower hull" located below a somewhat traditional upper hull. The foils are attached to the lower hull, which in turn, is connected to the upper hull by one or more small waterplane area struts. A sufficiently large strut is required for personnel access to the lower hull machinery spaces. The machinery access issue limits the lower end of HYSWAS ferry applications to approximately 300 tons displacement. The relation of buoyant lift and foil lift may be varied over a wide range as a function of design objectives. In the 12-ton design, 70 percent of the foil-borne lift is buoyant while 30 percent is dynamic. Like a traditional hydrofoil, the HYSWAS operates on its upper hull at low speeds where the large waterplane area provides the vessel with the necessary hydrostatic stability. As speed increases, the foils generate sufficient lift to raise the upper hull out of the water and stabilize it in the presence of roll and pitch moments exerted by the sea and wind.

12-TON TECHNOLOGY DEMONSTRATOR

The 12-ton aluminum vessel QUEST was constructed during a 16-month period in 1994-95 at a cost of $731,000 (US). The vessel was first operated during the summer of 1995. Calm water testing was completed in Chesapeake Bay and rough-water testing occurred in the Atlantic during the winter of 1996-97. During rough water tests, the craft was operated from the Naval Amphibious Base, Little Creek, Virginia.

QUEST is operated by a crew of two using a fly-by-wire control system that was designed, fabricated and tested by MAPC. Two passengers can be carried. The foil arrangement is similar to a conventional airplane with large horizontal foils near the Longitudinal Center of Gravity (LCG), and smaller horizontal foils and a rudder aft. The operator selects a pitch attitude and a flying height, and the electronic control system maintains attitude and height of the vessel. In addition to maintaining pitch, roll and height stability, an integrated autopilot helm control is the standard steering method. The operator uses a joystick when a turn is necessary. Turns are banked in order to reduce lateral accelerations. The control algorithms were developed through dynamic simulation and testing in a virtual seaway.

The 27-foot QUEST was instrumented to measure vessel motions. In all cases, the measured vertical accelerations are equal to, or below, the values predicted during the HYSWAS design. The 12-ton demonstrator has a strut height of 4 feet and its motions remain excellent through short crested seas of 6 to 7 feet. The dynamic control algorithms allow a seamless transition from a "platforming" mode (in seas up to the strut height), into a "semi- contouring" mode in larger waves.

300-TON DESIGN

MAPC has developed a 450- passenger HYSWAS design for passenger service between San Diego, California and Catalina Island. This design used a steel lower hull and an aluminum superstructure. The 80 nautical mile route requires a speed of at least 35 knots in open-ocean conditions. Passenger comfort, low operating costs, and reliable operation were principal objectives.

Artist Rendering of HYSWAS Fast Ferry

Although the design met the operator's performance expectations, the financial and technical risk of being the first to market with a HYSWAS hull ultimately led this operator to a more conventional design.

Initial reviews against criteria in the International Maritime Organization (IMO) High Speed Code led to the identification of significant benefits of this design in passenger service:

Continued on Next Page

HYSWAS
(Continued From Page 3)

1) The location of propulsion and auxiliary machinery in the lower hull provides a natural fire boundary while the lower hull provides excellent cooling of the structure in the event of a fire in machinery spaces.

2) The righting arm of this vessel actually improves in the event of damage from grounding. The reserve buoyancy of the upper hull combined with the righting arm effect gives the HYSWAS hull exceptional damaged stability.

800-TON DESIGN

In 1997 MAPC won a competitive procurement for design work on an 800-Ton HYSWAS from the Naval Sea Systems Command under a Small Business Innovation Research (SBIR) contract. The first phase of this design effort is complete while the second more detailed phase is 30% complete. The 800-Ton design must meet a 3,000 nautical mile range requirement with an 80 ton payload so that the ship can self-deploy without refueling. Operating speeds with a single LM2500 gas turbine engine are in excess of 40 knots.

It appears that variants of the 800-ton design offer substantial financial and performance benefits when applied in the large point-to-point ferry and coastal-cruise vessel markets. These benefits include:

1) Excellent high-speed seakeeping (40 knots in sea state 5)
2) Reduced fuel costs (high lift-to-drag ratio with long range and high payload)
3) Increased area and volume for passenger functions (machinery and tankage in lower hull)
4) Reduced passenger noise (large separation of machinery and passenger spaces)
5) Low wake at foil-borne speed

When outfitted as a ferry, the 800-ton vessel has a capacity in excess of 1,000 passengers. When outfitted as a coastal cruise vessel, the 800-ton ship would be equipped with staterooms for 150 to 200 passengers. The HYSWAS is not applicable to shallow-water routes but may be applicable to the following types of routes:

1) Open-Ocean Ferry Routes Between Deep Water Ports;

2) Open-Ocean Small-Ship Cruise Routes; and

3) High-Traffic Ferry Routes with Wake Restrictions.

The authors concluded that HYSWAS vessels for these routes can be built within the per-passenger financial allocations now used for traditional high-speed vessels. The advantage is a higher level of seakeeping and passenger comfort in those applications where a deep draft can be tolerated.

DEVELOPMENT APPROACH

The present schedule will result in completion of a U.S. Navy design in December of 1999. Variants of this design could be available for the start of commercial construction shortly thereafter. Delivery of a commercial vessel by early 2001 appears feasible. A commercial operator is being sought to introduce a HYSWAS vessel on an appropriate route.

It is believed that State and Federal loan guarantees can be secured to support construction and operator financing.

For a complete copy of the HYSWAS paper at no cost, contact Mark Rice at mrice@mapcorp.com

15TH INTERNATIONAL FAST FERRY CONFERENCE

Held over the three days from 16th - 18th February 1999, the 15th International Fast Ferry Conference in Boston, MA, was the latest in the successful series of conferences covering this dynamic market. It was one of the largest gathering of industry principles worldwide and provided an ideal platform for the exchange of information.

A sampling of the papers presented include:

- HYSWAS Experience With A 12-Ton Demonstrator And Its Application To 300 And 800-Ton Ferry Designs, by M. Rice, Maritime Applied Physics Corporation

- A Software-Configurable Modular Electronic Control System For Waterjet Propulsion, by J. Flatman, C.W.F. Hamilton & Co. Ltd

- The Importance Of Designing For A Total Transport System For Fast Ferries, by K. McArdle, MBS Project Management

- The Development Of High Speed Ferry Service In New York Harbor, by A. Olmsted, New York City Department of Transportation

- USA Built High Speed Low Wash Passenger Catamarans, by Boulton, Advanced Multihill Designs.

A complete listing of papers offered can be found on the IHS Home Page (www.erols.com/foiler).

Two Panel Sessions were held during the Conference. The first was: “To Buy Or Not To Buy A Fast Ferry: An Operator’s Decision”. The second was: “The Fast Ferry Market: An Executive Briefing”.

NYC AREA PRIMED FOR NEW FAST FERRY ROUTES

(From MarineNews - June 29, 1998)

By Chris Palermo

The High Speed Ferry Northeast Conference featured speakers who share knowledge and detailed plans for new routes for New York.

The second annual High Speed Ferry Northeast Conference, sponsored by the Maritime Association of the Port of New York and New Jersey, was held in May 1998 in South Street Seaport. Among the ferry professionals attending the conference was keynote speaker Carl-Axel Psilander, deputy managing director of Stena Rederi AB in Sweden.

The conference, organized by the Motivators - JK Rovins Associates LLC, brought together industry professionals from the northeast, especially the New York area, where ferries are becoming an accepted means of mass transit.

Psilander focused on high speed ferries of the future, particularly Stena's HSS 1500 craft. He explained Stena Rederi's goal was to achieve the "best of seakeeping and seagoing at a speed of 40 knots." The company spent three years in research to meet those criteria, and a fourth year to ascertain that a vessel will hold together matching those criteria. "Hull form is critical," Psilander said. The HSS 1500, which cost $130 million to construct, has a unique hull form. The watertight longitudinal bulkheads and string- heads, mean even with some damage, the vessel would float.

"Restricted water depth costs more in dollars for fuel," he said, adding most owners don't mention this. Another area to focus on is time in port for loading. Psilander said a 20-25 minute period, striving for a 15 minute period, is essential to remaining profitable.

Other speakers at the conference included Alan Olmsted, director, private ferry operations in New York City; Claude McKernan, USCG, Activities NY, Waterways Oversight Branch; Lt. Joseph Duffy, USCG Boston, Industry & Government Study Group; Arthur Imperatore Jr., president, N.Y Waterway; Doren Voeth, managing director, SeaConn LLC; Jim Zok, Office of Ship Financial Assistance, MARAD, Washington, D.C.; Alex Conroy, CEO, Conroy Development Co.; Adam Wronowski, marine engineer; Cross Sound Ferry; Mike McGurl, president, Harbor Express; Dale Strand, president, U.S. Multi-Hull.

Olmsted commented on New York opportunities and commuting patterns since 1967. The changes in those patterns have resulted in a variety of technologies, operators and passenger sizes. Vessels range from 6,000 capacity to small water taxis capable of transporting 49 people.

Specific to New York, Olmsted mentioned the Hudson River and Jersey Shore seemed to be the most interesting opportunities for the fast ferry market. He advised longer distance routes have a better chance of success than shorter distance routes. He did mention two caveats, which he stated were fairly consistent in successes vs. Failures. Every owner overestimates first year ridership

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years of 1960-1962 when he had his first ride on a hydrofoil on the Deneper outside of Lenningrad, and on the Caspian Sea and several times on the Black Sea. He has wondered why the USSR had hydrofoils in operation over 40 years ago and the U.S. doesn't. He is of the opinion that hydrofoils should be operated between Staten Island and Manhattan to shorten the commuting time.

Frederick J. Marnach - Fred, from River Falls, Wisconsin has an interest in hydrofoil sailing. He has ordered a copy of Dave Keiper's Notes on Hydrofoil Sailboat designs and hopes to learn a lot from this material.

Chris Tietjen - Chris, from Guilford, Connecticut, has a general interest as an amateur in water craft and fluid dynamics and is interested in obtaining some direct experience with hydrofoils. He had been in contact with Dave Keiper before his death and was awaiting the test results on his work with the beach cat hydrofoil kits he was planning to market. Chris has ordered his notes and will hopefully be able to determine if his work can be brought to an acceptable state of completion. He has enjoyed browsing the IHS web site and hopes he can contribute something in the future.

James C. Wolbert - James is from Marietta, Georgia, and is interested in the design of a small sailing Trimaran, called Stormy Petrel. He anticipates obtaining a copy of David Keiper's Notes to help him in this project.

and it is essential to match the right equipment to the right market and people. It may not be necessary to have the fastest or largest (and likely, most expensive) ferry, if the demand isn't as great.

McKernan and Duffy discussed a risk assessment study, conducted by the High Speed Commercial Craft Safety Board (HSCCSB), which included analysis of routes and collision avoidance systems. So far, there is little data available as to the level of safety of high speed ferries. The identified risks include human element and congestion.

As McKernan wrote in the study, dated October 1997: "I haven't done the math, but it would appear that private ferry operations are cheaper (lower social cost) than new bridges and tunnels. Besides, the idea is to get the cars off the roads. So there you go; ferries are back to stay, at least until someone invents a transporter."

The human element risk factors were identified as reaction time, pressure to meet schedule, attention/complacency, training/bridge team management and physical/mental health. Congestion risk factors included traffic, confined/restricted waterways and marine events/construction projects. Possible remedies for human element risks, as arrived at by the HSCCSB, included training, bridge team manage ment, ISM code, cockpit voice recorder/black box, type ratings, endorsements, manning, area familiarization, fatigue limits, fitness requirements, self inspection program (SIP), competency checks and route and schedule reviews for reasonable time.

Congestion remedies included traffic patterns, Automatic Identification System VTS, public education, coordination of harbor activities, regulated zones with speed restrictions and special light. McKernan did add that the list is not all inclusive, and that the board is continually looking for additional risk factors and, more importantly, remedies.

Voeth displayed state-of-the-art high speed ferries used by SeaConn LLC. Currently, the company offers "Flying Boats" from New Haven to New York City in three hours and 15 minutes. Also offered is a 35-minute run from Stamford to New York City. The company's newest builds (boats) will handle the run from Martha's Vineyard in Nantucket to New York City, and back. The $20 million boats will have a capacity of 375 passengers. An improved hull technology and a design that looks like a yacht are features of the boat. The vessel is end-loading, and is designed for low wash and low noise.

Conroy, in partnership with an Australian company, is developing a $950 million harbor shoreside project in Bridgeport, Conn. Included will be 700,000 sq. ft. of office space, a pier for cruise ships as a port of call, a new intermodal transportation center, water taxis around the harbor, movement of 1,000 passengers a day into New York City, three million feet (square ft. - Editor) of private development and 10,000 parking spaces. The visionary goal of the waterfront energy is to develop alternative transportation.

Wronowski, whose family has a marine industry career spanning more than 50 years, discussed the benefits of linking the fast ferry to the bus station and other transportation terminals. Cross-Sound Ferry Services provides year-round passenger and vehicle ferry transportation, including seasonal high speed passenger-only ferry service between New London, Conn. and Orient Point, Long Island, N.Y.

Imperatore, president of the nation's largest privately operated commuter ferry service, N.Y. Waterway, discussed his company's operations. N.Y. Waterway has a fleet of 20 vessels and seven current routes with five pending. Most of the routes cover the distance from New Jersey to New York City, although proposed lines include Brooklyn, Rockland and Westchester counties and LaGuardia airport. In fact, the New Jersey Department of Environmental Protection and Energy stated the 2,500 cars carried by the ferry that normally would contribute congestion and fumes from exhaust, total nearly 4.4 million passenger miles, effectively eliminated through the ferry ride. Additionally, the 25,000 people transported across the Hudson each day by N.Y. Waterway, represents approximately four percent of all trans-Hudson commuter traffic.

N.Y. Waterway operated for more than 10 years, all privately financed, when it decided to partner with the government in jointly financed projects to ensure the ferry infra-structure pioneered is able to meet increasing demand and become a permanent part of the region's mass transit infra-structure.

In New York, not only is ferry travel increasing steadily, it's a viable alternative for one of the most congested metropolitan arteries in this country.

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

CANADIAN OPERATORS INVOLVED IN TWO ACCIDENTS

(*From Fast Ferry International, October 1998)*

Fast ferries operated by two of the four companies that introduced vessels in eastern Canada this summer were involved in accidents as the season was nearing its close. The incident that attracted the most attention, and resulted in a fatality, was a collision between Incat Tasmania 91m wavepiercing catamaran Incat 046 and a local fishing vessel.

Speed, however, was not a factor in the accident. Incat 046, which has been chartered by Bay Ferries and operated between Yarmouth, Nova Scotia, and Bar Harbor, Maine, since May was passing through Yarmouth harbour at reduced speed in heavy fog on the evening of September 4, with over 130 people on board, when the fishing vessel became lodged between the hulls and centre bow.

Two crewmen escaped unharmed but the skipper was trapped in the crushed wheelhouse of the boat and was later declared dead. Reportedly, the vessels were in radio contact before the collision and the wavepiercer had come to a complete stop at the time of the impact. The normal speed limit in Yarmouth harbour is 12 knots. Following repairs to minor damage, Incat 046 returned to service on September 8.

A week before, Sea Flight I, one of a pair of Kolkhida hydrofoils introduced on Lake Ontario this year by Hydrofoil Lake Jetlines, veered off track as it neared Youngstown, New York, at the end of a crossing from Toronto to Niagara-on-the-Lake on August 29.

There were eight passengers and five crew on board at the time. The vessel passed through moorings at the mouth of the Niagara River at high speed, and hit four pleasure craft, sinking one of them and seriously damaging another. Nobody was injured in the incident and the hydrofoil was undamaged.

Hydrofoil Lake Jetlines was one of three operators to appear on Lake Ontario this year. Another, Shaker Cruise Lines, also leased a pair of hydrofoils and introduced them between Toronto and Niagara. The vessels, Voschods Sunrise V and Sunrise VI, had been laid up in Toronto since an abortive attempt by Canadian Lake Express to introduce them in 1992. Neither came through the season unscathed, however, one was damaged by wave impact during August and the other by an underwater strike

The operating scene on the Lake this summer was completed by Waterways Transportation, who introduced the former Marinteknik Shipbuilders 36m catamaran Condor 8. Renamed Waterways 1, this was operated on a neighbouring route to the hydrofoils, between Toronto and Port Dalhousie.

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LAKE ONTARIO UPDATE

(From MarineNews, November 23, 1998)

The growth of the cross-lake Ferry industry this past season on Lake Ontario was very encouraging.

Shaker Cruise Lines, the first to reintroduce service in 1997, ended prematurely due to ongoing difficulties with it's 71-passenger Hydrofoils. The 275-passenger Lakerunner (formerly Marine Courier with Marine Atlantic) ended service with a charter out of Port Dalhousie. It is rumored Lakerunner will travel east to service a Petroleum Development Project similar to Hibernia.

Hydrofoil Lake Jet Lines, operating 139-passenger Hydrofoils between Toronto and Queenston, is still in operation and provides a limited service schedule.

Waterways Transportation Services operated Waterways I, a 300 passenger Catamaran. The value of their vessel proved itself as the Fall season approached - the Catamaran operated when Shaker's Hydrofoils were unable to. This bodes well for the next season, and for now Waterways has moored their Catamaran in Port Dalhousie.

The future is bright for cross-lake Ferry services, but both Waterways and Shaker have questionable financing and may not survive to next year. - Erin Diel

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GE UPRATES LM 6000 FOR MARINE APPLICATIONS

(From Fast Ferry International, October 1998)

General Electric Marine Engines has released details of an uprated version of its LM 6000 aeroderivative gas turbine for marine propulsion applications. The company reports, "Recent tests demonstrated the capability of the LM 6000's Dry Low Emissions (DLE) combustion system to meet all current and projected naval and commercial marine environmental restrictions when operated on liquid fuel.

"The LM 6000 features a unique configuration which allows the output power to be provided from either the hot or cold end of the turbine. The

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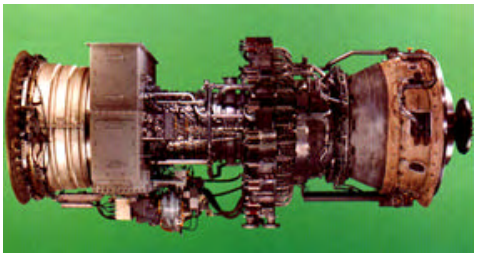
GE LM6000
(Continued From Previous Page)

uprated LM 6000 models have been designated PC (standard combustor) and PD (DLE combustion system). Both offer over 40 megawatts or more than 50,000 shaft horsepower with 42% ISO thermal efficiency.

"There are several commercial and military marine propulsion applications for the LM 6000 currently being evaluated. In one instance, a single LM 6000 could be used on a large monohull or catamaran fast ferry as the boost engine for high speed operation in combination with small diesels for maneuvering. A propulsion scheme that includes several LM 6000 gas turbines is suitable for a variety of large cargo ship programs which require over 200 megawatts."



Delivered as part of a commercial marine package, the LM 6000 would measure 11.0m x 3.65m x 3.95m and weigh approximately 21 tonnes. The first industrial unit began commercial operation at the end of 1992 and the first 'enhanced power' LM 6000 entered commercial service in late 1997. GE says that the 115 engines presently in operation have so far accumulated more than 1.2 million running hours. Referring to the design's record to date, the company reveals, "Based on the operational tracking data provided by an independent source, the fleet of industrial LM 6000 gas turbines has a 12 month rolling average of 99.5% reliability and 97.7% availability. In addition, environmental emission regulations are becoming increasingly stringent throughout the world.

"The next step in the development of DLE combustion for GE aero-derivative gas turbines is a dual-fuel system for the LM 6000. It is planned that this will be capable of operation on natural gas or distillate fuel without the use of water or steam injection to obtain low exhaust emissions, and be capable of fuel switching without shutdown.

"The dual-fuel system is designed to produce initially guaranteed maximum concentrations of NOx of 65 ppmv and CO of 25 ppmv (at 15% 02 on distillate fuel. Testing of the dual-fuel DLE system was completed in the first quarter of 1998. The first dual-fuel DLE system will begin industrial service in 1998."

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NETHERLANDS HYDROFOIL OPERATION

(From Fast Ferry International, September 1998)

Since the beginning of May 1998, Fast Flying Ferries has been operating three Gorki Voschod hydrofoils on a commuter service in The Netherlands linking IJmuiden and Amsterdam. The vessels have been fitted out for 79 passengers, have bicycle stowage areas on the superstructures and are powered by MAN diesels. Twenty round trips a day are scheduled on Monday-Friday, the first leaving IJmuiden at 0630 and the last returning at 1955.

Based on a journey time of 25 minutes and a turnaround of 5 minutes, two Voschods are required to maintain the peak frequencies of 30 minute departures during 0630-0930 and 1600-1930. Services are operated every hour during the rest of the day. Fast Flying Ferries also briefly operated a Gorki Meteor hydrofoil, Prins Willem Alexander, last summer on a trial service between several towns in the Flevo region and Amsterdam. The vessel remains in the company's fleet but it has not returned to the route this year.

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FERRIES URGED IN ANTICIPATION OF VIRGINIA GRIDLOCK

By Alice Reid

Washington Post Staff Writer.
Tuesday, October 27, 1998

A high-speed ferry service on the Potomac River between Quantico and the District could provide a detour for Virginia commuters around major road construction planned over the next decade, say federal officials who announced plans yesterday to study the idea.

U.S. Transportation Secretary Rodney E. Slater agreed to examine the feasibility of using ferries that would travel at up to 40 mph as part of a program to relieve congestion at the Springfield interchange and along Interstate 66.

Those key commuting arteries will undergo massive reconstruction during the next several years, and transportation officials say that unless thousands of cars can be removed from those roads during rush hours, commuters could see their trips ex-

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VIRGINIA FERRIES
(Continued From Previous Page)

tended by at least a half-hour each way.

The idea of a ferry that would carry passengers — but not cars — up and down the Potomac has been discussed by regional officials for years but has never gotten very far. In the late 1980s, a proposed ferry service fizzled because propeller - driven boats would have been too slow and the fares too high. Several other cities, including New York, Boston, San Francisco and Seattle, have various types of ferries.

A local company, Potomac Riverjet, has been working with state and federal officials to try to launch a ferry service using 150-passenger catamarans - double-hulled vessels that would whisk passengers to work at nearly 40 mph, powered by motors that suck water into a vent and shoot it out of the ferries' sterns.

A business plan worked up by the company three years ago estimated that a round-trip fare from Woodbridge to the D.C. waterfront would cost about $15.

Rep. Thomas M. Davis III (R-Va.), who along with Rep. Frank R. Wolf (R-Va.) encouraged Slater to endorse the ferry study, said yesterday that he expects other companies already in the ferry business elsewhere to get interested if the Washington federal study finds it feasible.

"If there is a dollar to be made, I think you'll see a lot of competition," Davis said.

In a letter to Slater written yesterday, Wolf referred to the eight-year, $350 million reconstruction of the Springfield interchange at the Capital Beltway and Shirley Highway as one of several major road projects likely to disrupt highway commutes over the next several years.

Wolf wrote that a high-speed ferry service "could not only take thousands of vehicles off the road during the heavy construction period ... but also.. develop into a long-term commuting option."

A spokesman for Slater said that the department is still assessing the cost of the study.

The regional Transportation Planning Board has examined the feasibility of high speed ferries and found that they make the most sense for shorter trips, said chief planner Ron Kirby.

"They have real potential for going across the river, and where it would work really well is as a reliever for the Woodrow Wilson Bridge," Kirby said, referring to the span linking Alexandria with Prince George's County that will be replaced over the next several years with a $1.6 billion bridge.

"But for longer distances" such as Quantico to the District, Kirby said, "you have trouble competing with commuter rail and car-pool lanes."

Potomac Riverjet calls for ferries that would make the 25-mile rush-hour trip from Woodbridge to the Navy Yard, for instance, in about an hour, about a half hour less than it takes motorists who are not in the car-pool lanes of Shirley Highway.

IHS E-MAIL ADDRESS

foiler@erols.com

THE LAW OF THE SEA CONVENTION: CONSIDERATIONS FOR MARINE BUSINESS

By Dr. Philomene Verlaan

The 1982 United Nations Convention on the Law of the Sea (LOS Convention) has 130 full state-parties as of December 1998 (158 countries signed the Convention during the signature period, now closed). The parties represent nearly three-quarters of the world's present 185 nation-states and include almost all the major industrialized countries, but not the United States, which is also not a signatory.

The LOS Convention has been correctly described as a "Constitution for the Oceans" because it establishes a comprehensive, global, binding framework of law to govern not only activities undertaken throughout the marine domain, which usually includes "internal" or "territorial" waters, but also activities that affect the marine environment, even if they are wholly land- or air-based.

Under the LOS Convention, coastal state jurisdiction over marine resources may extend seaward from the baseline out to 200 nautical miles for both the water column and the seabed, and in some cases up to 150 nautical miles further on the seabed where a continental shelf exists. Resources of the Area (the deep seabed beyond national jurisdiction) are subject to complex international supervision. Even the so-called "high seas freedoms" — those activities that traditionally were freely engaged in by all states on the high seas — are now limited by obligations on states such as: reserving the high seas for peaceful purposes, conserving living re-

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sources, protecting the marine environment and having due regard for the interests of other states and for activities in the Area. The prolongation of territorial waters to 12 nautical miles and resource jurisdiction to 200 nautical miles has considerably diminished the traditional extent of the high seas.

From the point of view of the marine entrepreneur, the effect of the LOS Convention is to bring marine resources under single- or multi-state control everywhere in the ocean. Resources are comprehensively defined in terms of scope and location; they include living, non-living, traditional and new resources in the water column, in or on the seabed or subsoil, or in the overlying atmosphere. Hence the marine entrepreneur would be well advised to take the LOS Convention into account in planning a business that involves development and use of marine resources.

The LOS Convention is designed to promote the cooperative exercise by states of their extensive new rights to achieve the optimally sustainable development and use of marine resources. The sustainability criterion may be derived from and is consistent with the unqualified duty of states under Article 192 of the LOS Convention to protect and preserve the marine environment.

In keeping with its constitutional character, the LOS Convention envisions that ocean law will be reviewed and updated to take account of environmental change and scientific and technological progress. Although not stipulated in a single article, this conclusion results, inter alia, from requirements that states:

- use the best scientific evidence available to conserve living resources and cooperate in their management in the 200-nautical-mile Exclusive Economic Zone and on the high seas

- cooperate to harmonize resource management in enclosed or semi-enclosed seas

- develop, harmonize and enforce laws and regulations to protect the marine environment

- set scientific criteria to formulate these rules

- develop and promote contingency plans to respond to marine pollution incidents

- promote and participate in research on marine environmental pollution and exchange information and data acquired

- monitor risks and effects of marine environmental pollution and of activities which states permit or engage in and report to competent international organizations.

States need substantial financial and technical resources to execute these responsibilities adequately in the complex marine sector. Insufficient resources to regulate imaginatively and appropriately are often invoked by a state as its reasons for not regulating well, but this usually does not inhibit the state in regulating nevertheless. Often, if a state does not fully appreciate the merits of the proposed activity, the work either risks being forbidden outright or regulated so inappropriately that it becomes uneconomical. This result is unrewarding for all concerned. The state and the entrepreneurs bear the immediate financial and administrative burdens of inappropriate regulation. Entrepreneurs may respond by abandoning the field, or not even entering it, or taking their business to a more enlightened jurisdiction. The whole community, however, suffers the effects of long-term losses of income, skills and information that may otherwise have been available, and of environmental degradation that may otherwise have been avoided, had state regulation been more soundly based.

An instructive example of the unproductive consequences of inadequate state preparation for a new legal area is offered by the experience so far under the LOS Convention for marine scientific research. Marine entrepreneurs would be prudent to consider developing pre-emptive, win-win strategies in order to avoid extension of the unsatisfactory situation in marine scientific research to the commercial development and use of marine resources.

Given the importance under the LOS Convention of scientific and technological progress and environmental change as drivers of state regulation and that regulation of many marine activities is now mandatory, marine entrepreneurs should evaluate the advantages of using their specialized knowledge and taking the initiative to design acceptable regulations to ensure the optimum development and use of marine resources. States are generally receptive to proposals by knowledgeable and interested parties for the administration of an area of common concern. A detailed draft for a new area can be most persuasive, particularly when it is likely to be the only one on the table and when the state's time and resources to prepare adequate alternatives are almost certainly limited. It also presents an opportunity to engage the important and

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vocal marine environmental constituency in a constructive dialogue, especially in light of the increasing use of the precautionary principle in marine environmental regulation, which essentially imposes a difficult burden of showing no environmental detriment on the proposed activity.

In conclusion, sustainable development of marine resources is likely to benefit from early efforts by the marine entrepreneurial community to comprehensively inform state action on the exploitation of marine resources. Because the LOS Convention mandates cooperation between states in these matters, much of the work will be elaborated in international fora. US-based marine entrepreneurs will significantly increase the value of their input to this process, not to mention enhancing their competitiveness, if the US were to participate as a full party to the LOS Convention. This can be achieved if the US were to accede to the LOS Convention, which requires the consent of the US Senate. Support for US accession from the marine business community would considerably accelerate the work of the Senate on this issue.

Philomene A. Verlaan is an attorney and oceanographer specializing in law of the sea and the sustainable development of marine resources. She divides her time between Honolulu HI, where she is Adjunct Professor of Ocean Policy at the School of Ocean and Earth Sciences and Technology, University of Hawaii, and London, UK, where she is engaged in marine minerals research at the Imperial College of Science, Technology and Medicine, University of London. An earlier version of this article appeared in Sea Technology, May 1998.

email: paverlaan@gn.apc.org; or p.verlaan@ic.ac.uk

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DO YOU REMEMBER..... VANNEVAR BUSH AND LANTERN? By John R. Meyer

Several years ago, a series of articles, with a similar heading, appeared in the IHS Newsletters. They were intended to test and challenge some of the hydrofoil "Old Timers" by offering a thumbnail description of some of the early hydrofoils. For the "non-old timers", it was a history lesson. Here is another in the series. Editor

In a paper he presented at the 1st International Hydrofoil Society Conference in Nova Scotia, 1982, Robert Johnston related a series of events in the 1950s that had a significant impact on the development of hydrofoils in the United States. One of them was the investigation of a trans-ocean, hydrofoil cargo carrier. Dr. Vannevar Bush, who was president of Carnegie Institution and scientific advisor to the President of the United States, had become concerned over the extensive shipping damage inflicted during World War II by only a few submarines. He directed a study seeking a solution to sustain trans-ocean operations in the event of hostilities involving a considerable number of submarines. One of the potential solutions envisioned was a hydrofoil cargo-carrier. The hydrofoil, with its speed and small submerged area, was considered virtually impervious to torpedo attack.

An organization was formed to design and build a 3500-ton hydrofoil cargo carrier with a destroyer-type hull in the 1951 to 1954 time frame. The Office of Naval Research (ONR) was given the program management responsibility for the U.S. Navy, and was supported by the Bureau of Ships, the Bureau of Aeronautics, and the David Taylor Model Basin (one of the former names for the Carderock Division Naval Warfare Center). The research was undertaken by the Hydrofoil Corporation of America, a non-profit organization formed by Dr. Bush. Gibbs and Cox was contracted to perform experiments that would lead to the design of the hydrofoil, and Bath Iron Works was selected as the construction yard. There were many contributors to the much needed technology to accomplish such an ambitious task, along with a series of Project Officers and Project Managers. Bob Johnston, then the ONR Project Manager, remembers the periodic personal reporting sessions with Dr. Bush on the progress of the program. As time went on, the program became more and more overwhelming and impractical based on the inadequate state of hydrofoil knowledge at that time. In 1954 it was concluded that to develop the propulsion system for a 3,500-ton hydrofoil would tax the total capability of the U.S. industry. On this note the project ended. It is safe to say that even over 40 years later a 3500-ton hydrofoil would still be very taxing!

Although the hydrofoil cargo-carrier was put aside, a number of hydrofoil initiatives resulted from the project. Gibbs and Cox entered the hydrofoil design field and made major contributions to stimulate hydrofoil technological development. The Hydrofoil Corporation of America assembled a technical group that derived basic hydrodynamic theories for submerged

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foil systems. One of the concepts that was investigated was the Constant Lift Control System (CLCS). The objective was to have the foils adjust automatically to the changes in angle of incidence due to the so-called orbital motions in waves.

This concept led to a test hydrofoil named *LANTERN*, which was built to evaluate the CLCS. It was designed and built by The Hydrofoil Corporation, Annapolis, Maryland, and was one of the earliest hydrofoils using electronic controls. *LANTERN* first flew in 1953, had tandem submerged foils, displaced about 10 tons, was 35 feet long with a beam of 22 feet.

The control system was a straight adaptation of an aircraft automatic control system. The craft was unusual from another point of view - the foils struts and hull were all the same shaped section, namely a symmetrical 24% thickness ratio NACA airfoil section. *LANTERN* was powered by a 200 horsepower Chrysler marine engine, had a takeoff speed of 14 knots and a maximum speed in calm water of only 18 knots. As one can see from the illustration, the designers were enamored with a 24% thick foil section and used it throughout the craft. From what we know now, it would be predicted that foil performance could have been better and a higher speed attained, if a thinner foil section had been selected.

For a time there was an interest in *LANTERN* for use as a photographic platform to assess the changes in harbor bottoms, but the interest waned and the program ended.

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HYDROFOIL PAPERS AT HYPER '99

The following are papers on the subject of hydrofoils at the HYPER '99 Conference to be held in South Africa in March. [See IHS web site for detailed Announcement.]

- Hydrofoil Catamaran Developments In South Africa, by Hoppe (University of Stellenbosch)

- Development Of Hydrofoil Assisted Catamarans With Semi- Displacement Hulls, by Migeotte, Hoppe (University of Stellenbosch)

- Prediction Of Hydrofoil Characteristics By A Vortex Lattice Method, by Thiart (University of Stellenbosch)

- Nonlinear Free Surface Flows Around Hydrofoils, by Landrini, Lugni, and Greco (INSEAN)

- A New Computational Method For The Hydrodynamic Performance Of Hydrofoil Craft, by Walree (MARIN)

NEW BENEFIT

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

Disclaimer

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.

LETTERS TO THE EDITOR

Kit Wanted

I am looking a model or a model kit of the PHM-1 Class of ships. If you know of any I would appreciate the help in this matter.

Michael Brint; brint@maco.net

Response…

I have heard of a PHM model, but I have no idea what makes or made it. There probably weren't that many made. By the way... I'm not at Boeing any more. This is my sixth day of retirement! (Dec xx, 1998 - Editor)

Joe Schobert, DIRIGO99@aol.com

Response…

There is a plastic model kit combination of the USS Missile Frigate FFG43 USS THACH and USS Patrol Missile Hydrofoil PHM1 PEGASUS Class to a scale of 1:700 in the "Sky Wave" series produced by Pit-Road, 5-10-3 Kajigaya Takatuku, Kawasaki City, Japan. The kit number is 55, and the box is also labeled SW-1300. The FFG is modeled only down to the waterline and is about 195mm long. The PHM can be modeled either hullborne or foilborne, as there is a split in the hull at the waterline. The down side is that the PHM model is only about 59mm long. It is fairly cute through and has reasonable detail! The decals include pendant numbers for PHM-4 through PHM-6, AQUILA, ARIES and GEMINI. Although you appear to be looking for plastic scale model kits, I am also reminded of an article on a radio-controlled semi-scale PHM model included in a Dutch radio control modeling magazine on sale in December 1995 in the Netherlands. This model was built "from scratch" rather than as a kit, but may be of interest to you if you can still trace the article from the scant description I have given. Finally, you may also be interested to know that in the UK magazine Model Boats of April 1991 featured a small advertisement for "Hydroflight Models, model hydrofoil and hovercraft specialists incorporating the Hydroflight Society (The Society for Model Hydrofoil and Hovercraft Enthusiasts)." The advertisement announced that their first kit, a 48 inch model of HMS SPEEDY, a military derivative of the Boeing Jetfoil, was to be released soon and included photos of the bare hull of this scale fiberglass model. The advertisement had a UK address, but I may write to confirm they are still at this address before it is listed on the HIS web site. —Martin Grimm

Trampofoil Photos

We have a web page about our new Trampofoil. Feel free to add it to the links page on the IHS website. [Done. Good photos of this interesting water vehicle. - Ed.] The effort required is about like running. I'm 44 years old and not at all athletic. My best distance so far is about 200 yards. It seems to be getting easier the more I do it, as I develop the proper cadence and technique. I don't think I'll ever be doing long distances on it. The experience is like a cross between a pogo stick and a hang glider. You have the sensation of "flying" a wing. If it gets too slow it stalls. You have to keep the turns coordinated by matching the bank to the yaw rate like an airplane. The steering bar controls the yaw axis and you shift your weight left and right to roll. The roll axis is well damped by the 9-1/2 ft wing span. Pitch is taken care of automatically by the bow foil and surface sensor. It is an elegant design, the designer has reduced the hydrofoil to its basic elements. He's taken away everything not required for flight. The quality of the extrusions and construction are very good.

Bob Hodgen;
RobertHodgen@compuserve.com

Chinese Yuloh

If anyone is interested, I have some university (Tokyo, Yokohama) prepared reports of studies and towing tank tests on these low speed hydrofoil propulsion devices. - The Chinese Yuloh, the Japanese Ro, also known as the oriental sweep, or over the transom sculling.

Richard Watson;
rwatson@csbsys.com

Schertel Geneology

I am doing genealogical research on the surname Schertel. I would like to find out if there is a record of Baron von Schertel mailing address or that of his descendants. There is a reasonable chance, with such a rare name as Schertel, that he and I may have common ancestors. It is interesting to note that Baron (Freiherr) von Schertel was also "von Burtenbach." I have been able to retrieve a print of the original Baron von Schertel, who is listed as Baron Sebastianus von Schertelius von Burtenbach. He lived in the town of Burtenbach (which still exists today) in Bad Wurttemberg, Germany. Based on the telephone

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white pages for Germany there are no Schertels living in Burtenbach (unfortunately!!). At that time the nobility would "latinize" their names; perhaps it sounded more distinctive. The name Schertel is rare. Apparently there are only about 400 families in the world. Of course there could be more, but according to the records there are not. The Schertels of the last 400 years were scientists, writers, etc.; even one painter (Joseph Schertel, 1810-67). I have found my geneological research to be interesting, to say the least. Supposedly my great grandfather operated the first steam locomotive in Bavaria for which he was awarded a sword which I have in my possession.

Herman Schertel; leeherm@tfb.com

Wanted: von Schertel

Please can you help me to find the address of your former President Baron Hanns von Schertel or his family? I am trying to get some contact to the Schertel-Sachsenberg Group with reference to high-speed ships.

Dr.Ing. Juergen Heinig;
drheinig@heinig.de;
http://www.heinig.de

Response…

Baron Hanns von Schertel died some years ago The company he founded with assistance from Gotthard Sachsenberg, Supramar AG is still listed in Jane's High Speed Marine Craft as a consulting firm, refer to Jane's for the details. In an article in the IHS Newsletter of Summer 1996 concerning Gotthard Sachsenberg, Robert Johnston reported that the Sachsenberg shipyard fell into Russian hands after World War 2. You may also wish to contact Thomas Wuhrmann who had written to the IHS in mid 1997 indicating he had hoped to write a book about the (Supramar designed) hydrofoils on Lake Lucerne, Central Switzerland. It is a long shot, but he may have some information you need. His address is Bahnhofstrasse 18, CH-6370 STANS Switzerland. — Martin Grimm

Response…

The Baron and I were close friends for several years. I never met any of his personal family, but we visited on several occasions and played some golf. He was a tough competitor on the golf course.. I always enjoyed our get-togethers both with men and women. I never understood why he never married. With no immediate family our get-togethers were primarily technical and business related. Perhaps addresses of his places of business might be helpful to you: He opened his design and business office for hydrofoil boats in Switzerland. Supramar Hydrofoil Limited, Ausserfeld 5, CH-6362, Stasstad. Switzerland. His principal builder was Rodriquez Cantiere Navale, Spa. Via S. Raineri 22, 98.100, Messina, Italy.

Bob Johnston; rjohns0199@aol.com

Remembering DAK and Dad

As a much younger arm-chair participant, fueled by my dad's experiments in submerged hulls, "bulbous bows" (way before they showed up on Japanese tankers!), and solid airfoil/wingfoil sails, I read a great book Sailing Hydrofoils by James Grogono and two of his associates. David Keiper's experiments and accomplishments were mentioned several times - he DID it, not just wrote about it. Thanks for the vicarious moments, David!

Eric Wuolle;
eric.wuolle@home.com

Response…

For Eric Wuolle and for others who are interested in sailing hydrofoils, and who want some good design guidance and a review of some of the craft that had been built by the early 1970s, the full details of the book to which Eric referred are: Hydrofoil Sailing; Alan J. Alexander, James L. Grogono and Donald J. Nigg; published in Great Britain in 1972 by Juanita Kalerghi ISBN 0 903238 00 4. The book covers the full range of design considerations for hydrofoil sailboats in an easy to read format.

Martin Grimm

Ocean Sailing

I am interested in locating a marine engineer who could design an ocean-going sailing hydrofoil that would include an enclosed cockpit like a MacGregor 65. I am an aerospace engineer with some experience in aircraft design, but not enough experience in hydrofoil design to consider myself competent to design one from scratch. I have about 500 hours on the water, sailing 20- thru 55-foot boats. I would like to see any plans that might be out there.

Larry Manofsky;
MPMHFP123@worldnet.att.net

Adding Foils

I have some general questions about power boat foils: Since I'm mainly a power boater the last few years, a recent power cat design (Powershuttle 40 by Shuttleworth) caught my eye. It's a displacement type hull using twin 90 hp. 4 cycle outboards for a speed of about 20 knots. Would a sim-

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ilar size and weight boat using foils be able to get up on it's foils using these outboard motors? Does a foiler have to plane first to achieve foiler posture? These questions assume of some method to adjust the motor height for foiling.

Jim Montgomery;
AMontgo830@aol.com

Response…

Hydrofoils can be designed for nearly any boat weight for a takeoff speed of around 15 or 16 mph. Therefore, if a displacement boat without foils can reach 20 knots, then hydrofoils can be designed to lift it out of the water. The speed should increase at least 10 mph. Some of the boats shown in my IHS article (www.erols.com/foiler/upright.htm) could not plane when heavily loaded; but, when outfitted with hydrofoils, they would first plane, and then rise out of the water. However, boats do not have to plane to rise up on hydrofoils.

Tom Lang; tglang@earthlink.net

Student Finds IHS

I am contacting you regarding membership of your society, with a view to sourcing the latest hydrofoil technology and developments. I am currently studying for a BEng Marine Engineering at Plymouth University in the UK, and am looking for up-to-date hydrofoil technology information for my final year dissertation.

Jonathan Morley; jemorley@plymouth.ac.uk, or: r.morley@virgin.net

Human Power

One of, if not the busiest commercial human powered hydrofoil website is: http://members.aol.com/jfreeent/hf.htm. There is lots of info on how to build your own boats, a source for hydrofoil parts, lots and lots of scientific data, a history of human powered hydrofoils, and lots of links. Included is an image of the world's first hand /foot ("Orbital") powered hydrofoil. If you would be interested in some fresh-out-of-the-file-images of our hydrofoil prototypes, let me know.

Jake Free; JFreeEnt@aol.com

MONITOR History

I have just now received a letter from Mr. Neil Lien, who was the engineer working with Gordon Baker [on the US Navy's sailing hydrofoil MONITOR]. I am now starting a correspondence with him; let's see what more information this will yield.

Hanno B. Smits, MSc. Nav. Arch.

hbsmits@worldonline.nl

Response…

Neil Lien is a hard name to forget since it spells the same forward or backward. Actually I have been trying to locate Neil since last spring when interest in the MONITOR came to the attention of IHS. Neil was Gordon Baker's project Engineer on the MONITOR's design, construction, and trials of the sailboat. I cannot help but believe that we are going to learn more about the MONITOR from Neil than any other source. Perhaps we can get Neil to do an article for IHS.

Bob Johnston, IHS Historian;
RJohns0199@aol.com

Hanno Smits has contacted me pertaining to your interest in the "Monitor" hydrofoil sailboat. I am a retired engineer and was the designer or project engineer for Mr. Baker on the Monitor as it was built and sailed. Its been a long time since but I think I have a better knowledge of the Monitor than anyone living. When I was asked to clean out all hydrofoil material from the Baker Mfg. Co., I put the "Monitor" in the Mariner's Museum to preserve its history and concepts for others to enjoy. My daughter**,** Karen, who has her Master's degree from Purdue would like to interrelate on an article on this boat. We are both busy at this time so no time frame can be set. I would be interested in hearing from you and know your desires. I'm hoping to visit with Bob Johnson in Daytona Beach, Florida if all works out the first part of March.

Neil Lien

Response

I am delighted to hear from you. Hanno Smits stirred up quite a bit of interest in Monitor with his website and correspondence, particularly among some of our members who worked on Navy projects and are old

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

enough to remember Monitor. Bob Johnston is a prime example, as he actually took a ride on Monitor. Another member has been to the Mariners Museum and was allowed to take pictures, but so far he has not mailed them in to me or Hanno. As to an article, I would very much like to have more textual and photographic material on Monitor for the website and Newsletter; so would Hanno.

Barney Black (foiler@erols.com)

Mystery Foil

We are running a English-built hydrofoil in Queenstown New Zealand. Would you be able to help us as we have only taken over? Here is a photo and what info I have come up with: Built by Porthleven Shipyard Limited Porthleven Cornwall. In 1966 the model PT4 Hydrofoil was built as a patrol boat, but unlike our hydrofoil, only had a small cockpit which would carry only 4 people as ours had a custom top built and can carry 18 people. She is 30 feet long and powered by a 440 Chrysler V8.

David Esler;
neville.beker@xtra.co.nz

Response…

It is pleasing to hear that the New Zealand PT 4, originally named METEOR III, is still well and good. Back in 1994, my friend Garry Fry (Sea Flight Cruises) in Sydney Australia was interested in obtaining the PT 4 for operation in Sydney Harbour before deciding a larger craft would be more suitable. He subsequently imported the Rodriquez PT 20 MANU WAI, also from New Zealand. Garry and I had discussed some technical issues concerning the PT 4 when he was considering its acquisition. Supramar AG, who were the designers of this hydrofoil, provided Garry with some technical information but they had little of the original design data remaining. Only a handful of the PT-4 craft had been built, and that was many years back. If you can gain access to the early issues of Hovering Craft and Hydrofoil magazine, then you can read an article written about your very own boat on page 40-43 in Vol.5, No. 3&4, December-January 1965-66. I will send a copy if you can not get access to it. The article refers to it as a Wykeham-Supramar PT 4 and includes overall technical details, a photograph of the craft and some general arrangement drawings. Please look after this treasure of a hydrofoil. I would be keen to take a ride on it if I ever get over to New Zealand.
-Martin Grimm

Lift/Drag Equations

In the Letters to the Editor section (page 12) of the Summer 1998 Newletter Tom Croswell requested some information on estimating lift and drag for a submerged hydrofoil. Martin Grimm was kind enough to offer the following:

For Tom Croswell: It may be a little late for you, but there is some good guidance on estimating lift and drag of hydrofoils for preliminary design purposes in the following reference: Eames, M.C., Principles of Hydrofoils in the book HIGH-SPEED SMALL CRAFT by Peter Du Cane, David and Charles (Holdings) Limited, Devon, 1974, Fourth Edition, Chapter 3, pp 12-54. This chapter of the book was written by a man who really understood hydrofoil design as he was deeply involved in the Canadian naval hydrofoil project which led to the construction of FHE-400 Bras d'Or. Michael Eames has presented his notes in a way that can be digested with relative ease. With the exception of the influence of the water surface and of cavitation, the lift and drag of a hydrofoil can essentially be determined using the same principles as applied for aircraft wings. There are many aeronautical engineering texts which provide such information. — Martin Grimm

HYDROPTÉRE

I send you this message to give you the address of my web-page about HYDROPTÈRE
http://perso.wanadoo.fr/terrasse.web
It's a famous French hydrofoil which was built by Eric Tabarly and Alain Thébault. Please send me your comments!

Gabriel Terrasse;
Gabriel.terrasse@wanadoo.fr

Shown here are two sample pictures of the HYDOPTERE - Editor