The NEWS LETTER

International Hydrofoil Society

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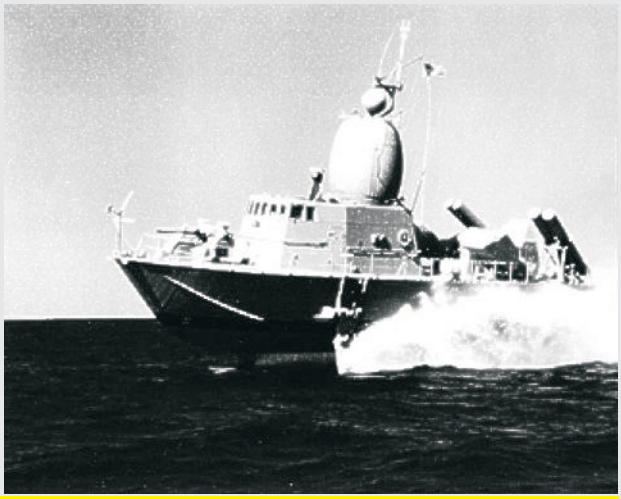
SHIMRIT – SON OF FLAGSTAFF

From *Ships That Fly*

SHIMRIT was a collaboration between Grumman and the Israeli Government. It was in 1977 that the Israeli Government contracted with Grumman Aerospace Corporation to design and build the first of a series of hydrofoils based on the U.S. Navy FLAGSTAFF (PGH-1). However, its full load weight was increased from 69 tons to about 105 tons. The agreement was for Grumman to build the No. 1 ship, then provide the Israelis with foil systems, control systems, and propulsion components so they could build additional ships in their country. The Israeli Navy anticipated that with the employment of appropriate tactics and techniques, this high performance hydrofoil would provide a substantial improvement in fast striking power against the conventional hullborne vessels of its adversaries. As one can see from the picture of this hydrofoil, the radome, which almost overpowers the superstructure, is indicative of the "high tech" nature of the ship.



Grumman-Israeli SHIMRIT

The first ship of the series, SHIMRIT (Guardian) was actually built in Lantana, Florida at Lantana Boat-yard, Inc, rather than at Grumman's plant in Bethpage, Long Island where the engineering base was located. Grumman therefore had a real

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SUSTAINING MEMBERS

YOUR 2013 IHS DUES ARE DUE

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INSIDE THIS ISSUE

Tribute to John R. Meyer – IHS Past President

By Mark Bebar and Bill Hockberger

As noted in the President's Column of the Fourth Quarter 2012 IHS Newsletter, John Meyer has stepped down as President of the International Hydrofoil Society after 21 years of outstanding service and leadership of the organization. In recognition of his contributions to the success of the Society and to hydrofoil technology development over a period of many years, this issue features a retrospective on John's impressive career and tribute to his outstanding accomplishments.

A native of Staten Island, New York, John attended public schools there and enrolled in Aeronautical Engineering at the Brooklyn Polytechnic Institute in 1941. After his sophomore year, he joined the U.S. Navy V-12 program at Rensselaer Polytechnic Institute in Troy, New York. Subsequent to earning a bachelor's degree in Aeronautical Engineering at RPI, he attended Cornell University and received a commission in the U.S. Naval Reserve in March 1945. After serving as an aircraft maintenance officer, John returned to RPI in 1947 to earn an M.S. degree in Aeronautical Engineering, followed by additional graduate work at the Massachusetts Institute of Technology in the same field. Subsequently John held several research and development, long range planning, and engineering management positions with Boeing-Vertol, Trans-Sonics Inc., Air Force Cambridge Research Center, and the Aero-Elastic Laboratory at MIT. He has served on the AIAA Marine Systems and Technologies Committee and the High Speed Vehicle Committee of the American Towing Tank Conference (ATTC) and he is a member of the American Institute of Aeronautics and Astronautics (AIAA) and the Society of Sigma Xi.

John joined the David Taylor Model Basin, now known as the Naval Surface Warfare Center, Carderock Division (NSWCCD) in 1971. He was involved with Advanced Naval Vehicles in the Advanced Concepts Office and was Manager of Hydrofoil Technology in the Hydrofoil Group (Code 115) of the Ship Systems Integration and Programs Departments. He served as the Center's technical manager of the PHM program, participating in many activities including Contracting Officer's Technical Representative (COTR) on the Boeing contract, the Automated Surface Ship Information System-Technical (ASSIST), Hydrofoil Collision Avoidance and Tracking System (HYCATS), and various PHM sea trials. He was also project leader for an Innovation Center one-year study of a Semi-Submerged Surface Ship. During his 25 years at NSWCCD, John was closely associated with and a strong advocate for maintenance of the Advanced Ship Data Bank (ASDB), a unique collection of technical data and reports on all types of High Performance Marine Vehicles.

John has authored numerous NSWCCD reports, as well as AIAA and ASNE papers on hydrofoils and hybrid marine vehicles. He has also written two books: *Ships That Fly* and *Hybrid Ships and Craft - A New Breed*.

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WELCOME NEW MEMBERS

Howard Apollonio - Howard signed up as a new member of IHS at the Tacoma Fest several months ago. He is a lifetime boater from Maine, now living in Lynden, Washington, and an early hydrofoil sailor. He designed and built several boats (successful) before going to Univ of Michigan to learn how to do it (better). With a Naval Architecture degree in 1969 and Professional Engineer's license, he has run an independent practice since 1981, specializing in advanced design motoryachts and commercial craft. The first 12 years of his career were in design of commercial & military craft, and waterjet propulsion. While at U of M he became fascinated with hydrofoils and hovercraft. One outlet for that was to design and build a successful sailing foilcat with tandem surface-piercing foils in 1967. It hit speeds over 30 knots, and was a great rough water performer. Another was a senior design project for a 250 ft hydrofoil Coast Guard cutter. Subsequent employment realities and family obligations sidelined hydrofoil activity until the last 15 years when he got to

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YOUR 2013 DUES ARE DUE
IHS Membership options are: US$30 for 1 year, $56 for 2 years, and $82 for 3 years. Student membership is still only US$10. For payment of regular membership dues by credit card using PAYPAL, please go to the IHS Membership page at <http://www. Foils.org/member.htm> and follow the instructions.

SHIMRIT

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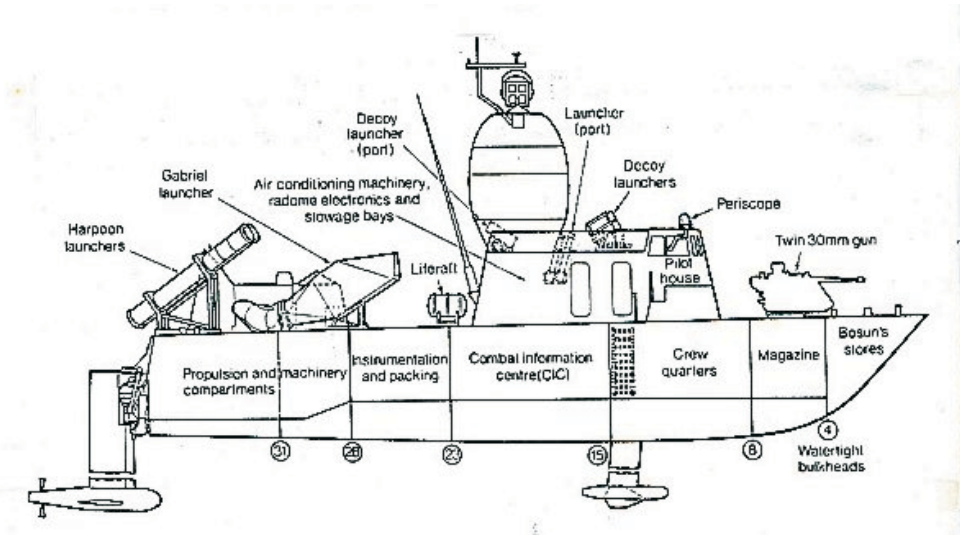
challenge: design, build and test an essentially new hydrofoil with 1,500 miles between engineering and construction, and another 8,000 miles from the customer and their second construction base.

After launch of SHIMRIT in May 1981, a series of sea trials in the Atlantic and equipment tests were performed with approximately 550 operational hours accumulated at the time of acceptance by and delivery to the Israel Navy. The first Israeli-built hydrofoil, LIVNIK (Heron), followed about 18 months behind the lead ship. Launched during the latter half of 1982, it was identical to the U.S.-built craft. A third ship, SNAPRIT was completed by the Israeli Shipyards Ltd. in Haifa in the first half of 1985. The original plan to build a total of 12 hydrofoils of this class has been dropped. The hull of SHIMRIT is about 11 feet longer and 2 1/2 feet greater in beam than FLAGSTAFF. This increased size provides deck space for mounting missile launchers aft of the forward deckhouse and on either side of the aft deckhouse. It also provides additional space on the foredeck for a larger gun, an enlarged forward deckhouse with provisions for the large radome, and accommodations for a 13-man crew.

The overall general foil and propulsion arrangement is the same as FLAGSTAFF with two foils/struts forward and a single aft foil strut. Foilborne propulsion is provided by a four-bladed controllable-pitch propeller driven by a four-gearbox main transmission system. Hullborne propulsion consists of two hydraulically-powered stern drives mounted on port and starboard lower outboard sections of the transom. In the extended position, the lower leg of the unit protrudes below the bottom of the hull, rotating inboard 90 degrees to its retracted position behind the transom for foilborne flight.

Due primarily to the hydraulic stern drives, SHIMRIT is equipped with perhaps one of the largest hydraulic systems ever designed for a military vessel of its class. In flow capacity it is larger than the systems of a Boeing 747, Lockheed C-5A or the Space Shuttle. In addition to hullborne propulsion and steering, the hydraulic system supplies power for strut extension, retraction (and locking), foil incidence control, aft strut steering, main engine start, various pumps, transmission brake/ clutch, and forward deck gun positioning. Hydraulic fluid at 3,000 psi is provided by seven pumps, each with a capacity of 64 gallons per minute.

SHIMRIT is designed with an advanced hybrid (digital/analog) fly-by-wire automatic control system (ACS). Craft motions and position relative to the calm-water surface are sensed and the information processed by a digital computer. This in turn generates foil commands which (via a digital to analog interface) are transmitted to the servo amplifier unit and the servo actuators. The ACS craft attitude and motion inputs include height above the water surface from two French TRT radar altimeters in the bow, vertical acceleration from an accelerometer, heading from a gyro, roll and pitch attitude from dual redundant vertical gyros, and roll, pitch and yaw rate from rate gyros. Signals from these sensors are supplied to the ACS computer which compares them with desired parameters and automatically commands the required foil incidence and aft strut turning angles.



SHIMRIT General Arrangement Profile

These advanced features, combined with a 5,400 horsepower Allison 501-KF marine gas turbine engine, give SHIMRIT a maximum intermittent speed of 52 knots, a most economical speed of 42 knots, and hullborne propulsion speed of 9.5

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SHIMRIT

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kts. With a fuel load of 16 to 21 tonnes, the ship has a foilborne range of about 750 to 1,150 nautical miles.

Armament on this small ship is indeed impressive. SHIMRIT carries four HARPOON missiles in two pairs of launchers mounted aft, and two Israeli Aircraft Industries GABRIEL Mk III ship-to-ship missiles immediately just forward of them. Anti-ship missile and aircraft defense is provided by a twin 30mm EMERLEC remote-controlled cannon on the foredeck. Chaff launchers are mounted on the deckhouse roof. The large radome contains a powerful search radar antenna.

One of the most interesting and advanced systems on SHIMRIT is the Engineering Monitoring and Control System (EMCS) which is warranted because of the complexity and sophistication of her systems. Without an EMCS, about half of the crew would be assigned to systems operation, monitoring and control duties, whereas with it, a single Engineering Officer is able to do the same job. The EMCS is an integrated, distributed microprocessor based system, designed to provide reliable management of SHIMRIT's propulsion, hydraulic, electrical, systems; this amounts to twenty-two parameters in all.

Overall, SHIMRIT demonstrated a high level of reliability throughout the trials program. Very few failures of significance or of critical components were experienced. The large majority of hardware failures were with components such as valves, sensors, etc. which were designed and built as "commercial quality". A great deal of time was required to develop and refine the complex systems aboard the ship. It was reported that as these various tasks were completed and corrections incorporated, the operational readiness and performance of SHIMRIT improved to provide the basis for concluding that she was truly an outstanding military hydrofoil.

Reference: Frauenberger, H. C., "SHIMRIT-Mark II Hydrofoil for the Israeli Navy", 1st International Hydrofoil Society Conference, Ingonish Beach, Nova Scotia, Canada, July 27-30, 1982.

QUADROFOIL

From:www.gizmag.com/quadrofoil-electric-hydrofoil-watercraft/22560/

The field of motorized recreational toys is currently undergoing a renaissance due to the availability of high performance electric motors, new materials, computer aided design, new manufacturing techniques and a new wave of educated designers with no understanding of the word "cannot."

The Quadrofoil is a prime example of this phenomenon, having been created by three young Slovenian designers inside six months, and launched at Slovenia's recent exhibition.

So successful has been the response from the public that a short production run of 100 units will be completed before the year is out, giving the Quadrofoil a concept to market time of less than 12 months, and with some ambitious plans for faster future models and perhaps even a race version. The company is now in capital raising mode to fund production plans for more than 10,000 units a year from 2013 onwards.

The retail price of the Quadrofoil will be EUR15,000 (US$19,100) and a spot on the waiting list can be secured with a EUR5000 (US$6,370) deposit.

What you get is a two-person electric vehicle which offers completely silent running and a 40 km/h (25 mph/22 knot) top speed, along with the fast-turning dynamics of a "sports car for the water."

One of the greatest advantages of the Quadrofoil is its lack of emissions and hence impact on delicate marine ecosystems. Another advantage of the Quadrofoil over PWCs (and plus for the marine environment) is that in addition to being silent, it does not create a wake at speed, as it does not displace a significant amount of water.

Rendering of Quadrofoil

Due to the remarkable efficiency of hydrofoils, it achieves its 25 mph top speed with just one 3.7 kW electric motor, and thanks to its lightweight of 150 kg (330 lb) carbon fiber and Kevlar body and in-built 4.5 kWh lithium batteries, it has a range of 100km (62 miles). It can also be recharged from a domestic powerpoint

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QUADROFOIL

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in an hour, or via the flexible solar panels which come with each Quadrofoil and are designed to be folded inside the watercraft as an emergency power source, or to top up the battery when "off the grid."

The hydrofoil's efficiency comes from its ability to lift a boat out of the water during forward motion, reducing hull drag to near zero into the bargain.

This means the speed of a boat equipped with hydrofoils is either greatly increased, or the amount of power required to propel it is greatly reduced, in comparison to a boat that does not have hydrofoils. It is hence not surprising that the world sailing speed record, and the human-powered water speed record, both belong to watercraft with hydrofoils.

Another benefit of a hydrofoil is the comfort factor for passengers - as once the hull has been lifted above the waves, the incessant pounding disappears and the boat feels like it is flying. Indeed, a hydrofoil is a wing that "flies" in water, and the flight of the Quadrofoil is only disturbed by waves greater than 20 inches (50 cm).

The designers claim the Quadrofoil is unsinkable, and it is designed to always return to upright should you manage to overturn it in a tight turn.

One of the key enablers of the machine was the development of a hydrofoil-folding mechanism, which enables the six kilogram hydrofoil legs to be adjusted during use, and to be folded upwards by means of a manual or electric winch before entering a

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REMEMBERING SAM BRADFIELD

IHS HONORARY LIFE MEMBER

We were saddened to receive the news from IHS member and Hydrosail associate, Tom Haman, of the passing away of long time IHS member and hydrofoil advocate Professor W. Sam Bradfield, the principal of Hydrosail Inc, on Tuesday, October 16, 2012 at Melbourne, Florida at the age of 94.

Sam, as a professor in aeronautical engineering with an interest in boundary layer studies, had used a hydrofoil sailboat as the basis for a senior design course at the State University of New York, Stonybrook, since 1964. Successive classes of engineering students worked on various design aspects, carrying their work through to full-scale testing on Long Island Sound. Sam inspired many students to design, build and test sailing hydrofoils over several years in the 1960s.

With an early test boat named **NF^2**, short for "Neither Fish Nor Fowl", Sam established several world speed sailing records: In B Class 17.20 knots in 1975 increasing to 23.00 knots in 1977. Then in C Class in 1978 at 24.4 knots.

In subsequent years, since 1987, with his associates Tom Haman and Mike McGarry at HydroSail LLC and various students at Florida Tech, Sam developed a prototype of a practical sailing hydrofoil which entered production in August 1998 as the 16 ft (4.9m) trimaran configured WindRider **Rave**.

The HydroSail team developed or contributed to a string of other sailing hydrofoils that included: The 25ft (7.6m) "**EIFO**", short for Easily Identified Flying Object, designed as a coastal racing day sailor. A further development was **NF^3**, an 18ft (5.5m) trimaran hydrofoil built in 1988 which was equipped with a wing sail and dihedral main foils and a T-foil rudder aft. **Volantis** (a design; not built)**,** a 60ft wing sail trimaran hydrofoil in association with Mark Ott, Nigel Irens and David Hubbard. The 37ft (11.3m) **SCAT** (Sam's Crazy-Ass Trimaran) project was aimed at applying hydrofoils to true offshore sailing conditions. The overall configuration of SCAT is similar to the Rave except that SCAT is a considerably larger. Sam's most recent project with his HydroSail Associates has been the 18ft (5.5m) **Osprey** which was launched in 2012.

Sam initiated the 'Sailors Page' column of the IHS Newsletter in the Winter 1999-2000 issue and continued editing this column for several issues before sailing hydrofoil commitments and age made him pull back from the role.

Sam and the HydroSail LLC team have been sustaining members of the IHS for several years. In February 2010, in recognition of Sam's contributions to the hydrofoil community, the IHS awarded him with an Honorary Life Member. The full award citation can be found on the IHS website.

QUADROFOIL
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swimming area or approaching shore. Once the hydrofoil legs have been turned upwards, the Quadrofoil has a draft of just 6 inches (15cm).

The folding legs can also be removed, making for an easily transportable machine at 150 kg and 10 feet (3 m) in length.

Due to the low power of the 3.7 kW motor, the Quadrofoil belongs to a category of watercraft that does not require registration, a PWC license, insurance or navigation permit in the European Union.

The future looks bright for the Quadrofoil and already development of a much faster machine is underway. The current foils are suitable for speeds up to 80 km/h and, in cooperation with Fakulteta za Energetiko (Faculty of Energy Technology) in Krškothe, the company is developing its own outboard motor and propeller with variable pitch which it believes will be one of the most efficient in the world.

The propeller and 12 kW outboard will be ready later this year, presumably meaning that a version will be available in the not-too- distant future with a top speed more than double the current version.

From a recreational craft to a silent, fast craft for special forces, the Quadrofoil looks to have every chance of commercial success. Distribution, dealership and investment inquiries will be welcomed from all countries according to the company.

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A&R MAKES WAVES WITH NEW SWASH DESIGN

Excerpt from Maritime Journal, August 2012

By Tom Todd

Germany's specialist Abeking and Rasmussen (A&R) Shipyard is building a small new type of work boat tender based on its proven SWATH boats but with a single hull and says the new design will be tested in autumn.

Rendering of SWASH

A&R in Lemwerder was the first German facility to enter the SWATH (Small Waterplane Area *Twin* Hull) technology sector. Its new type is called SWASH (Small Waterplane Area *Single* Hull).

The yard claims to be the first to have marketed a reliable and commercially successful SWATH and has been a leader in the development and marketing of SWATH boats in the 25m to 60m range. All have been pioneers in their fields. However, because of their stability in rough weather and good sea holding, many have found service as pilot tenders and mother ships and as Coast Guard patrol boats in Germany and neighboring countries. Others are in offshore service and one was built as a private yacht.

The new smaller SWASH type looks a bit like a Praying Mantis on land and like a trimaran on water but is a stabilized single hull vessel whose displacement is in its central hull tube.

A&R marketing and sales manager Silke Thape told Maritime Journal, "This is a very extravagant new development, which we are very consciously financing ourselves." She revealed that it was planned to begin testing the new type in September and that A&R hoped to provide more technical details about it at that time.

The SWASH prototype, already being built to GL classifications at A&R as Hull No 6496, will reportedly be 20m long and operate in principle just like a SWATH boat.

The deck and superstructure of the vessel are of aluminum and closely resemble that of the standard SWATHs.

SWASH under construction

They rest on two central struts welded onto a single cigar shaped tube suspended below the center of the vessel and three meters below the surface.

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SWASH

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To meet class requirements, designers have also mounted two vertical outriggers on either side of the superstructure which work in combination with a fin stabilizer system to balance the 12.16m wide vessel. They also provide flat sides for convenient berthing

The single hull tube contains all the ship's systems technology including gears, shaft, generators and bow thruster plant along with the main engine, which unconfirmed reports said would be a diesel unit from MTU of 900 kW providing up to 18 knots with a variable pitch propeller. A&R believes the concentration and hull location not only means equipment is less noisy but also that there is more space for a maximum of ten people on the tender's superstructure.

A&R experts are said to believe that the new small SWASH design will interest pilot groups, wind parks, police, customs and local authorities.

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

Tribute to John R. Meyer – IHS Past President

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He has also obtained a number of patents related to this technical area. Hybrid surface ships were under study at NSWCCD by John and his colleagues for about two decades during his employment there. Largely as a result of his sustained efforts over many years, the technology has matured through analytical studies, feasibility designs, computer simulations and model tests. Investigations have been performed on hybrid ships ranging from 160 tons to about 4,000 tons. John also published a series of classified hybrid hydrofoil reports related to pressure signatures, sonar array installations characteristics, a Light Escort design, and multi-mission versions of the concept. In 1993-1996 a Hydrofoil Small Waterplane Area Ship (HYSWAS) demonstrator, named QUEST, was designed, built, and successfully tested under U.S. Navy/MAPC contract, with John as the COTR. Since retiring from NSWCCD, John has consulted for George G. Sharp, Inc., and Maritime Applied Physics Corp (MAPC).

In his 21 years as President, John has truly been the force behind the success of IHS. He has run a tight ship and ensured that we have fulfilled the legal requirements of an organization of this type. With the help of those on the Board and other members, he has managed all aspects of IHS business, organizing and efficiently running regular Board meetings and special meetings as required. He has been an outstanding leader, with the ability to delegate specific tasks to those individuals best suited for the work that is necessary. Under his leadership, we have forged strong relationships with other professional societies, including ASNE and the Society of Naval Architects and Marine Engineers (SNAME). As a result, IHS has benefitted greatly by having a presence at many ASNE conferences and holding regular joint meetings with SNAME Panel SD-5 on Advanced Marine Vehicles. John has also consistently recognized others in the high performance marine vehicle community for their contributions to the advancement of the technology.

As Newsletter Editor and major contributor, he has been the voice of the Society in increasing awareness of hydrofoil developments around the world. Through his many professional contacts, he has gathered information on everything from hydrofoil sailboards to large hydrofoil assisted catamaran ferries. He has been a driving force behind the IHS website and has pushed for development and continuous improvement of the bulletin board, which provides a mechanism for real-time communication among IHS members. As a result of his strong desire to preserve the legacy of hydrofoil technology development, John has encouraged the establishment of a permanent exhibit at the National Museum of the U.S. Navy at the Washington Navy Yard. Clearly, development of hydrofoil, hybrid hydrofoil and advanced naval vehicle technology have benefitted greatly from John Meyer's unmatched technical expertise, tremendous energy, and dedication to the U.S. Navy and the Nation. Let all of us in the IHS join together in saying: "Well done John, may you have fair winds and following seas in your retirement."

DO YOU REMEMBER ...HMS SPEEDY?

All of Boeing's JETFOILs were not destined for passenger ferry service. In 1979 the 14th ship in the production line was diverted to the Royal Navy of Great Britain. They purchased the hydrofoil "HMS SPEEDY" as a demonstration vehicle to investigate it technically and evaluate several operational roles. Although there are obvious differences in the superstructure between JETFOIL and SPEEDY, the fundamental elements of the craft in terms of propulsion system, foils and automatic control system are essentially the same. However, there is a small exception. Separate hullborne propulsion engines consisting of two GM Detroit Diesels were installed to drive directly into the foilborne propulsion gearboxes and in turn drive the waterjets. This provided more economical, low speed, hullborne operations.

Fisheries Protection was the major role in which SPEEDY was evaluated. Operating extensively around the British Isles and in the North Sea, the ship was exposed to a complete spectrum of the sea environment. Seas as high as State 7 (waves can be as high as 25 feet) were experienced which of course forced SPEEDY into the hullborne mode. She maintained headway, good control and survived the ordeal with no damage to equipment or personnel.

During other rough water evaluations, SPEEDY was compared side-by-side with Britain's ISLAND and TON Class patrol boats, and it was concluded that the foilborne SPEEDY was more comfortable than the much larger conventional boats. It should be noted that these ships were about 1000 and 425 tons respectively. However, SPEEDY's endurance was found to be limiting in that the 10 hours of foilborne time was not sufficient for patrols in the more remote parts of the fisheries enforcement zones. The ISLAND class ship has a much higher endurance of 7,000 nautical miles at 15 knots. On the other hand, the hydrofoil's higher speed of 45 knots gave her considerable greater annual "census taking" ability and quicker reaction to intelligence and hence the arrest of offenders who would escape or appear innocent by the time the conventional patrol boats could have arrived on the scene.

HMS SPEEDY on patrol

At the completion of the evaluation it was concluded that "SPEEDY cannot be regarded as a direct alternative to fishery protection vessels, since there are some requirements that she cannot meet (primarily range and towing ability). However, a hydrofoil could have a useful role as part of a "mixed force." Since SPEEDY could not substitute directly for the conventional ship's role, and finance precluded her from joining the Fishery Protection Squadron without a compensating reduction in its normal strength, it was reluctantly decided to decommission SPEEDY in April 1982 and offer her for sale. Subsequently she was purchased in 1986 by Far East Hydrofoils for conversion to a passenger ferry and integration into their fleet of other JETFOILs.

It must be said that an evaluation or comparison, which such evaluations inevitably become, are somewhat unfair - something like comparing apples and oranges. The vast differences in range and towing capability between the ISLAND Class and SPEEDY were bound to produce the Royal Navy eventual negative "evaluation" in the Fisheries Protection role. Apparently there was no way to accept the tradeoffs of high speed and excellent motion characteristics for SPEEDY's lack of range and towing capability.

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REMEMBER THE MINE COUNTERMEASURES HYDROFOIL SLED?

By Martin Grimm, IHS Member

I stumbled across a photo of an AN/ALQ-166 hydrofoil MCM sled (an early version of what is also referred to as the Mk 105) on display outside the Museum of Man in the Sea taken 10 June 2012 in Gulf Resort Beach, Panama City Beach, Florida:

While conceptually the same as the Mk 105, it is a different float and foil configuration than the current design. If anyone knows about the evolution of the design, I would be interested to hear about it.

AN/ALQ-166 on display at Man in the Sea Museum, Florida

The AN/ALQ-166 Helicopter-towed magnetic minesweeping system was designed and manufactured for NAVAIR by EDO Corporation. The hydrofoil sled is towed on a 450' cable and allows the helicopter to sweep for magnetic mines. The sled trails two-electrode cables in the water, one long (800 feet), and the other (600 feet). An electrical current generated on the sled travels between the electrodes. The current is caused by a 1000-volt electrical potential between the two cables. This creates an electric field in the water, which can set off a magnetic mine. A noisemaker that simulates a ship's acoustic signature can be towed behind the magnetic sweep. It detonates sound-activated mines.

The EDO sled is unmanned. The sweep operator, at a control console in the helicopter, can start and stop the turbine and raise and lower the hydrofoils. The helicopter can pick up the sled from a ship's deck, fly it to a contaminated area, clean the area, and then return the sled to the ship or shore.

IHS AT ONR/ASNE S&T EXPO

By Joel Roberts, IHS Member

The Office of Naval Research (ONR) Naval Science and Technology (S&T) Partnership Conference & American Society of Naval Engineers (ASNE) Expo was held 22 – 24 October 2012 at the Hyatt Regency, Crystal City, Arlington VA. This was a stellar event, and the IHS was a proud participant.

Joel Roberts and Frank Horn manning the IHS booth

Simply stated, this expo was a "candy store" for anyone interested in high performance ships, vehicles, and the latest science and technology which makes them possible.

Our IHS booth featured a large photo kiosk which portrayed the history of hydrofoils and an eye catching banner advertising the coming "Hydrofoil Reunion" scheduled for 2013. Our booth was manned by Mark Bebar, William Hockberger, Frank Horn, Nat Kobitz, and Joel Roberts. Special thanks are in order for Frank Horn who manned our booth for the entire 3 days.

FROM THE BOARD ROOM

By Joel Billingsley, IHS Member, Secretary

18 July 2012 - Mark Bebar, George Jenkins, Leigh McCue-Weil, and Ray Vellinga were elected to the Board to fill the 2012 - 2015 term. Officers for the coming year are Mark Bebar – President, Joel Roberts – Vice President, Frank Horn – Treasurer, and Joel Billingsley – Secretary.

Plans came together quickly and highly successfully for IHS to participate in the Tacoma Maritime Fest. held on 25 & 26 August 2012 in Washington state. IHS had a tent booth staffed by Mark Bebar, Sumi Arima, Ray Vellinga, Mike Terry, and Bill Hockberger. Harry Larson brought personal hydrofoil Talaria IV. Terry Orme set up an adjacent booth devoted to the restoration of PCH 1 High Point.

The Board is making preparations also to exhibit at the ASNE Day 2013 event to be held 21 & 22 February 2013 at the Hyatt Regency Hotel in Arlington, VA. ASNE is offering the IHS meeting room space in addition to the standard booth to attract additional attendance.

Plans also are continuing for the Hydrofoil Reunion to be held in Key West, FL 20 – 23 September 2013.

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SAILOR'S PAGE

MORE ON SAM BRADFIELD

The following collection of photos of the numerous hydrofoil sailing craft developed by Sam Bradfield and his associates are either courtesy of the Hydrosail website, via Mike McGarry or from the book *Hydrofoil Sailing* by Alexander, Grogono and Nigg.

1967 tow testing of a canard configuration tri-hulled sailing hydrofoil completed by Sam Bradfield and his students prior to fitting of a sail rig.

Sam Bradfield's tri-hulled sailing hydrofoil configuration which was extensively tested during the summer of 1969.

Another early test boat named NF^2, short for "Neither Fish Nor Fowl", with ladder foils, steering canard foil and inflatable outrigger hulls.

Another variation on the NF^2 speed sailing record holder again with ladder foil configuration but this time with a center hull.

NF^3 was an 18ft (5.5m) trimaran hydrofoil with wing sail, dihedral main foils and a T-foil rudder aft, built in 1988.

NF^3 was an 18ft (5.5m) trimaran hydrofoil with wing sail, dihedral main foils and a T-foil rudder aft, built in 1988.

Further view of NF^3.

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NEW OUTRIGHT SAILING SPEED RECORDS FOR VESTAS SAILROCKET2

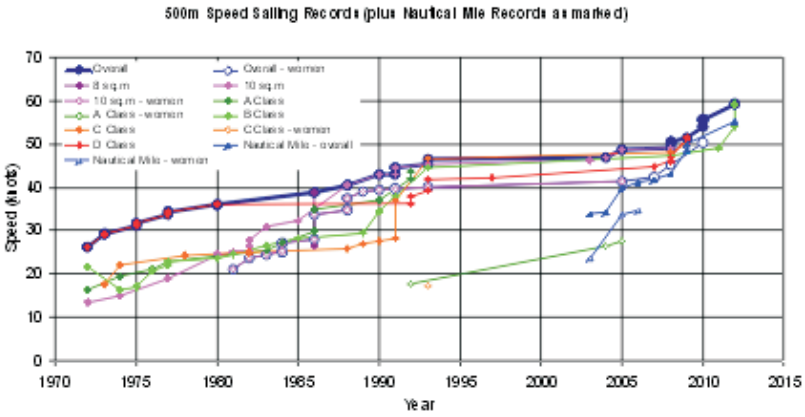
The 2nd and 3rd Quarter 2012 Newsletters described the Vestas Sailrocket2 (VSR2). The Sailrocket team, lead by Australian, Paul Larsen, has since returned to Walvis Bay in Namibia equipped with a new foil to continue their speed sailing record attempts.

Profile and plan views of Vestas Sailrocket2

We are pleased to be able to report that Paul Larson and his team have provisionally broken the outright world speed sailing record at about 59.2 knots average speed over 500m. This outright speed record over 500m was previously held at 55.65 knots by Rob Douglas from USA and had been set at Luderitz, Namibia, in 2010 using a kite board.

The Trimble GPS unit on board recorded a 59.23 knot average over 500m and a peak speed of 62.53 knots. These speeds and the record are still subject to ratification by the World Speed Sailing Record Council (WSSRC).

As if this was not sufficient, on a subsequent run, Paul achieved a speed of about 55.3 knots over a nautical mile



On an earlier run last season with leeward pod flying.

thereby also claiming the outright record for this distance category from previous record holder Alain Thebault with l'Hydroptere. Paul reports achieving "a whole nautical mile dipping well into the 60's on each gust" and a peak speed near 64 knots while at the same time marginally beating his previous 500 meter average by increasing it to 59.38 knots. These records will also be subject to WSSRC ratification. The peak speed reached on this run was close to 64 knots though such peak speeds do not constitute any formal speed records.

At the time of writing, the WSSRC had confirmed the establishment of a new World Record for "B" Division sailcraft by Paul Larsen with Vestas SailRocket 2 on 12th November 2012. of 54.08 knots over 500 meters with no current exceeding Paul's previous class record also set at Walvis Bay in 2011 at 49.19 knots. WSSRC notes a further claim for a speed in excess of this is currently being assessed.

The complete re-design of the hydrofoil on the craft since last season appears to have been a key to this successful outcome.

More details from the team are at www.sailrocket.com. A video of the earlier record run has been posted on You Tube and is worth viewing. When running at speed, the craft appears to sail with only the bow planing sponson and foil in the water.

Ratification of records is announced on the WSSRC website at: www.sailspeedrecords.com

WELCOME NEW MEMBERS

(Continued From Page 2)

design several foil assisted catamarans. A wish for the future is to help produce a fully foil supported yacht.

Capt. Mark Sedlacek USN (RET) -Mark is from Alexandria, Virginia. He is a retired Navy Captain residing in Alexandria Virginia. Mark grew up in Los Angeles and graduated from USC NROTC in 1984 with a degree in Industrial and Systems Engineering. After progressing through the ranks, he ultimately commanded USS DONALD COOK (DDG 75) and Destroyer Squadron 28. He retired in 2011 and joined The Boeing Company's missile defense division where he learned of Boeing's role in the Navy hydrofoil program. Mark had several colleagues in the Navy who served on PHMs and is interested in reconnecting with the hydrofoil community.

Capt Carl E Weiscopf USN (ret) - Carl is from San Diego, CA. He was the commissioning CO of USS ARIES (PHM 5). Carl has promised more information, but so far, none has been received. Stay tuned.

Claus Dettelbacher - Claus is from Bern, Switzerland. More to come.

IHS OFFICERS 2012 - 2013

Mark Bebar	**President**
Joel Roberts	**Vice President**
Frank Horn	**Treasurer**
Joel Billingsley	**Secretary**

FROM THE BOARD ROOM

(Continued From Page 9)

There are between 100-150 potential attendees already. Several members are planning a reconnaissance trip this September.

8 November 2012. - The Board is actively exploring the opportunity to establish an exhibit highlighting the U S Navy's hydrofoil development program with the U S Navy Museum. To that end, the Board Meeting was held in the newly established Cold War Gallery at the Washington Navy Yard. The Director of the museum explained what kind of effort putting together an exhibit entails and then gave a tour of the CWG showing where the hydrofoil exhibit might fit. The Curator of Ship Models has models of FRESH 1, AGEH 1, PCH 1, PGH 1, PGH 2, and PHM 3 available for loan to the Navy Museum. Long range plans for the Navy Museum are to relocate to a facility off the WNY that is easily accessible by the general public. The new museum will be a state-of-the-art facility, over three times the size of the current museum. If the IHS is willing to take on this opportunity, we can develop an exhibit immediately in the current museum, and then ride the wave into the new museum.

MORE ON SAM

(Continued From Page 10)

HydroSail 21 (or simply HS-21) served as a test boat in the 1990's originally with dihedral J foils as seen here.

To be continued in the next IHS Newsletter

NEW BENEFIT

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

IHS BOARD OF DIRECTORS

2010 - 2013	2011 - 2014	2012 - 2015
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The NEWS LETTER

International Hydrofoil Society

PO Box 51 - Cabin John MD 20818 - USA

Editor: John Meyer | 2nd Quarter 2013 | Sailing Editor: Martin Grimm

SPARVIERO – SON OF TUCUMCARI

From Ships That Fly

It has been said that the NIBBIO Class of hydrofoils of the Italian Navy is the grandchild of TUCUMCARI (PGH-2). This can be understood when one traces the successful evolution of its design from TUCUMCARI through its predecessor, SPARVIERO.

SPARVIERO Class Hydrofoil, SWORDFISH

In October of 1970 Alinavi, S.p.A. was awarded a contract by the Italian Navy for the design and construction of the P420 SPARVIERO Class hydrofoil missile craft. Alinavi had been formed in 1964 to develop, manufacture and market military and commercial advanced marine systems, particularly in the European and Mediterranean areas.

See SPARVIERO, Page 3

SUSTAINING MEMBERS

YOUR 2013 IHS DUES ARE DUE

See IHS Website under Membership

INSIDE THIS ISSUE

PRESIDENT'S COLUMN

To All IHS Members,

Happy New Year and all the best for 2013! As you know from reading the retrospective in the 1st Quarter 2013 Newsletter, IHS was truly blessed to have John Meyer's outstanding service and leadership as President for 21years. As newly-elected President, I am in the process of taking on more of the business of the Society. We are very appreciative that John is continuing in his role as Editor of the Newsletter.

Since the last issue of the Newsletter, we had one Joint Dinner Meeting with SNAME Panel SD-5 (Advanced Marine Vehicles) on 17 January at the new Army-Navy Country Club facilities in Arlington, VA. We were fortunate to have Jeff Kline, Vice-President of Naval Architecture, Navatek, Ltd. as guest speaker.

Mr. Kline's presentation was on the "CAAT" - Captive Air Amphibious Transporter. The CAAT is a new amphibious vehicle technology that enables heavy-lift logistics transport at about 20 knots over open or shallow water, surf-zone and beach, land and mud-flats, and moderate obstacles. Unlike an air cushion vehicle, it has translating buoyant belts that provide both buoyancy and propulsion. With its low ground pressure, it can traverse environments, including sensitive ecosystems, that could not support an equivalently-loaded tracked or wheeled vehicle (15-20 psi).

The CAAT has progressed through several stages of model and prototype development and testing under DARPA and ONR sponsorship. The complete presentation will be posted on the IHS website.

On 7 March, the Board of Directors held a regular meeting, at which several initiatives were discussed, including plans for a permanent hydrofoil exhibit at the Washington Navy Yard and a potential Student Hydrofoil Design Competition. This will be covered in more detail by Secretary Joel Billingsley in a future newsletter.

Planning continued for the Navy Hydrofoil Reunion to be held in Key West from 20-23 September 2013. The announcement will be published on the web and in the next issue of the NL.

We are also looking forward to participating again at the Tacoma Maritime Fest in August 2013. More details on both of these events will be issued in the future.

On the subject of new members, we urge all of you to recruit colleagues and others to swell the ranks. I hope that we can exceed last year's numbers by a reasonable amount this year. Finally, please consider your Newsletter Editor's plea for volunteers to provide articles of interest to our members and readers. Please send material, drafts, or ideas to editor@foils.org John Meyer will be pleased to hear from you.

Best regards,

Mark Bebar, IHS President

WELCOME NEW MEMBERS

Claus Dettelbacher -

Claus holds a master's degree in Philosophy and Oriental Studies from Vienna University, Austria. After an Internship at Blohm & Voss shipyards he began a degree in Naval Architecture at the University of Hamburg in 1994, before switching course and then finally specializing in Philosophy of History and Philosophy of Science. Claus has been an avid blogger for years and has published several books on politics, philosophy of history and his travels in Asia.

Claus is currently living in Dar es Salaam, where he is working as a web designer and film maker. He is sailing a lot - mostly on beach cats and his Hobie AI - and working on the prototype of small 2-person hydrofoil trimaran. In 2012 he has also made a short documentary film on Ngalawas, the traditional fishing trimarans of East Africa

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HYDROFOIL REUNION STATUS

By Dave Patch, IHS Member

The reunion preparations remain on track for 20-23 Sept 2013. NAS Key West Morale, Welfare , Recreation (MWR) Director is in the process of preparing the procedures for our participants to make reservations at all the MWR facilities in Key West. He has asked that we wait until he coordinates things at his end and expects to be ready by 1 April. Once we have those procedures, the next two steps in the process are to start the security

Continued on Page 12

SPARVIERO

(Continued From Page 1)

The company was jointly owned by The Boeing Company, Finmeccania, and Carlo Rodriquez. Under the terms of a Boeing- Alinavi licensing agreement, Alinavi had access to Boeing technology for fully-submerged-foil hydrofoil craft. Hence the SPARVIERO - TUCUMCARI connection.

Whereas TUCUMCARI was a patrol boat carrying a crew of 13, the Italian boats were to be designed as fast-attack craft for very short duration missions with minimum "hotel" services. Thus a crew of only 10 was required. Because of the mission requirements, emphasis was placed on heavier weapons than those on TUCUMCARI. SPARVIERO's OTOMAT missiles and a 76mm OTO Melara gun dominated the deck of this relatively small, 60- ton craft. You may remember that this is the same gun that was incorporated on the 235-ton PHM.

Although the craft retained the foilborne propulsion system, foil system, and automatic controls of TUCUMCARI, extensive rearrangement of the hull was required. The hull was wider, the internal layout to accommodate the larger Combat Operations Center and electronics equipment was completely different. Named SWORDFISH, this 60-ton fast attack hydrofoil was delivered to the Italian Navy in July 1974. Although designed primarily as a "day-boat", it could stay out up to 5 days if foilborne operations were restricted and remained hullborne for most of the voyage. To obtain this hullborne capability in such a small boat, another difference from TUCUMCARI was evident, namely a hullborne propulsor utilizing a propeller outdrive instead of a waterjet on the transom centerline. With this 360 degree fully rotatable outdrive, the designers of SPARVIERO were able to eliminate the bow thruster used on the PGH-2.

The NIBBIO Class of Italian Navy hydrofoils followed closely behind SWORDFISH with relatively minor, but important changes. These centered around the rather interesting and innovative use of distilled water injection in the gas turbine engine. The result was a 600 horsepower increase in maximum engine power. The ship could carry up to about 1,100 pounds of water which was sufficient for up to one hour of higher power operation. This additional power provided such advantages as takeoff in very rough seas, takeoff in very warm air, takeoff with very high weight such as a fuel overload, and probably most important, an increase in maximum speed from 48 knots to 50 knots in battle conditions. An additional 3,300 pounds of fuel, plus the 1,100 pounds of injection water, could be carried as a fuel overload. A total of seven SPARVIERO/NIBBIO hydrofoils were built for the Italian Navy up until 1990. The other ships in the Class were: Falcone, Astore, Grifone, Gheppio, and Condor. They were all commissioned in the 1981 to 1983 time frame.

The TUCUMCARI heritage did not end with the Italian Navy. The Japanese Defence Agency, after considering a larger alternative hydrofoil, in 1989 included three SPARVIERO Class hydrofoil missile boats for its Maritime Self Defence Force in its FY90 Defense budget. These hydrofoils, were to be built under license in Japan, would retain the OTO Melara 76mm gun, but would replace the SPARVIERO's missiles with the Mitsubishi SSM-lB, a derivative of the Ground Self- Defence Force's land-based missile.

NIBBIO- Class Hydrofoils, GRIFONE and ASTORE

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DO YOU REMEMBER CANADIAN BRAS D'OR. FHE-400?

The Canadian requirement for a hydrofoil centered about the Anti-Submarine Warfare role which demands an extremely versatile ship. Michael Eames, in his paper reviewing hydrofoil developments in Canada, points out that an alternative to improving sonar range (on large ships) is to provide a significantly larger number of sonars economically - the so-called "small and many" concept. Initial detection requires long endurance at slow search speeds; interception and attack require short bursts at speeds exceeding those of conventional ships.

With this philosophy firmly in mind, and continued confidence from their earlier developmental effort, the Canadians undertook in 1959 a study of design requirements for a nominal 200-ton ASW hydrofoil ship designated R-200. The design concept that resulted was reviewed in January 1960 by experts from the United States, United Kingdom, and Canada with the conclusion that the concept was sound.

In August 1960 a contract was awarded to DeHavilland Aircraft of Canada to carry out engineering studies and to determine the technical feasibility of the R-200 design. Based on the positive conclusions that resulted, a second contract was awarded to develop a preliminary design. In May 1963 this led to award of a three-phase contract to DeHavilland which called for preparation of contract plans and specification, detailed design and construction, and the conduct of performance trials. DeHavilland, in turn, subcontracted fabrication of the hull and installation of ship systems to Marine Industries Ltd. in Sorel, Quebec. Hull construction of BRAS D'OR commenced in 1964, but during construction, on 5 November 1966, there was a disastrous fire in the main machinery space which almost caused termination of the program. In spite of the delays and cost increase, however, the ship, designated FHE-400 and named BRAS D'OR, was completed in 1967.

The surface-piercing foil system of this hydrofoil is very evident from the photo. The main foil carries about 90 % of the lift, whereas the small bow foil carries the remaining l0%. The bow foil is steerable and acts like a rudder for both foilborne and hullborne operations. It can also be adjusted in rake, enabling the best angle- of-attack to be selected for foilborne or hullborne operation under whatever load or sea conditions that may exist.

As in many hydrofoil designs, the different power levels involved in hullborne and high-speed foilborne operations dictate separate propulsion systems. The illustration on page 5 shows the layout of BRAS D'OR's propulsion system. For the lower-power, long endurance hullborne system, fuel weight is a critical factor which made the selection of a high speed diesel engine a logical one. A Paxman 16 YJCM diesel rated at 2,000 hp drove two three-bladed propellers on pods mounted on the main anhedral foils. These 7-foot diameter, fully-reversible, controllable-pitch propellers were 30 feet apart in the lateral direction which provided excellent maneuverability at low speed through differential pitch control.

The foilborne propulsion system consisted of a Pratt & Whitney FT A-Z gas turbine engine, rated at 22,000 hp, driving two fixed-pitch, three-bladed propellers 4 feet in diameter.

BRAS D'OR arrived in Halifax, Nova Scotia on 1 July 1968 to begin a long series of trials. From September of 1968 until July 1971, when the trials terminated, the ship logged 648 hours, 552 hullborne, and 96 hours foilborne. The most operationally

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Canadian BRAS D'OR, FHE-400,at 62 Knots

BRAS D'OR

Continued from Previous Page

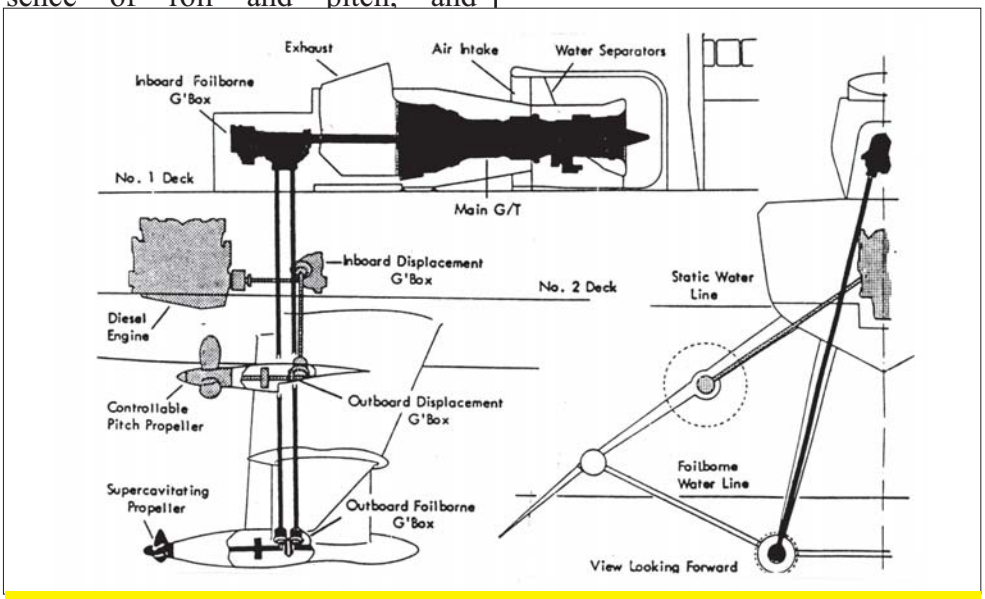
representative trial was a 2,500 mile voyage to Hamilton, Bermuda, and Norfolk, Virginia, in June 1971.The biggest disappointment, albeit from a scientific point of view (but not the sailor's aboard), was that the amount of significant rough-water data collected was regrettably small. At no time during the trip were limiting rough-water conditions experienced, either hullborne or foilborne.

This was not to say that BRAS D'OR did not encounter rough water! According to Michael Eames, HMCS FRASIER, a 3,000-ton frigate sailing in company during a rough-water trial sent a signal as follows: "Weather conditions were considered most unpleasant, heavy seas and 15-20 ft swell, wind gusting to 60 knots, ship spraying overall with upper deck (of FRASIER) out of bounds most of the time. BRAS D'OR appeared to possess enviable seakeeping qualities. She was remarkably stable with a noticeable absence of roll and pitch, and apparently no lack of maneuverability. The almost complete absence of spray over the fo'c'sle and bridge was very impressive."

Foilborne, BRAS D'OR exceeded her calm-water design speed, achieving 63 knots at full load in 3 to 4 foot waves. Sea trials included a comprehensive set of seakeeping and motions data, all of which prompted the Canadians to conclude that BRAS D'OR showed its performance to be quite remarkable for a surface-piercing hydrofoil ship.

The FHE-400, although no longer operational, remains even today the most sophisticated and advanced design of a surface-piercing-type hydrofoil. Its design and extensive trials program contributed significantly to the technical data base and this was invaluable in complementing the U.S. development program.

Editor's Note: A comprehensive treatment of the FHE-400 was a report by Thomas G. Lynch, entitled "The Flying 400 - Canada's Hydrofoil Project", published by Nimbus Publishing Limited.



BRAS D'OR Propulsion System Layout

CLASSIC FAST FERRIES ON-LINE MAGAZINE RETURNS

By Martin Grimm, IHS Member

After a pause of several years, as of October 2012, Classic Fast Ferries is once again being published. This free on-line magazine is produced by former Danish IHS member and long time fast ferry enthusiast Tim Timoleon. The latest issues are available at: www.classicfastferries.com

The on-line magazine was first published by Tim in January 2000 and continued to be produced regularly in an electronic 'magazine' format until May 2005, before being produced more intermittently in the form of shorter 'Netnewz' items until about 2008. One further full issue was released during that period. Many of the previous issues are still available in the archive at the CFF website.

The new October 2012 issue included some historical private photos of the SR.N4 cross Channel hovercraft as well as plans for the possible preservation of the Rodriquez built PT20B 'Ekspressen' that once operated in Norway. The November issue reviewed current and past hydrofoil and hovercraft services in Italy. The December issue provided an update on the Rodriquez fully submerged hydrofoil prototypes "Hydrofoil 1" and "Hydrofoil 2" and also the operation of the one-off fully submerged hydrofoil 'Victoria' by Northwest Hydrofoil Lines and subsequent Jetfoil services on the routes from Seattle in the USA and Victoria and Vancouver in British Columbia, Canada. This issue also included an item on the Voskhod hydrofoils that had

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CLASSIC FAST FERRIES

(Continued From Previous Page)

previously operated between Montreal and Quebec City.

If you have any historical photos or information related to commercial hydrofoil, hovercraft, catamarans, SES or monohull fast ferries, why not pass that information on to Tim for possible future use in this fabulous and detailed online magazine. Of course, for hydrofoil material, the IHS Newsletter Editor would also be interested in a copy of such material.

RODRIQUEZ UPDATE - I

Excepts from Classic Fast Ferries, December 2012

It has been well over five years since a new hydrofoil was last delivered by Rodriquez Cantieri Navali. But this does not mean there has been no new hydrofoil development at the Messina yard. Quite the opposite.

Even before the last Foilmaster to date entered service with Ustica Lines in 2007, a new design had been on the drawing-table since the beginning of the new millennium. By far the most significant difference between this and the yard's other hydrofoils is that it features fully submerged foils, whereas previous generations were all of the surface-piercing type.

Financed by the Italian Ministry of Research, it was decided to construct two prototypes in order to acquire the necessary full scale experience to successfully put into production this next generation Rodriquez hydrofoils. Towing tank tests were carried out by the Krylov Shipbuilding Research Institute of St. Petersburg.

Both prototypes are of the fully submerged type featuring a T-shaped bow foil and aft foil with three struts incorporating the rudders. But unlike the Boeing Jetfoil which is waterjet-propelled and powered by gas turbine engines, the Rodriquez craft, like hitherto, are powered by diesel engines. However, each vessel is equipped with a different propulsion system.

The sleek, 38m twin-deck design can be fitted out for 240–280 passengers and has a cruising speed of approx. 42 knots. Corresponding figures for the Foilmaster are 31.2m, 224 passengers and 36 knots, respectively.

The first of the two prototypes, Hydrofoil 1, was launched in 2008 and is equipped with traditional shaft propellers. The second unit, not surprisingly called Hydrofoil 2, has a pod propulsion system with pulling counter rotating propellers. The vessel is structurally complete at Rodriquez but has yet to be launched.

Hydrofoil 1

Conversely, extensive sea trials have been carried out in the Straits of Messina with Hydrofoil 1 and these should by now have been finalised. The trials verified the project's goal of, for example, better seakeeping in high sea states and consequently greater passenger comfort and lower resistance in foilborne mode and thus lower fuel consumption in comparison with the surface-piercing hydrofoil. Also, the resistance in hullborne mode is lower allowing for a higher speed, approx. 25 knots compared to approx. 15 knots for the surface-piercing craft. The design takes off at around 27 knots.

Stern Quarter View of Hydrofoil 1

To simulate a full load condition of 240 passengers, the vessel was loaded with water tanks for the trials. While the design service speed of 42 knots was confirmed, the expected maximum speed of 45 knots was not reached. It is believed that this will be achieved on the second unit which features the pod propulsion system.

Since it was launched, the superstructure on bridge deck on Hydrofoil 1 has been extended in accordance with the initial design drawings. In this connection, prior to the main sea tests, the livery was

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RODRIQUEZ UPDATE - I

(Continued From Previous Page)

changed from a simple and becoming cream white to a perhaps more striking appearance of a brighter white and sporting a large seagull on its wing on each side.

EARLIER ATTEMPTS

This is not the first time that the Rodriquez yard is dealing with the fully submerged hydrofoil technology.

Already in the mid-1960s Carlo Rodriquez, son of the founder of the Leopoldo Rodriquez Shipyard, appreciated the prospective competition from the big American companies of Boeing, General Motors and Grumman which were all interested in adding to their aircraft business the production, on a grand scale, of the fully submerged hydrofoil, civil as well as military. Negotiations between Rodriquez and Grumman went on for a year, but Carlo Rodriquez felt his yard would only act as Grumman's right-hand man with no influence on design changes, etc., and the plans for an alliance with the Americans were dropped.

Some years later Rodriquez turned to Boeing to build military hydrofoils of the fully submerged type developed by Boeing for, initially, the Italian Navy. Having formed a joint venture, Alinavi, made up of the Rodriquez yard, Boeing and a third party of Italcantieri, the Italian Government commissioned six craft of what was to be called the Sparviero class fast attack hydrofoil. Built not in Messina but in La Spezia in north-western Italy, the first of these was launched in 1973. There was also talk about setting up a production of the commercial Boeing Jetfoil in Italy for the European market.

More recently, when the Maximum Efficiency Craft, MEC, was being developed by Rodriquez it was to have been built in two variants. When launched in 1992, the 25m MEC 1 prototype was equipped with surface-piercing W-foils for the initial trials and the plan was to replace these with a fully submerged foil system when these trials had been completed before entering upon a batch production, including the larger fully submerged MEC 3. None of these projects eventuated and only the prototype MEC 1 was realized. Instead, Rodriquez focused on developing the Foilmaster.

COMMERCIAL SERVICE

At present it is uncertain when one or both of the new fully submerged prototypes will be tested commercially in regular service. Unfortunately the global cash flow could be better and times do not spur to new investment or ideas, a situation which of course has been going on for a number of years. Everyone, including Rodriquez, is cutting back on expenses. It should be safe to assume, though, that when it happens the hydrofoil(s) will be leased to or acquired by an existing operator with sufficient experience in operating fast ferries and with back-up craft should it prove necessary.

RODRIQUEZ UPDATE - II

By Lorenzo Bonesera, IHS Member

When I recently visited the Rodriquez site I observed that there are very few people working to complete the two last catamarans, "City Cats", for the Oman customer. Moreover a little yacht has been produced but without foils, I do not know the customer.

The AliSwath is always in the same condition as it was two/three years ago. Maybe it will be completed as "normal" catamaran.

Hydrofoil 1 and Hydrofoil 2 are still waiting financial help to continue their development. The first one is already completed, could be sold to an operator, but in a social/financial crisis period finding a customer is quite impossible. The second one is still waiting to be finished. It has a different propulsion system (not included in the rear foils) but not yet installed.

TALARIA UPDATE

By Harry Larsen, IHS Member

An article about Talaria's developments including its digital control system in was published in 2010.

My work since has been to replace its original aluminum aft foil with one of carbon fiber and add an additional Moog servo value. The new foil was installed this last October. The original aft flaps were actuated differentially by two single acting cylinders. Thus there was no pitch control without moving the aft struts. Now, the aft flaps are independently actuated and adjusted up or down dependent on speed (engine RPM). Thus the camber of the foil is varied as a function of speed yielding a better L/D over is entire speed range. The boat, despite a smaller foil area (3/4), can

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TALARIA UPDATE

(Continued From Previous Page)

fly at about the same minimum speed as with the original aft foil. Also, the computer is programmed to drop the boat to the water given a rapid cut to the throttle or engine failure.

Talaria Foilborne on Lake Washington

The carbon fiber aft foil, span 8', cord 9", .9" thick, has an anhedral of 10 degrees. The new carbon fiber aft side struts, 54" x 6.25" x .75" were made in a two sided mold using resin infusion. It was a chancy procedure since with a two-sided mold one can not observe the infusion as it takes place. My attempts with test samples to infuse the aft foil were unsuccessful so it was hand laid up. Using a slow (14 hour cure) epoxy it has 60 plies of unidirectional carbon with a FG core. I am currently working on a printed circuit board to replace the hand wired digital/analog interface board. A sunlight readable 1000 nit 8" LCD screen is ordered to replace the existing 300 nit screen.

REMEMBERING JOE KOELBEL

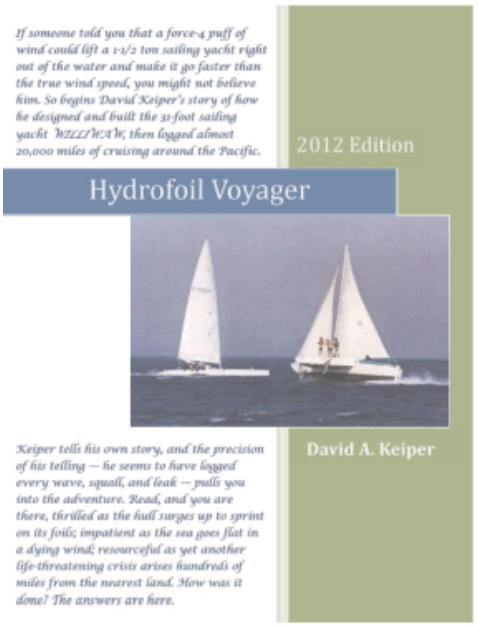
Joseph G. Koelbel, Jr., of Springfield, VA died early Monday, January 14, 2013 in Inova Fairfax Hospital, after a long illness. Born in Hempstead, NY on October 29, 1928, Joe was raised in Baldwin, NY. He served in the U.S. Army during the Korean War.

A respected naval architect, Joe began his career at Sparkman and Stephens and Grumman Aircraft Engineering on Long Island, NY, and later worked at Asset Inc., Advanced Marine Enterprises, and John J. McMullen Associates in northern Virginia. He was a member of the Society of Naval Architects and Marine Engineers (SNAME) and the International Hydrofoil Society. Joe specialized in the design and development of hull forms for both displacement and planing craft. Projects included ship conversions, patrol boats, high speed passenger ferries, surface effect craft, hydrofoils, and wheeled and tracked amphibious craft. His particular specialties in the small ship and craft field were the design of high speed, rough water planing boats, and consultation in difficult performance and propulsion problems. Joe was an expert in the fields of hydrodynamics, bottom loading, and structures of high speed craft, and presented a number of SNAME papers on those subjects.

REVIEW OF THE BOOK: HYDROFOIL VOYAGER, BY DAVID KEIPER.

By Ray Vellinga, IHS Member

20,000 miles under sail. 960 Nautical miles in 6 days! For a 31' cruising sailboat this is phenomenal, and may still be a record for hydrofoil sailing boats. It's the story of David Keiper who nearly 40 years ago flew into history aboard his self-designed, home-built hydrofoil trimaran, Williwaw.



In 1975 David cast off his moorings in California and chartered a course for the South Pacific. Hawaii, Tahiti, Cook, Samoa, Tonga, Rarotonga, New Zealand are some of the islands visited.

Continued on Next Page

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

HYDROFOIL VOYAGER

(Continued From Previous Page)

Did he dream of blue water adventures nine years earlier as he cut the first plank in his Petaluma, California back yard? Perhaps, but when I visited David later in Sausalito aboard his work-in-progress the focus was on the technical achievements and performance characteristics. By that time, David was living on shore and Williwaw was moored within rowing distance. I remember him as a slender, 6' 3", friendly, helpful young bachelor with a tasseled head of hair suggesting that he either just came from the sea or slept late. He was a real Sausalito guy preparing for a great adventure. When we boarded Williwaw I heard her timbers beckon to him, "come, sail away with me". Shortly thereafter he answered the call and watched Golden Gate Bridge dissolve into his wake.

Lucky for us, David shared his adventures in his exciting book, *Hydrofoil Voyager*. We join David as he struggles with capsizing, material failure, dissolving wood glue, crew problems, torn sails, high winds, no winds, freak waves, cold, heat, spoiled food, good food, contaminated water — if you've been to sea in a small boat, you know. Did I mention girl crews jumping ship, drunken jealous boy-friends, and hepatitis?

His crew problems started in Sausalito where locals volunteered. In the mid sixties "there was a substantial counter-culture and half the crew were stoned and the other half drunk." The more he sailed the more his taste in crew changed. In Lahaina, Hawaii, he posted on some bulletin boards: Affirmative Action: To get more women into yachting - Free sailing and navigation lessons Four ladies and one guy applied within a day. On other occasions in Auckland, his search for an all girl crew resulted in some "all night interviews," but "I had difficulty persuading any to go voyaging." Later success in this approach leads to navigation problems. He wrote: "A boat with a women crew never gets to where it was planning to go." (His words, ladies, not mine).

David and Williwaw Smoothly Underway in Force 3 Seas

In Samoa a traditional family almost involuntarily married him off to the oldest granddaughter that ended up in a "hair-pulling cloths-tearing fight" between two hopeful brides-to-be. No wonder David occasionally found himself alone at the tiller far from landfall.

However, dear reader, before you can have this kind of fun at sea, you must build your boat. For this, the appendix describes how to make your own Williwaw. This part of the book is filled with hints based on hard experience about materials, techniques, and common mistakes.

Let's not forget that above all this is a book on sailing, and David goes into great detail. It is also a fine book on hydrofoil design. It is a must-read for those going to sea, building a boat, or designing one. You will learn a lot, and it is exciting.

In 1976 a death in the family required David to return to the States. The boat's caretaker anchored her close to the shore in Hanalei bay, and an October storm brought 15' waves that crumbled the unattended boat against a concrete pier. The vessel was uninsured.

Footnote: Ironically, in a paper dated 1977, David wrote: "For low cost adventure, I turned to backpacking. For intellectual challenge, I returned to doing research in the biomedical field. The loss of my two favorite relatives, my father and my uncle, to heart disease gave me the motivation to do research on heart disease." On June 27, 1998, David followed in the footsteps of these two blood relatives and suffered sudden fatal heart attack. The hydrofoil world lost a colorful, important hydrofoil innovator, and a fine writer.

David and Williwaw can be seen in the Youtube video: http://www.youtube.com/watch?v=1cYXxZiL4B8&list=UU7Z-PqVlYu5m4CDTgesvR7g&index=4

Hydrofoil Voyager is available at Amazon.com: http://www.amazon.com/s/ref=nb_sb_ss_i_0_15?url=search-alias%3Dstripbooks&field-keywords=hydrofoil+voyager&sprefix=hydrofoil+voyag%2Cstripbooks%2C277

SAILOR'S PAGE

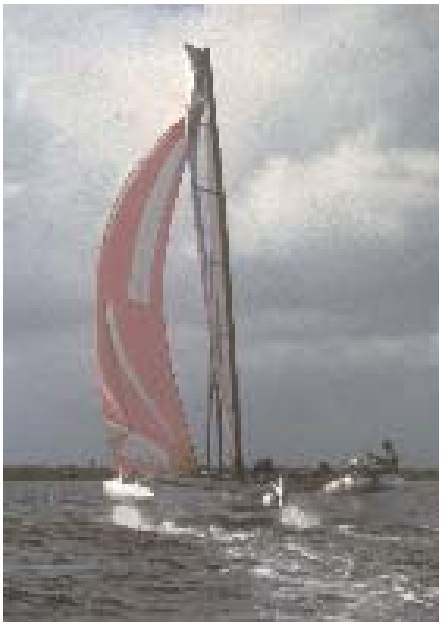
More on The Pictorial Tribute to Sam Bradfield

HydroSail 21 rebuilt with a T-foil arrangement including surface-sensing wands as seen here.

Another view of HydroSail 21 with T-foils and clearly showing one of the surface sensing wands in action.

The 25ft (7.6m) "EIFO", or Easily Identified Flying Object, designed as a coastal racing day sailor equipped with carbon fiber T-foils pictured in October 1995.

This is shown at top of second column.

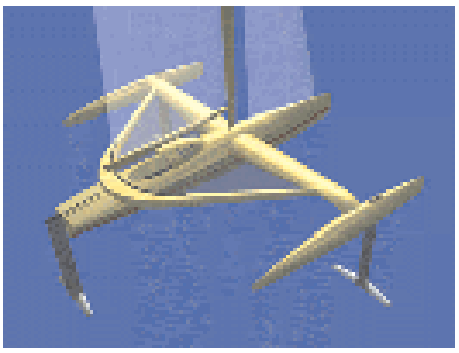


Further photo of "EIFO" in October 1995.

Further photo of "EIFO

The 16 ft (4.9m) trimaran Windrider Rave with surface sensing wands and T-foil support which entered production in August 1998. Shown here sailing smoothly through choppy seas. Photo: Ralph Naranjo.

The 37ft (11.3m) SCAT (Sam's Crazy-Ass Trimaran) built in 2002 in Florida sailing in light air.



CAD rendering of SCAT showing layout.

Continued on Next Page

Tribute to Sam Bradfield

Continued from Previous Page

Sam Bradfield (left) aboard SCAT with his team in 2003. Tom Haman reports that Scat was sold to Harbor Wing a few years ago. She was shipped to California and was stored at Morelli and Melvin's yard and sits there still. She had to be cut apart to ship and was supposed to be reassembled as a 50 footer, but I think they lost their funding.

The 18ft (5.5m) Osprey was launched in 2012 as Hydrosail's most recent project.

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Multiple New Speed Records for Vestas Sailrocket2

At the time of going to print in the previous Newsletter we noted that new outright world speed sailing records had provisionally been set by Vestas Sailrocket2. In fact, Paul Larson and his team have now broken the outright world speed sailing record convincingly for both 500m and over one nautical mile, with the 500m record increased on two separate occasions.

Initially, on the late afternoon of 12th November 2012, Paul managed to increase his own World "B" Division Speed Record with an average speed of 54.08 knots over 500m exceeding his previous record in this class of 49.19 knots set in 2011. However this was not the team objective.

The true goal was achieved a few days later on the afternoon of 16th November, when Paul managed to increase his average speed over 500m to 59.23 knots breaking the outright speed record for this distance across all classes of sailing craft.

On a subsequent run on 18th November, Paul achieved a speed of 55.32 knots over a nautical mile thereby also claiming the outright record for this distance category. At the same time he marginally increased his 500 meter average to 59.37 knots.

Finally, on the afternoon of Saturday 24 November, a significant further improvement in average speed over the 500m distance was achieved at 65.45 knots measured using the GPS. A peak speed of 68.01 knots over 1 second was also recorded on this run.

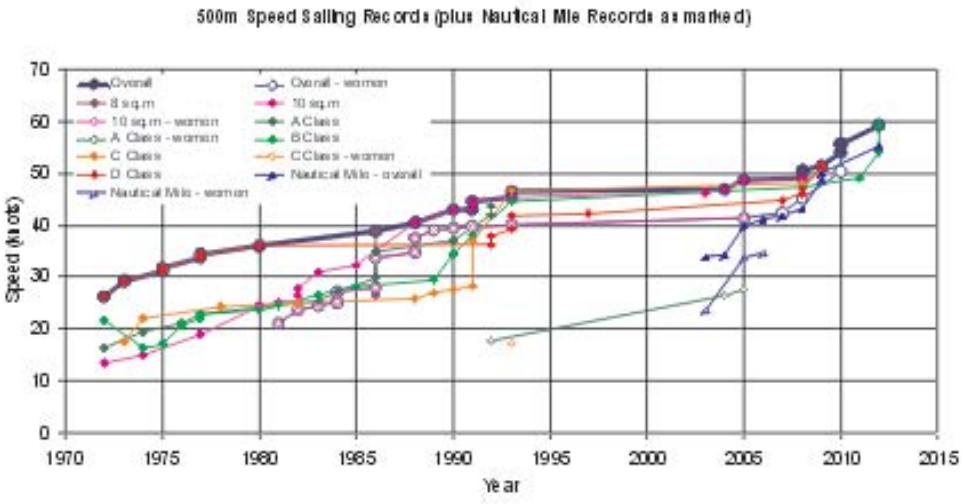
These records have all now been ratified by the WSSRC; see the webpage www.sailspeedRocket 2 [data courtesy WSSRC].

See page 12 for the chart of speed records.

VSR2 on the 65 knot run with leeward float airborne and bow float merely skimming the water, The sail and foil are doing the bulk of the work.

Aerial photo of the 65 knot run at the Walvis Bay site.

Aerial photo of Walvis Bay, Namibia, with speed sailing strip on right of image. Winds typically approach from the South.



The steady progress in speed sailing records since they were officially recorded is shown here. Of interest is the competition and progress made in recent years and the jump in the records by SailRocket 2 [data courtesy WSSRC].

IHS AND SNAME SD-5 HOLD JOINT MEETING

As mentioned by Mark Bebar in his column on page 2, IHS held a Joint Dinner Meeting with SNAME Panel SD-5 (Advanced Marine Vehicles) on 17 January at the new Army- Navy Country Club facilities in Arlington, VA. We were fortunate to have Jeff Kline, Vice-President of Naval Architecture, Navatek, Ltd. as guest speaker. Mr. Kline's presentation was on the "CAAT" - Captive Air Amphibious Transporter.

The CAAT is a new amphibious vehicle technology that enables heavy-lift logistics transport at about 20 knots over open or shallow water, surf-zone and beach, land and mud-flats, and moderate obstacles.

Shown here are IHS President, Mark Bebar, the speaker, Jeff Kline and SD-5 Chairman, Bill Hockberger.

IHS OFFICERS 2012 - 2013

Mark Bebar	**President**
Joel Roberts	**Vice President**
Frank Horn	**Treasurer**
Joel Billingsley	**Secretary**

HYDROFOIL REUNION STATUS
Continued from Page 2

form process, and finalize reunion cost, prepare registration forms, and distribute.

We are making the final arrangements relative to the Friday BBQ and the Saturday Banquet. This will enable us to finalize the cost of the reunion.

We have received over 145 notifications from those interested in attending. That could mean over 250 attending. The banquet space has a total capacity of 280, with 250 a more comfortable number. Event planners indicate that a rule of thumb is about 20-25% who express interest ultimately do not register. We are looking at alternatives, but are hoping that we will not exceed 280.

We have just learned that the Key West Poker Run is being held the same weekend (20-23 Sept). 10,000 bikers descend on Key West. We have talked to Key West Chamber of Commerce and they indicate that there are still plenty of rooms available, but reservations should be made soon. We will be providing links on our web site for finding appropriate accommodations for those who don't want to stay at MWR facilities.

IHS BOARD OF DIRECTORS

2010 - 2013	2011 - 2014	2012 - 2015
Sumi Arima	**Joel Billingsley**	**Mark Bebar**
John R. Meyer	**Martin Grimm**	**George Jenkins**
Joel Roberts	**Captain Frank Horn**	**Leigh McCue-Weil**
William White	**John Monk**	**Raymond Vellinga**

The NEWS LETTER

International Hydrofoil Society
PO Box 51 - Cabin John MD 20818 - USA

Editor: John Meyer | Third Quarter 2013 | Sailing Editor: Martin Grimm

RUSSIAN HYDROFOILS – STILL FLYING!

It was about 1957 when commercial hydrofoil activity started at the Krasnoe Sormovo Ship Yard in Gorki in the Soviet Union with the launching of RAKETA, an 88-foot, 27 ton hydrofoil powered by a 900 hp supercharged diesel engine. Several hundred of these vessels were produced over the years up until the 1970s. This was the beginning of a whole series of hydrofoils designed, built, tested, and operated in Russia and the Ukraine, and continues even until the present time.

Meteor is one of the most common Russian hydrofoils for river operations - *Courtesy of Konstantin Matveev*

Today there are several shipyards producing hydrofoils for high-speed passenger transportation on rivers and in coastal areas around the world.

See Russian Hydrofoils, Page 3

SUSTAINING MEMBERS

HAVE YOU PAID YOUR 2013 IHS DUES? IF NOT, THEY ARE OVERDUE

See Full Announcement on Page 6

INSIDE THIS ISSUE

PRESIDENT'S COLUMN

To all IHS Members

I hope this finds everyone well. Over the past few months, in getting more deeply involved in the business of the Society, I have obtained greater insight of and appreciation for the outstanding work by our past president, John Meyer. John continues to play a key role on the Society's Board of Directors, and we are blessed to have John continue as NL Editor.

Since the last issue of the NL, we had a Joint Dinner Meeting with SNAME Panel SD-5 (Advanced Marine Vehicles), which was co-sponsored with ASNE and held on 21 February in conjunction with ASNE Day 2013. The technical presentation was "Ride Control for High-Performance Ships" given by Alan Haywood and Benton Schaub of Naiad Dynamics US, Inc. (see page 7). The complete presentation has been posted on the IHS website (www.foils.org). Also see page 8 for details related to Naiad Dynamics capabilities.

In the last issue of the NL, I noted the potential for a Student Hydrofoil Design Competition. After much planning, the International Hydrofoil Society has established and recently announced the Mandles Prize for Hydrofoil Excellence. See page 5 for details. Background for the Mandles Prize and Rules for the competition can be downloaded from our website at and questions can be sent to: prizechair@foils.org We anticipate a very exciting competition and look forward to receiving many high-quality entries. Best of luck to all those who compete!

On 7 March, the Board of Directors held a regular meeting, at which several initiatives were discussed, including plans for a permanent hydrofoil exhibit at the Washington Navy Yard. This is covered by Secretary Joel Billingsley in *From the Board Room* on pages 6 and 9.

Planning continues for the Navy Hydrofoil Reunion to be held in Key West on 20-23 September 2013 (see page 2 of the 2nd Qtr 2013 NL. We are also looking forward to participating again at the Tacoma Maritime Fest on 24-25 August 2013. Information can be found at: http://www.maritimefest.org/. We encourage those of you on the West Coast to attend the Fest and we also need volunteers to staff the IHS booth. This is an outstanding opportunity to enjoy the festivities and increase public awareness of hydrofoil technology. More details on both of these events will be issued in the future.

On the subject of new members, we urge all of you to recruit colleagues and others to increase our numbers and bring new talent into the Society. Our goal is to exceed last year's numbers by a reasonable amount this year. As always, please consider your NL Editor's plea for volunteers to provide articles and photos of interest to our members and readers. Please send material to John Meyer at editor@foils.org; he will be pleased to hear from you.

Best regards,

Mark Bebar, IHS President

WELCOME NEW MEMBERS

Jack Fruin – Jack received his BSE in Mechanical Engineering and Material Science from University of Connecticut in 1986. He later received an MSME in Structural Analysis from RPI, and an MSME in Manufacturing from University of Connecticut. Prior to joining Naiad in 2007, his Engineering experience in the Aerospace and Machine Tool industries has involved machine tool design, bearing testing and analysis, as well as Product and Process Development. As Lead Mechanical Engineer at Naiad, he is responsible for Mechanical Design and Applications Engineering at the Connecticut office.

Jon Kashetta – Jon received his BSET in Electronics Engineering and Minor in Mathematics from Pennsylvania College of Technology in 2005. Prior to joining Naiad in 2010, he was part of an engineering firm designing experimental electronics through SBIR/STTR contracts. There, he accrued knowledge in FPGA programming, high speed digital embedded design, and high voltage reactive drive technology, with much experience gained in circuit board design. As Electrical and Software Engineer for Naiad Dynamics, he is responsible for all electrical designs for custom ride control systems, design of new products, systems integration, and project management.

Vic Kuzmovich – Vic began working with Naiad products in 1976 and has been with the company through different ownerships in various capacities, from machinist through

Continued on Page 12

RUSSIAN HYDROFOILS

(Continued From Page 1)

The Morye/Feodosia Shipbuilding Company is a Ukrainian Yard located on the Black Sea near Feodosia on the Crimean Peninsula. It specializes in production of high-speed dynamically supported vessels (hydrofoils, hovercraft, vessels with air-cavities) planning boats, pleasure yachts and boats with hulls made of aluminum-magnesium alloy. The company is the biggest in the Ukraine in its field. A considerable part of its production are patrol boats and antisubmarine hydrofoil craft and, in addition multi-purpose hovercraft. From their building berths were launched such well-known passenger hydrofoils as Raketa, Kometa, Voskhod, Cyclone and Olympia. The total composed about 40% of these types of vessels built in the world. The hydrofoils Kometa, built at the end of the 1960s and the beginning of the 1970s, are still in operation in Greece and Cuba.

Another builder is the Volga Shipyard located in Nizhny Novgorod (called Gorky in Soviet times) that has been in operation for over 30 years and continues to produce hydrofoils distinguished by their good construction and reliability. According to the company, the best evidence of this is the operation of hydrofoils in different climatic conditions, in particular: Meteor, Sunrise and Polesie in Russia, China, Hungary, Ukraine, Vietnam; also Comet, Katran Olympia Cyclone in Russia, Estonia, Italy, Greece, Croatia, Cuba, Ukraine, Vietnam. According to their website, they are manufacturing and making repairs to Kolkhida, Kometa, and Lastochka type hydrofoils.

The speed limit for these hydrofoils is about 65 knots and was reached by a patrol boat **Antares** with a displacement of 220t. [Ed Note: This is a very high figure for their passenger hydrofoils, and really only applies to their military hydrofoils mentioned below.] These patrol boats were built from the late 1970's to early 1990's.

Antares

It is interesting to note that the USSR introduced several hydrofoil fast attack craft into their navy, principally:

Sarantcha class missile boat, a unique vessel built in the 1970s.

Turya class torpedo boat, which was introduced in 1972 and still remains in service today.

Matka class missile boat, which was introduced in the 1980s and still remains in service today.

Muravey class patrol boat, which was introduced in the 1980s and still remains in service today.

Soviet Union-built **Voskhods** are one of the most successful passenger hydrofoil designs. It was developed in the Soviet Union and manufactured in Russia and Ukraine. Currently, they are in service in more than 20 countries. The

Voskhod

most recent model Voskhod 2M FFF, also known as Eurofoil, was built in Feodosia, Ukraine for the Dutch public transport operator Connexxion.

According to Wikipedia, some current operators of Russian/Ukrainian hydrofoils include:

Voskhod and *Polesye* service between Tulcea and Sulina on the Danube.

Meteor and *Polesye* service in Poland between Szczecun and Swinoujscie.

Cometa service between Nijneangarsk and Irkutsk on Lake Baikal .

Cometa service between Vladivostok and Slavyanka.

Polesye service between Mozyr and Turov on the Pripyat River.

Meteor service between Saint Petersburg, Russia and the Peterhof Palace.

Meteor service between Saint Petersburg, Russia, and the Kronstadt, a strongly fortified Russian seaport town, located on Kotlin Island, near the head of the Gulf of Finland. It lies thirty kilometers west of Saint Petersburg.

Continued on Next Page

RUSSIAN HYDROFOILS
(Continued From Previous Page)

Meteor, *Raketa* and *Voskhod* hydrofoil types operate on the Volga, Don, and Kama Rivers in Russia.

Kometa and *Kolhida (Katran)* hydrofoils are operated by a number of tour operators in Croatia, mostly for packaged tours, but there are also some scheduled services to islands in the Adriatic.

Hydrofoils are regularly operated on the three major Italian Lakes (Maggiore, Garda and Como) by branches of Ministry of Transportation. *[Editor's Note: My wife I had the opportunity, while touring Northern Italy several years ago, to stay a few days at each lake. While there we rode on an RHS160 and saw a 50-year old RAKETA chugging along on Lake Como.]* Three units of the Rodriquez RHS150 type operate on each lake, for a total of nine hydrofoils. Navigazione Lago di Como still operates the last Rodriquez RHS70 in active service in Italy.

Former Russian hydrofoils are used in southern Italy for connection with islands of Lazio and Campania. SNAV has 5 RHS200, RHS160 and RHS150 used in the connections between Naples and the islands of Capri and Ischia.

Fast Flying Ferries operated by Connexxion, provides a regular service over the North Sea Canal between Amsterdam Central Station and Velsen-Zuid in the Netherlands, using Voskhod 2M hydrofoils.

Hellenic Seaways operate their Flying Dolphins service over many routes in the Aegean, between the Cycladic islands, Saronic Gulf islands such as Aegina and Poros and Athens.

Meteor (2), *Polesye* (4) and *Voskhod* (3) hydrofoil types operate in Hungary. MAHART PassNave Ltd. operates scheduled hydrofoil liners between Budapest, Bratislava and Vienna,, inland liners between Budapest and the Danube Bend, and theme cruises to Komárom, Solt, Kalocsa and Mohács.

Vietnamese *Greenline Company* operates hourly shuttle service between Ho Chi Minh city and Con Dao island. Hydrofoil lines using the Russian-built Meteor type also connect Hai Phong, Ha Long and Mong Cai in North Vietnam.

Several hydrofoils of Meteor and Lastochka types were built in 1990-2000s and sold to China.

This is an impressive list and could be supplemented by the Rodriquez RHS series hydrofoils operating in and around Italy plus the Jetfoils operating in the Far East.

It is fair to say: Yes!, Russian (and other) hydrofoils are still flying.

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NEW INITIATIVE

ANNOUNCING: The International Hydrofoil Society Mandles Prize for Hydrofoil Excellence.
By Ray Vellinga, IHS Member

Recently, Martinn Mandles and his wife Connie funded up to $5,000 a year in IHS hydrofoil achievement awards for students. What was once just a dream of past president, John Meyer, is now a reality due to the contributions of the Mandles and the creative efforts of several IHS members including President Mark Bebar, Ray Vellinga, Leigh McCue-Weil, Bill Hockberger, Martin Grimm, Joel Billingsley, Frank Horn and George Jenkins.

Martinn and Connie Mandles

The Mandles Prize itself is an annual $2,500 award in recognition of hydrofoil engineering, design or construction achievement by college and university students (undergraduate and graduate level) worldwide.

The award of the Prize will be based on submissions from individual students or groups of up to six students with the signature of a faculty adviser endorsing each submission. Submissions must be specific to hydrofoils, and publishable by IHS.

Submissions will be solicited on the IHS website, by contacting faculty at educational institutions internationally, and by advertisement, cost permitting, in applicable professional and trade publications (e.g., SNAME's *Marine Technology*, ASNE's *Naval Engineers Journal*, etc.).

Papers must be submitted in English, and students need not be a member of the IHS. Submissions will be due on or before June 1st of each year, with the Prize winner selected, announced and awarded no later than August 1st of that year. The awards consist of the $2,500 Prize with a commemorative plaque, and up to two $1,000 Honorable Mention awards. The initial awards will be made in 2014.

The IHS Board of Directors will appoint a panel of no less than five (5) judges, free from any real or perceived conflict of interest, to evaluate the submissions and recommend the Prize winner. The recommendation of the panel shall be ratified by a majority of the IHS Board of Directors. Depending on the submissions received, it may be necessary to add other judges who are Subject Matter Experts.

The IHS annual dues form will be amended to allow any member to specify a donation toward this Prize in addition to their dues payment. Any and all such funds will be applied to a cash reserve or endowment to sustain the Prize.

In a recent email of thanks to Martinn and Connie, Bill Hockberger captured the spirit of this competition: "I was really pleased when I learned of your generous offer to establish a student competition with monetary awards. I think it will motivate young people studying ship design to consider hydrofoils in a way that a mere award certificate or plaque can never do. And if they jump in, by necessity it will also motivate their professors to learn about hydrofoils so they can oversee their students' projects. That'll be a significant extra bang for the buck! A big part of the problem getting people to consider hydrofoils when they might be the best alternative, is that so few know enough about them."

Many of our members know Martinn and something about his accomplishments. For others, here is a summary: Martinn started as a hydroplane racer in high school and became both an airplane and hydrofoil "pilot" before earning an engineering degree from Stanford University in 1964. As such, he was the first co-pilot of Boeing's Aqua-Jet hydrofoil research hydroplane, and on the first flight crew of the Boeing built FRESH-1 high-speed research hydrofoil. Upon his return from Vietnam in 1967, Mandles became the Navy's first captain of Boeing's first hydrofoil gunboat, USS Tucumcari.

After completing five years of military service in 1969, Mandles commenced a 37-year career at ABM

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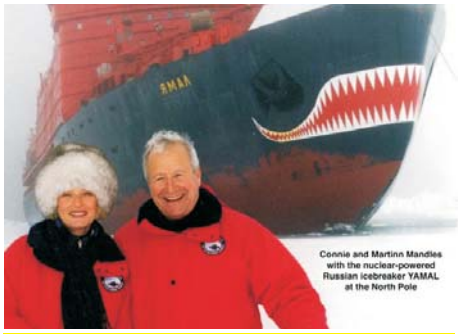
NEW INITIATIVE

(Continued From Previous Page)

Industries (NYSE:ABM), where he was Chairman of the Board from 1997-2006.

An accomplished aviator and avid adventurer, Martinn was the first non-NASA American pilot to graduate from the Russian Cosmonaut Basic Training Program at Star City near Moscow, and has visited both the North and South Poles, as well as the North Face Base Camp of Mt. Everest in Tibet and countless other challenging destinations worldwide. Two of these adventures are illustrated here.

Martinn training in the cockpit of a Soyuz



Connie and Martinn at the North Pole

IHS member Martinn and his wife Connie reside in Los Angeles, where he now serves as an executor and trustee of several major trusts.

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FROM THE BOARD ROOM

By Joel Billingsley, IHS Member and Secretary

March 7, 2013

The IHS Board of Directors meeting was scheduled to be held on March 7 at the Army-Navy Country Club in Virginia., but became its first 100% virtual meeting by teleconference due to a snow storm in the Washington, DC area. It worked out well and served as a model for future meetings if need be.

Activity for the IHS is at an all time high and the agenda was chock full of discussion items. These ranged from topics for the next joint IHS/SNAME dinner meeting to finding successors for the Board and bringing in additional volunteers for projects underway.

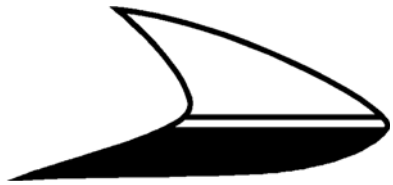
A major opportunity for the IHS is the development of an exhibit at the Washington Navy Yard Museum covering the R&D program begun in the 1940's that culminated in the PHM class of six patrol craft in the 1980's. Another opportunity is the establishment of a design competition for university students, funded by a gift from IHS Member, Martinn Mandles, to encourage interest in the application of hydrofoil technology. The Board is sponsoring a reunion in Key West, FL in September for everyone involved in the hydrofoil program.

The Board is supporting a major public display at the Maritime Fest in Tacoma, WA this August. Discussions also addressed ongoing efforts to increase membership, public relations, organization finances, website development, and publications. The results of these topics are evident elsewhere in the Newsletter, but suffice to say there are many irons in the fire.

IHS Membership is by calendar year. Options are:

- Regular Membership: US$30 for 1 calendar year, $56 for 2 years, or $82 for 3 years
- Student: still only US$10
- Sustaining: US$250.00 per year

To pay by credit card using PayPal, go to the IHS Membership page at www. foils.org/member.htm and scroll down to the green payment box.



IHS at HiPer 2013

By Mark Bebar, IHS President

We will once again have an IHS booth at this year's ASNE High Performance Craft Forum 2013, which will be held on 19 – 20 June at the Half Moone Cruise and Celebration Center in Norfolk, VA.

The event will feature exhibits, in-water demonstrations, displays, vendor presentations, panel discussions and technical discussions. For more information, go to: www.navalengineers.org

IHS, SNAME SD-5 PANEL MEETING

On the evening of ASNE Day, 21 February 2013, IHS teamed with SNAME SD-5 Panel on Advanced Ships and Craft and ASNE in hosting a presentation by Naiad Dynamics US, Inc. on "Ride Control for High-Performance Ships". Mr. Alan Haywood and Mr. Benton Schaub, IHS members, were the presenters.

Ride control systems are needed because even moderate waves can generate substantial forces on a ship or boat and produce significant motions that can disturb passengers and cause damage to cargo and equipment. This is especially true for smaller high-performance vessels encountering waves at high speed. Ride control systems have been developed that are able to reduce these motions significantly, and Naiad and its predecessor companies have been major players in this achievement.

Pictured here are Bill Hockberger, Alan Haywood, Mark Bebar and Ben Schaub

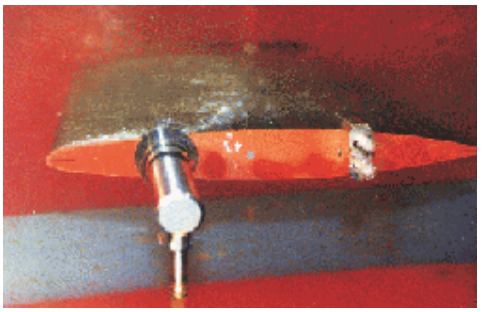
The presentation provided an overview of ride control devices (fins, trim tabs, interceptors, T-foils), their incorporation into systems for ride control, and examples of their applications and resulting effectiveness in a range of high-speed ships. These include commercial ferries, private yachts, and military vessels (for which the technology has been largely adopted from the commercial sector).

The meeting was well attended and followed by a vigorous Q&A session. The presenters received IHS coffee mugs as a token of appreciation. Dinner was provided afterward in the ASNE Day exhibit hall, courtesy of ASNE. The support of ASNE in making the meeting possible in conjunction with ASNE Day 2013 made for a very successful event.

DIFFERENT TYPES OF CAVITATION

Extracts from S.A. Kinnas, University of Texas

Illustrated here are photographs of different types of cavitation including foils and propellers.



Partially Cavitating Hydrofoil

Here we see a hydrofoil exhibiting partial cavitation. A hydrofoil is a "lifting" surface. It is like an airplane wing in that it provides lift when a fluid flows past it. Both an airfoil and a hydrofoil create lift by creating a low pressure on the upper surface. In the case of the hydrofoil though, the pressure can become so low that the liquid water transforms into a gaseous water (cavity). The study of cavitating hydrofoils is important for research in the propulsor industry because a propeller is nothing more than a few hydrofoils "wrapped around" a hub.

Cloud Cavitation

This hydrofoil exhibits "cloud cavitation" Cloud cavities present modeling difficulties because they tend to be unstable. It is also difficult to hydrodynamically model the flow around a "cloud".

Sheet Cavitation

This foil exhibits a fairly clean "sheet" cavity. Although near the

Continued on Next Page

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.

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

CAVITATION

(Continued From Previous Page)

end of the cavity, you may notice some "bubble" cavitation. Notice that the cavity does not begin at the leading edge of the foil. (The leading edge is the very front of the foil.) Efforts are underway to correctly model cavitating propellers with non leading edge detachment.

Super Cavitation

Here we can see a hydrofoil undergoing "super cavitation"—the granddaddy of all cavities! A partial cavity becomes a super cavity when it extends beyond the end of the foil (or blade in the case of propellers).

FRESH-1 UPDATE

By Eliot James, IHS Member

Work on the Foil Research Experimental Supercavitating Hydrofoil (FRESH-1) restoration has been progressing, since she is in our shop, warm and dry, we have been spending more time on her than other hydrofoils. There are a lot of rivets we have to shave to remove the skins, which is necessary for the large amount of corrosion has popped many rivet heads. Fortunately we have the equipment for working on aircraft structures. The biggest pain is where the main cabin had urethane foam sprayed for insulation. This is a mess to clean up and hampers pulling the skins easily. Anyone have a better approach than shaving rivets and prying away skin, please let me know.

We closely examined the original foilborne engine and while it still turns over by hand, it has set outside so long with oil caps removed that the general consensus is we should look for a donor engine. There are a number of specialized parts including the ducts built to utilize the bypass fan trust that we plan on installing on a new engine. We have been looking for a TF33 or JT3D from the federal surplus system since we are eligible to receive property for the museum, and haven't found one yet. It seems most of the craft that use that equipment have already been phased out, but there has been a JT8D come up in the system. My question that I hope someone here might be able to answer is whether or not this newer engine would be compatible with the specialized mounts and fan ducts of the TF33 or JT3D? I know that the JT8D replaced the JT3D on the DC-8, but I don't know how close it really is?

Eliot James is Curator of the USS Aries Hydrofoil Museum, phone number: +1 (660) 998-0801

FRESH-1 Flying High in the Good Ole Days

TACOMA MARITIME FEST

By Ray Velinga

August is rapidly approaching and the IHS will once again be manning its booth at the annual Tacoma Maritime Fest. Last year we had plenty of enthusiastic participation by the west coast members, along with East coast Society Board members, Mark Bebar and Bill Hockberger.

Of course, we will once more be needing people to occupy our booth during either or both days of the Fest. This is a great time to enjoy the company of fellow members, meet the public, and help spread the hydrofoil gospel.

Please respond to Mark, Bill, or Ray Vellinga and let us know what day(s) are best for you to attend.

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NEW SUSTAINING MEMBER

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IHS AND THE NAVY MUSEUM

By Joel Billingsley

Mr. Jim Bruns, Director of the U. S. Navy Museum in Washington, D.C., was invited by the IHS to address: "What would be involved in setting up an exhibit to present the Navy's hydrofoil program that coincided with the Cold War time period?"

He responded that there were two opportunities. Immediately, the Cold War Gallery (CWG) could accommodate an exhibit with static displays and multi-media components. Regarding static displays, Joel Billingsley had contacted Dana Wegner, Curator of Ship Models at Naval Surface Warfare Center – Carderock Division, and learned there were a dozen Navy models of six different Navy hydrofoils available for display by the Navy Museum plus additional hydrofoil artifacts held by the Cheatham Annex. Downstream, Mr. Bruns was hopeful that Congress would approve a $145 million dollar proposal to re-locate the Navy Museum to new quarters off the WNY that are more easily accessible by the general public. The Museum would expand from 70,000 sq. ft. to 240,000 sq. ft. with multi-story galleries in a state-of-the-art facility to open in 2018. The new facility could accommodate full-size displays, not the size of a PHM, but at least as large as a 77 foot PT boat. He said that the Museum could lend professional designers to accomplish production work. For example, the Museum employs large panels of 3' x 7' size that roll up, window shade style, and prepares large posters.

The IHS would need to provide subject matter experts to create the theme of such graphics. The Museum could provide exhibit cases and provide, operate and maintain audio-video equipment. It was also noted that the new museum, if approved, has commitments from major sponsors to fund multi-million dollar exhibits. In the ensuing discussion, the Board discussed topics such as availability of simulators, whereabouts of the *Sea Legs*, development of video presentations, and donations from private collections. The consensus was that this represented a golden opportunity for the IHS to develop an exhibit immediately for the CWG that could ultimately expand to the new museum. Mark Bebar and Joel Roberts took joint action to come up with "bubble diagrams" to depict the theme of a hydrofoil exhibit for presentation to the Board and the Museum.

At a recent Board meeting, Mark Bebar and Joel Billingsley reviewed the near term and far term prospects before us at the U.S. Navy Museum. We plan to have models available from the Curator at NSWC Carderock, videos from Ray Vellinga, and storyboards that the museum is willing to put together with our input. The storyboards envisioned would tell the story of a successful R&D program that led to the PHMs. For those wanting more detailed knowledge of the technology, a secondary set of displays and videos could be available. Discussion noted that interest in personal/human powered hydrofoils is also very strong besides the military hydrofoil program. We will need to focus on the purpose of the WNY exhibit, but possibly accommodate the more general interest. Joel B. took action to follow-up with Dana Wegner re availability of models. Joel R. and Ray Vellinga took action to follow up with a company that converts film of this nature to digital format. Joel B. took action to recruit additional help for the museum initiative.

SAILOR'S PAGE

ORACLE ON FOILS

In an email message circulated to various IHS members by Martinn Mandles during March, Martinn attached the following photo of the AC72 class Oracle Team USA catamaran sailing boat built for the Americas Cup and remarked about it: *"Those black vertical objects - one deployed into the water on the port side and the other one retracted amidships to starboard - sure look like hydrofoil struts to me! And what are those black "wing" under the red rudder to starboard? Perhaps Oracle should rename the boat "Tucumcari Too"?"* (in reference to PGH-2 which he had previously commanded).

Martinn has indeed observed that the latest generation of America's Cup yachts have ventured into the hydrofoil domain to the point that the craft can operate fully foil supported under some sailing conditions. This is clearly demonstrated on team videos such as at: http://www.youtube.com/watch?feature=player_embedded&v=Y6dnOIE9sjk or at: https://www.youtube.com/watch?v=jUZu7RivhoQ

In response to Martinn, Tom Speer, who is engaged with the Oracle team, added the following comments and clarifications: There is a daggerfoil and a rudder in each hull. T foils are used on the rudders. Under the class rules and protocol for the AC72, the windward daggerfoil must be retracted to within 500 mm of the hull except when maneuvering in tacks, jibes, and pre-start maneuvers. The daggerfoil's lower bearing is not allowed to translate, but the foil can be raked (pitched) and canted about the lower bearing. The rudder is only allowed to rotate about an axis within 10 deg of the vertical. No pitch control is allowed and the horizontal rudder foil cannot be adjusted when racing. No movable flaps are allowed on either the rudder or the daggerfoil. No other appendages, like a sensor wand, are allowed. So the boats are severely handicapped with regard to their foil design compared to, say, the International Moth class.

When sailing off the wind, the boats are full flying foilers, and not foil assisted. At least for the Emirates Team New Zealand and Oracle Team USA designs. The Artemis AC72 design was foil assisted, but they are now converting to a flying configuration. Upwind, the boats will be foil assisted, with at least some of the weight supported by buoyancy.

Various foil types have been investigated, including C (constant curvature), J (multiple curvatures), S (J foil with inflection point on vertical segment), L (straight vertical, straight horizontal segments), and L foils with dihedral. The cant angle (inboard-outboard tilt) has also been varied and may be controllable when sailing for some designs.

Speeds, in knots, are in the mid 30's to low 40's off the wind and mid 20's when sailing upwind. The teams are now working on the tradeoff between stability and performance, and on maneuvering while flying.

In response to a question from Harry Larsen: "Is the

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ORACLE flying high

ORACLE ON FOILS

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daggerfoil's pitch/cant adjusted while foiling?", Tom responded: Under the design rules, the boards are allowed to be raked and canted. The degree to which the various designs are doing that is something that is under development. The boards are heavily loaded when flying, and no stored energy is allowed. The hydraulic power to move the boards has to be generated by the crew as the boat is sailing. They can't even use an accumulator to reduce the peak demands. The side force on the boards is equal to that of the wing and headsail, and the vertical load is approximately equal to the weight of the boat. Even with good bearings, there's a lot of friction involved. So moving the boards is not a simple matter.

Tom concluded that "there are some really interesting things being learned about stability while foiling" and observed that sailboats are quite different from power boats in this regard. He was hopefully some of this could be published after the campaign.

The 34th America's Cup will be sailed in September 2013 in San Francisco, California, with these 72-foot (21.9 m) wing-sail catamarans. Golden Gate Yacht Club (GGYC) will be the defender of the America's Cup. An overview of the 2013 America's Cup can be found at: while a summary of the AC72 class can be found at: http://en.wikipedia.org/wiki/AC72

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NEW BOOK ON L'HYDROPTÈRE RELEASED SOON

Extracts from http://hydroptere.com

The publisher Arthaud, a subsidiary of Flammarion, specialized in tales of adventure and travel, is preparing a reference book on the hydrofoil trimaran l'Hydroptère planned for release this northern autumn.

This 192 page book with around 200 illustrations in a 30x30cm format with a fold-central section will aim to celebrate the adventure of this exceptional boat. The publication will be in both French and English with a German version also under consideration. The publisher has previously covered French sailing history from Éric Tabarly to Florence Arthaud through Moitessier.

was deferred in 2012 as no favorable weather conditions were achieved for the attempt.

In the medium term, the team has an interest in building a prototype sailboat for pure speed, inspired by the recent achievements of the Vestas Sailrocket team. Now the target has to be an average of 80 knots explains Alain Thébault.

In the longer term, also planned is the launch in 2015 of a second generation l'Hydroptère designed to beat the North Atlantic record, Hydroptère 2. This craft will be a synthesis of l'Hydroptère features with those of the best conventional maxi-multihulls. The aim is to cross the Atlantic in three days and to achieve an ambitious speed record of in excess of a thousand nautical miles in 24 hours.

CAD image of the proposed Hydroptère 2.

Meanwhile, following the withdrawal of sponsorship by DCNS late last year, the l'Hydroptère team is looking for new partners to finance their Transpacific record attempt between Los Angeles and Hawaii this northern summer. Champagnes Lanson has strengthened its partnership with the l'Hydroptère team by becoming the official partner. The initial Trans-Pacific record attempt

WELCOME NEW MEMBERS

(Continued From Page 2)

management, since 1973. His current positions are Global Service Manager for all offices and regional manager for the Fort Lauderdale location.

David K Spurrier – David joined Vosper Thornycroft UK Ltd Hydraulic Power Division, Stabilizer Dept in 1975 as an apprentice Draughtsman and has remained with the company for the past 38 years after some company name changes. In 1980 he received his Degree in Production Engineering/Management studies and has progressed through the company from Draughtsman, Designer, Product Engineer and at present the position of Design Engineer with the new company name of Naiad Dynamics UK Ltd. He has the responsibility for a range of hydraulic Power Packs for Ride Control systems, Steering Gear, Marine Stabilizers, Bow thrusters and any special projects pertaining to hydraulic systems. This will include the verification of technical specifications and research and development of the products within the range. Supervision of the designers of these products is required within this role. Liaison with customers, sub-contractors, internal dept and classification societies.

John Venables – John has been active in the marine industry for over 30 years, in both Engineering and Executive roles, with specialization in ship stabilization and motion control. John is CEO of NAIAD MARITIME GROUP, INC, parent of the NAIAD DYNAMICS companies with operations in Connecticut, Maryland, Florida, Washington USA, Portsmouth UK and Maastricht Netherlands. John holds three degrees in Engineering & Business, including a Master of Science from Rensselaer Polytechnic Institute, New York. He is a member of several professional organizations including the Society of Naval Architects & Marine Engineers (SNAME), the American Society of Naval Engineers (ASNE), and serves on the Board of Directors of the International Superyacht Society.

Dr. Steven Vidakovic – Steven received his BE in Aeronautical Engineering from UNSW, Australia in 1985; Ph.D. from University of Adelaide, Aust. in 1995; M.Sc. Executive Masters in Technology Management from Rensselaer, Hartford, CT in 2006. He worked in Defense Industry, Industrial Research and Medical Devices Industry on Artificial Heart Program and in Commercial Sales of Novel Technologies, HVAC in Australia. He moved his family to USA in 2001 to join Pfizer Global Research and Development to head up Lab Automation Program in Groton, CT in 2001 and in 2009 joined Naiad Dynamics as Global Sales Director. He is an expert in aerodynamics, hydrodynamics, fluid mechanics, automation, robotics, business management and global business development with knowledge of simulation software, mechanical, structural and hydrodynamic design of underwater appendages.

Matthew Wolen – Matthew received his BSE from Roger Williams University in 2006. Following graduation he began working at VT Naiad Marine, now Naiad Dynamics, where he functions as a project engineer and concentrates in hydraulic system design, power unit design and general hydraulic troubleshooting in the Shelton Connecticut office.

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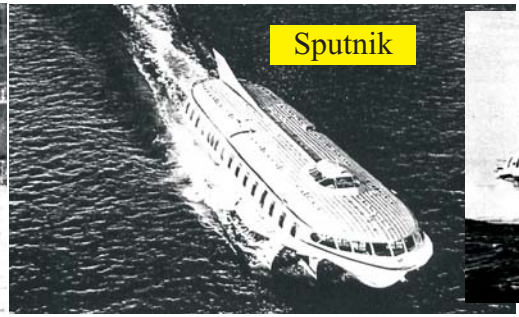

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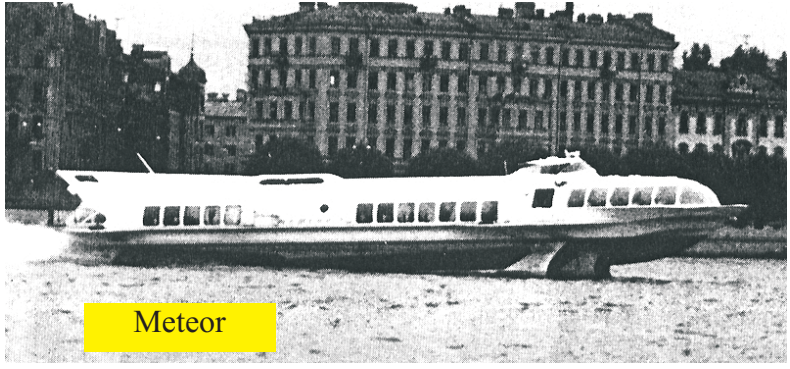

Meteor

Cyclone