The NEWS LETTER
International Hydrofoil Society
PO Box 51— Cabin John MD 20818—USA

First Quarter 2012
John Meyer, Editor-in-Chief
Martin Grimm, Sailing Editor
Barney C. Black, Publisher

Hydrofoil to Heaven

By Yoichi Takahashi 高橋洋一 IHS Member

One day I ventured forth from my Kidugawa City home in Kyoto Prefecture and drove east for 3-1/2 hours to Toba City in Mie Prefecture, a distance of about 150 km. Toba is a popular tourist destination at the southern entrance to Ise Bay. Toba's greatest claim to fame is as the birthplace of cultured pearls. The area is rich in lobsters, fish, and other seafood off the Rias Coast of the Shima Peninsula. The beautiful shoreline has a saw-tooth profile that creates unique scenery with a succession of capes and inlets, deep green remote islands, and pearl culture rafts floating on the waves. My purpose was to visit the PT-50 Hydrofoil Restaurant. Yes, you read correctly. In the township of Matsuo, alongside the sightseeing road R167 sits one of many restaurants. But this restaurant immediately catches the eye because *Ousho*, a retired and re-purposed PT-50 hydrofoil ferry, sits proudly on the roof.

Ousho *PT-50 Hydrofoil*

The PT-50 was one of the most popular hydrofoil ferry designs of the 1960s and 1970s. Initially constructed in the Leopoldo Rodriquez Shipyard at Messi-

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Harbor Wing Autonomous Unmanned Surface Vessels (AUSV)

The 2nd Quarter 2009 *IHS Newsletter* introduced the Harbor Wing Autonomous Unmanned Surface Vessel (AUSV) courtesy of Ken Childress, Vice President, Business Development at Harbor Wing Technologies (www.harborwingtech.com). This article provides further information on the company and its developments, summarized from their website.

The Company

Harbor Wing Technologies, Inc. is privately owned with offices in Seattle WA and Pearl Harbor HI. Founded by Mark Ott and Stuart Platt to design and produce an AUSV, Harbor Wing is now focused on developing and manufacturing AUSVs for sale to defense, government, commercial, environmental, domestic, and international markets.

Harbor Wing's management team includes Stuart Franklin Platt, Rear Admiral (Ret.) USN as Chairman and CEO and Larry A. Colangelo as President and Chief Operating Officer. Mark Ott, an accomplished open-ocean sailor, serves as Director, Executive Vice President and Project Manager. He had initiated the AUSV concept.

David Hubbard is responsible for Wing Sail Design/Engineering. In 1988 he designed and built the wing sail for Dennis Connor's winning America's Cup catamaran *Stars and Stripes*. IHS member, Dr Sam Bradfield, President of Hydro-Sail, LLC, is responsible

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Inside this issue

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ISLAND ENGINEERING, INC.

From the Author Bruce Bryant

This is the 3nd in a 5–part series of my experiences, observations, and comments: my 25 years with Boeing Marine Systems (BMS) as a test engineer and manager from 1962-1987.

All comments are my own and do not reflect the opinions of The Boeing Company or their employees or retirees.

Have YOU Hugged a Hydrofoiler Today?

By Ray Vellinga, IHS Member

Who in the world cares about hydrofoils? Saudi Arabians do. In fact, 167 Saudis downloaded *rvell7829* hydrofoil videos over a 30-day period. People in Nigeria, Myanmar, Kazakhstan, Azerbaijan, and Bangladesh, checked out these videos. Yemen and Mali each had 1 viewer, thank you. Viewers in 173 countries accessed these hydrofoil videos.

These facts are from youtube's most recent analysis of who is watching what. Hydrofoils draw worldwide interest.

Of 113,190 hits in last 30-day period, 31,893 were from USA, outnumbering 2nd place Germany 6 to 1. Other high-view countries in descending number of hits are: France, Canada, Australia, United Kingdom, Russia, Italy, Sweden, and the Netherlands.

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Jetfoil—The Good

by Bruce Bryant, IHS Member

After the first five boats, sales of Jetfoils picked up dramatically as potential customers were able to ride on a real boat during testing and builder's trials. This brought about the sales of two boats to Venezuela, two boats to Japan, and two to England for starters. The first boat in this surge of new boats went to Venezuela. The delivery of boat 006 *Jet Caribe* was an adventure I will never forget. The boat arrived at Lake Maracaibo by freighter in October of 1975 where she was to be prepared for transit to Puerto la Cruz, about 600 miles to the east. When our crew arrived in Maracaibo we learned that finances for the boat were not complete. The boat was still Boeing property under the American flag and had to leave Venezuela to a neutral country or be seized. The closest neutral country was Aruba Island (Netherlands) off the north coast of Venezuela. There was no time to prepare the boat for underway operations so we were tugged 120 miles north to Aruba. We spent about six weeks in Aruba preparing for delivery as finances finally came through. We then set out from Aruba across the Caribbean to La Guaira (Caracas), and then the next day to Puerto la Cruz. After several demos and route proving to Isla Margarita, I left the boat with another crew and returned to Seattle.

The most famous boat of all was boat 007, the *Flying Princess*, simply because we all spent so much time on her and she was a Boeing boat always looking for her next venture. The *Flying Princess* was launched in the summer of 1976 and was originally built for P&O Jet Ferries along with boat 010, which were both Model 100 or normally called Block I boats. P&O was aware of the new Block II boats that were planned and slid their position to 013 and 016, leaving the two Block I boats without a customer. The *Flying Princess* name was coined after it was leased by the Canadian company, Georgian Gulf Cruises, for the Seattle-Victoria six weeks charter during the months of September and November 1976. We only made one round trip per day which was less than two hours each way. The *Princess Marguerite* ferry was on the same run and took over four hours one way. A fly-by the "*Maggie*" was a daily routine that was the highlight of the trip. Soon after the boat 007 demonstration, boat 008 was launched, tested, and then loaded on a ship to Venezuela. Boeing and P&O agreed to lease the *Flying Princess* in June 1977 for the London-Zeebrugge, Belgium run.

Boeing decided that there was enough time before the P&O lease to accomplish

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President's Column

As I reported in the last Newsletter, I was in a very serious auto accident on June 3, 2011 and have been slowly recovering. Barney Black has filled in as Newsletter editor and has done a super job. I will be picking up the task starting with the second quarter 2012 NL.

I am pleased to report that we had a total of 13 new members join the IHS last year. We always encourage our members to recruit their colleagues and others to swell the ranks. I hope that we can exceed last year's numbers by a reasonable amount this year.

I regret to report that the *Fast Ferry International* magazine will no longer be published. This has been a primary source of information about advanced marine vehicles for about 50 years and will be sorely missed. We compliment Juanita Kalerghi, who started the publication, and more recently, Alan Blunden and his staff for doing such a magnificent job for many years.

As your President and Newsletter Editor, I continue my plea for volunteers to provide articles that may be of interest to our members and readers. Please send material to me (president@foils.org)). I will be pleased to hear from you.

Best regards.

John Meyer, IHS President

Hydrofoil Reflections...

Jetfoil—The Good

(Continued from page 2)

a seven-week grand tour of northwest Europe with the *Flying Princess*. A team was sent over to Europe to visit all the proposed ports of call and to make arrangements for dock space, fueling, and crew accommodations. The *Flying Princess* was loaded onto a ship and arrived in Copenhagen, Denmark in March 1977. This demonstration was a monumental task in that the *Flying Princess* covered nearly 7,000 nautical miles visiting 26 ports, some more than once. Dick Dougan was the captain, and I was the designated boat driver and first officer. We also had two other crew members who were responsible for navigation, plotter tracking, and radio operation. Our home port was Copenhagen where we visited 17 ports in Denmark, Sweden, and Germany. From there we traveled north to Norway and visited four more ports including Stavanger which was our staging port for our record setting voyage across the North Sea to Scotland. The crossing was delayed one day due to weather but was made up the next day after our 6¾ hour trip to Aberdeen, Scotland. From Aberdeen the *Flying Princess* traveled down the east coast of England visiting five more ports. The demonstration grand tour concluded on May 2, 1977, and the boat flew to Oostende, Belgium for the P&O charter preparations.

After the demonstration I stayed in Belgium and England for the training of P&O deck officers that supported the Boeing captains for the charter. I did the route proving and coordinated routines with the river and estuary pilots that were

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Welcome New Members

Julian Muschelknautz has been a mechanical engineering student at Univ. of Amberg in Bavaria / Germany since October 2011. As a child he was already exposed to hydrofoils because of his father, Sebastian. Julian helped him by building and testing small hydrofoils test craft. Two of them had surface piercing foils with an outboard drive. The last one was designed as a high-speed hydrofoil with a length of 7 m and a waterjet drive. The ultimate project target is an 80-knot hydrofoil with fully submerged foils. On these prototypes Julian helped by modifying the foils and struts, and participated in various tests on lakes and coastal waters. Currently Julian is working on a water test channel with low cavitation number capability and open surface test section. The aim is to optimize the foils and struts for smooth high speed operation and the thrust optimization of the waterjet drive.

Michael Heijmer is participating in a student project of the TU Delft to design a Solar Boat (See site *www.*

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Jet Caribe—*Boat 006*

Hydrofoil to Heaven

(Continued from page 1)

na, Italy under license to Supramar, the PT-50's featured a riveted aluminum hull powered by twin MB 820Db V-12 supercharged diesel engines. The PT-50 was 27.9m in length with a full-load displacement of about 60-tons. Top speed was about 35 knots.

The *Ousho* was launched in April 1963. It was built in Japan by Hitachi Zosen (another Supramar licensee), the first of the PT-50 design to roll off their production line. Its cost at the time was the spectacular sum of 300 million yen. The *Ousho* operated actively in Ise Bay in the 1960s, traveling out of Nagoya Bay on a route connecting Toba, Irako, and Minamichita (see map). Tourists and business people alike took advantage of the ferry's impressive speed of travel. As economic growth accelerated in Japan, so did tourism and business. The Ise Bay route quickly became a heavily traveled, high-earnings ferry route. A hovercraft was introduced and competed with the PT-50. Ultimately, hydrofoils could not dominate the high-speed sector of the ferry market. As the 1980's dawned, a rapid-rail service was introduced, and the Bay Shore Expressway was opened. The *Ousho* was unable to compete profitably. The ferry was retired from service in November 1982 and was originally destined for the scrapyard. *Ousho* had carried 1.52 million passengers over its service life, traveling a total distance equal to about 60 times the circumference of the Earth (1.5 million miles).

As modernization progressed, there remained nostalgia for the hydrofoil era in Ise Bay. A restaurateur, Mr. Sakou had a bold idea to capitalize on the nostalgia for history in the bay, and he acted on it. He acquired *Ousho* before it was scrapped, lifted it to the roof of his restaurant alongside highway R167, and merged it into his operation. From outside, the massive and soaring hydrofoil became possibly the most compelling signage ever conceived; it grabs the attention of all who see it and draws them to the restaurant. The hydrofoil, connected to the building inside by a stairway through the hull, is an integral part of the restaurant itself. This is truly a unique dining environment to complement the delicious and artistically presented menu of food. It was obvious to me during my visit that Mr. Sakou's remarkable restaurant is flourishing, as it well deserves.

Mr. Sakou preserved a 1969 newspaper article (photo, upper right) showing the PT-50 hydrofoil at the peak of its popularity, proudly passing the regular ferry at full speed. At that time the PT-50 was state-of-the-art technology. The headline translates as "Battle of the Ships." Imagine the exhilaration one would feel sitting in the open air on the rear deck watching the regular ferry fall rapidly behind.

(Photos continued on next page)

Ousho *in her previous life*
Ise Bay, Japan

"...Ousho, a retired and re-purposed PT-50 hydrofoil ferry, sits proudly on the roof ."

Below: The solid blue line marks the author's route from his home to the PT-50 restaurant. The dotted red line shows Ousho*'s routes as a ferry.*

Hydrofoil to Heaven

(Continued from previous page)

As seen from highway R167, Ousho really stands out with her blue hull and gray topsides accented by the brightly painted red hydrofoil.

The aft hydrofoil was removed from Ousho.

Ousho *is unexpectedly large when seen from up close. To give a sense of scale: the bow hydrofoil chord length is about 0.8m in the narrow portion at the base of the "V," increasing to a tip chord of about 1.5m. Note the character for* Ousho *on the prow (indicated by an arrow).*

A PT-50 scale model dating back to 1967 shows the aft hydrofoil and the propeller drive shafts (model photo © Museum Victoria, website: museumvictoria.com.au).

(More photos on next page)

Hydrofoil to Heaven

(Continued from previous page)

Left: An inside stairway connects the restaurant building and the hydrofoil hull. The stairwell location is visible from outside, as shown.

Right: The forward foil is shaped with 3-step dihedral angles. On the port side, the hydrofoil tip was cut off to stay within the property line

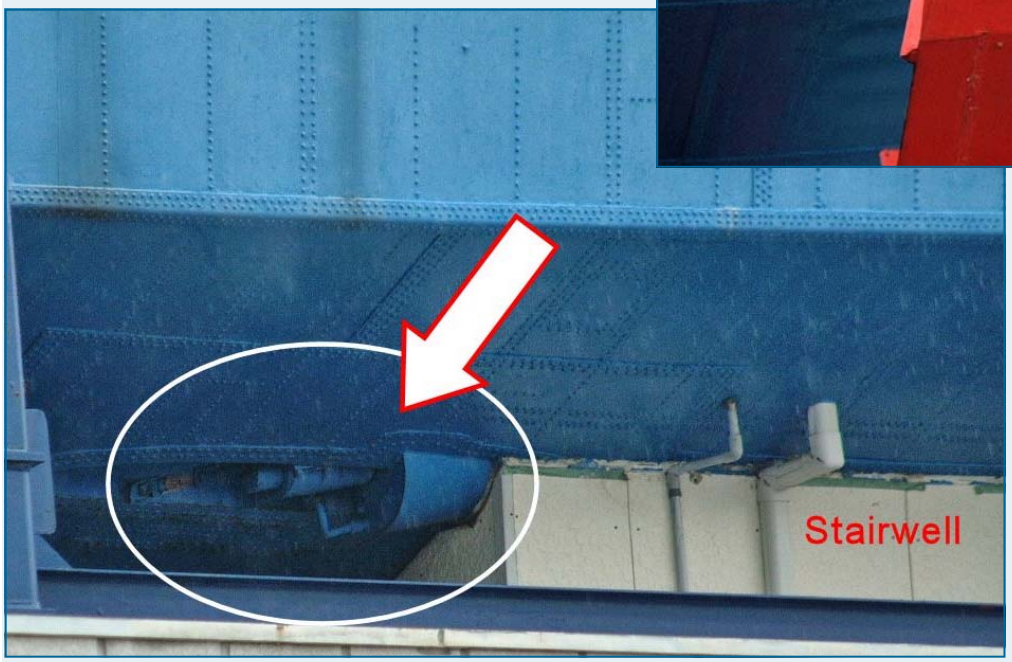
Left: Ventilation occurs when the hydrofoil boundary layer separates near the leading edge on the upper side, and air fills the separated region, generally ventilating the entire foil section downward for several inches. The result is the sudden loss of lift in the region. Several "fences" are arranged along the foil's length as can be seen in the photo. Fences can be used to stop ventilation at intervals, but add some drag.

(More photos on next page)

Hydrofoil to Heaven

(Continued from previous page)

Right: The foil section can be seen in the photo. Leading and trailing edges are sharp. Foils with sharp leading edge (or "nose") tend to ventilate sooner than foils with airfoil noses.



Left: Indicated is the starboard propeller shaft stern tube (the shafts have been removed). As seen in the following model photo, there are two shafts, each turning a propeller aft of the foil. Each shaft was powered by a 1350 hp German MB 820Db turbocharged after-cooled 12V cylinder diesel engine made by Mercedes-Benz.

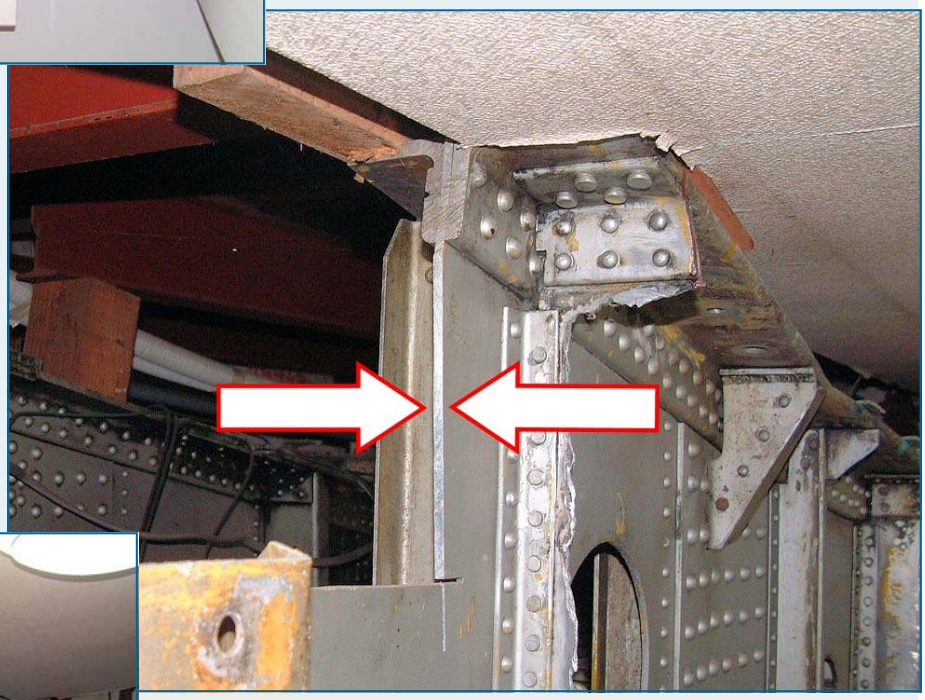
Left: This cutaway model shows the location of the starboard engine and its inclined mounting. (model photo ©Museum Victoria).

(More photos on next page)

Hydrofoil to Heaven

(Continued from previous page)

Left: This is the view looking aft at the top of the stairs leading from the Japanese-style restaurant up into the PT-50 hydrofoil passenger saloons, which have been converted to a banquet dining area. The V-bottom hull can be seen in cross section where the hole was cut for the stairs, as can the construction technique used for this area of the hull structure. The inboard pair of engine support girders is seen on either side of the staircase. The hull is made of rust-free aluminum alloy and is still in good condition.



Below: Another view showing interesting construction details of the starboard engine girder as seen from the staircase, looking aft.

Above: Looking aft, the photo shows the all-aluminum longitudinal starboard engine inboard side support girder made up of aluminum plate, longitudinal angle bar and vertical stiffeners all assembled with rivets. The thickness of the aluminum plate (see arrows) – the web of the longitudinal – is about 5mm (measured by eyeball, not calipers). The wooden beams to the upper left support a floor added in way of the engine room after the PT-50 was mounted onto the building. The starboard outboard engine girder is visible in the background to the left.

(More photos on next page)

Hydrofoil to Heaven

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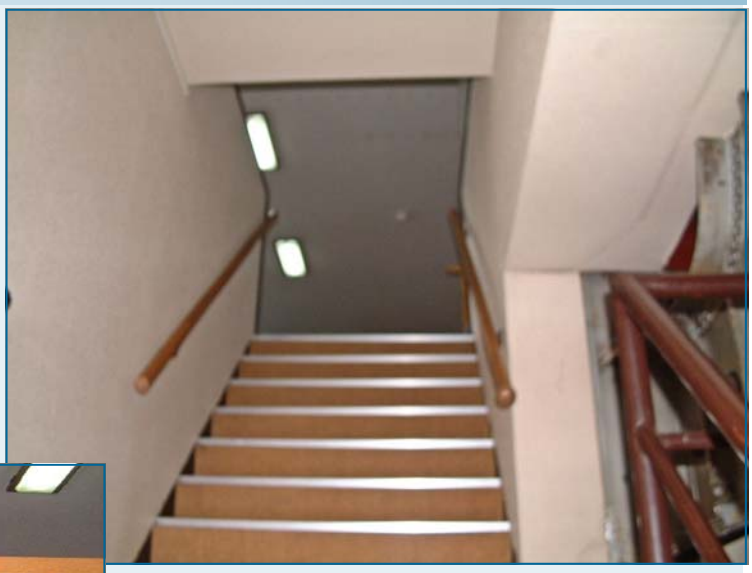
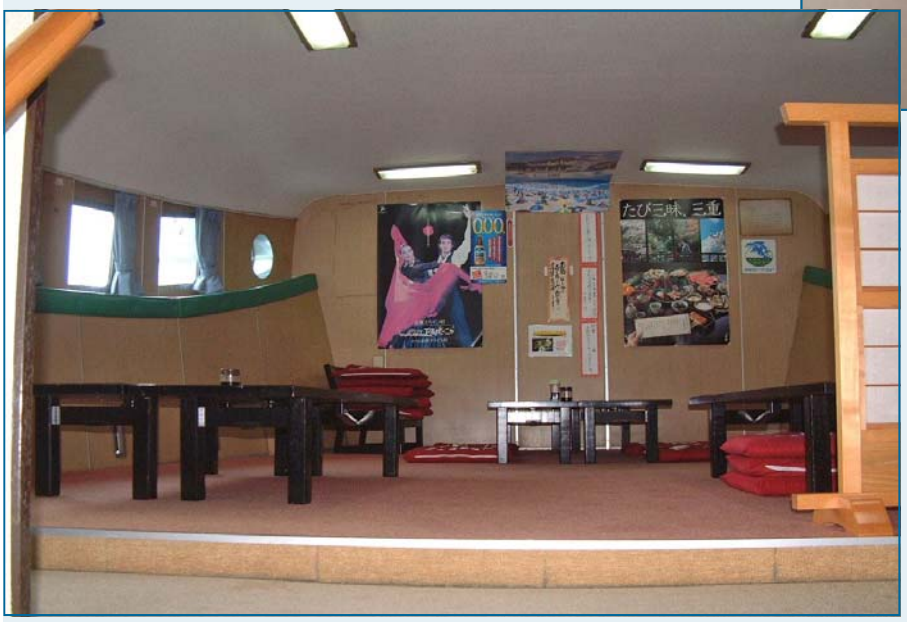
Right: This is the stairway leading up to the ship's former forward passenger saloon, which is now part of the dining area.





Left: At the top of the stairs is the dining area. This view looks forward into a Japanese-style banquet room set in the forward passenger saloon. Just visible is the top level of the staircase and the handrail on the upper left of the photo. The circular window in this view corresponds to the circular window seen on the external view of the bow area of the hull. A total of 50 diners can be accommodated collectively, 20 in the banquet area shown in the photo and 30 in the main dining area, which also features a karaoke machine.

Left: But enough of the technical construction details; it is time to select from Mr. Sakou's delicious menu. This is a bowl of rice topped with sashimi fish and lobster that I ordered on the ground floor of the restaurant. Heaven is reached! The PT-50 illustration on the chopsticks bag is a nice touch, a souvenir for the tourist to take home.

Harbor Wing ASUVs

(Continued from page 1)

for hydrofoil design during the prototype phase. Duncan MacLane is the Naval Architect. His career includes nine years designing and consulting for four America's Cup syndicates. He is also president and CEO of MacLane Marine Designs. Gino Morrelli and Pete Melvin at Morrelli Melvin Design & Engineering, Inc. provide engineering and design services for hull structure, construction, and production.

HWT X-1 Prototype

The prototype X-1 AUSV is a catamaran configuration without hydrofoils but incorporating the Wing Sail. It can carry a range of mast- or hull-mounted onboard sensors, or it can be outfitted with a winch to deploy underwater equipment such as sonar. Cross-arms are also suitable for installation of hard points for mounting instrumentation.

After extensive development and at-sea testing, Harbor Wing conducted its initial proof of concept and proof of technology sea trial on the X-1 prototype in open Pacific Ocean waters off Pearl Harbor on June 9, 2007. The prototype's wing-sail, software and command-and-control systems gave exemplary performance, providing precise GPS-based course holding along a pre-designated figure-eight patrol track. The sea trial results establish that the craft could support typical AUSV mission requirements.

HWT X-3 Production Vessel Design

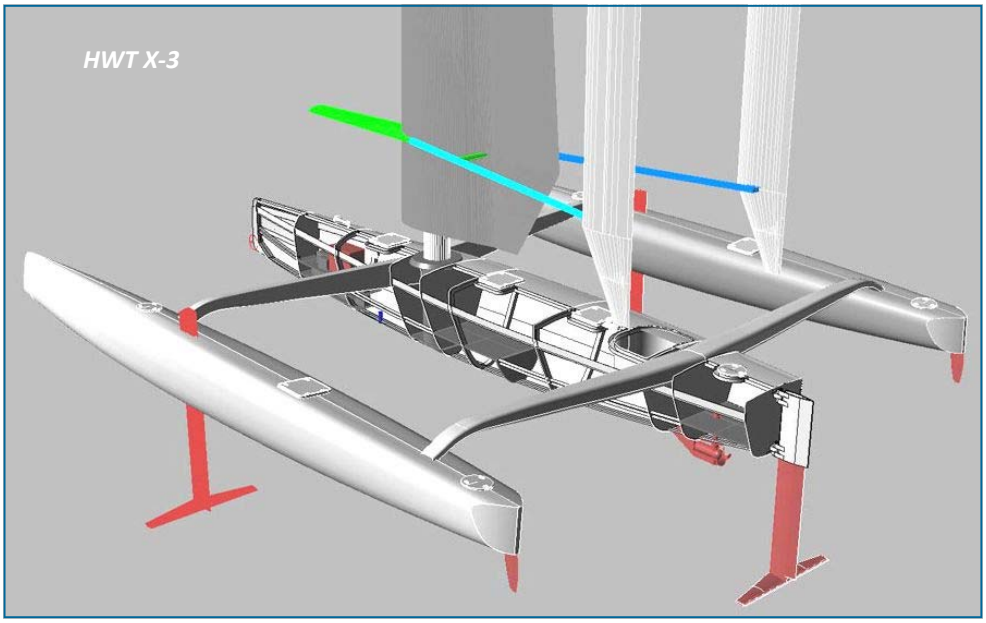
Harbor Wing now has the initial design for the production prototype of their unmanned, wind powered trimaran AUSV, the HWT X-3. The X-3 will incorporate technology demonstrated on the X-1 prototype. Supported by three inverted "T" hydrofoils, this vessel can patrol long-duration / long-range in open ocean or offshore. The fully-submerged lifting foil system is based on Hydrosail's design that was built for their SCAT sailing hydrofoil project covered in a previous *IHS Newsletter*. The X-3, now at the advanced prototype development stage, will be a concept demonstrator for the US Navy and other potential customers.

Morrelli Melvin Design & Engineering is building the craft. Demos and testing are conducted in Hawaiian waters. The initial goal is to meet operational needs of the US Navy Region Hawaii, particularly the ability to operate over the horizon in the open ocean as well as close to shore in shallow waters. As a wind-powered unmanned vehicle, X-3 can remain on patrol for extended periods with minimal fuel or crew costs. This vessel will integrate unmanned guidance and control systems, long range communications and radar and telemetry capabilities within the composite construction trimaran hull.

Left: HWT X-3 Concept Design for the production AUSV

Left: Recreational concept vessel deploying Harbor Wing WingSail™ and Sail-by-Wire computer technology

Below: HWT X-3 layout showing foil configuration



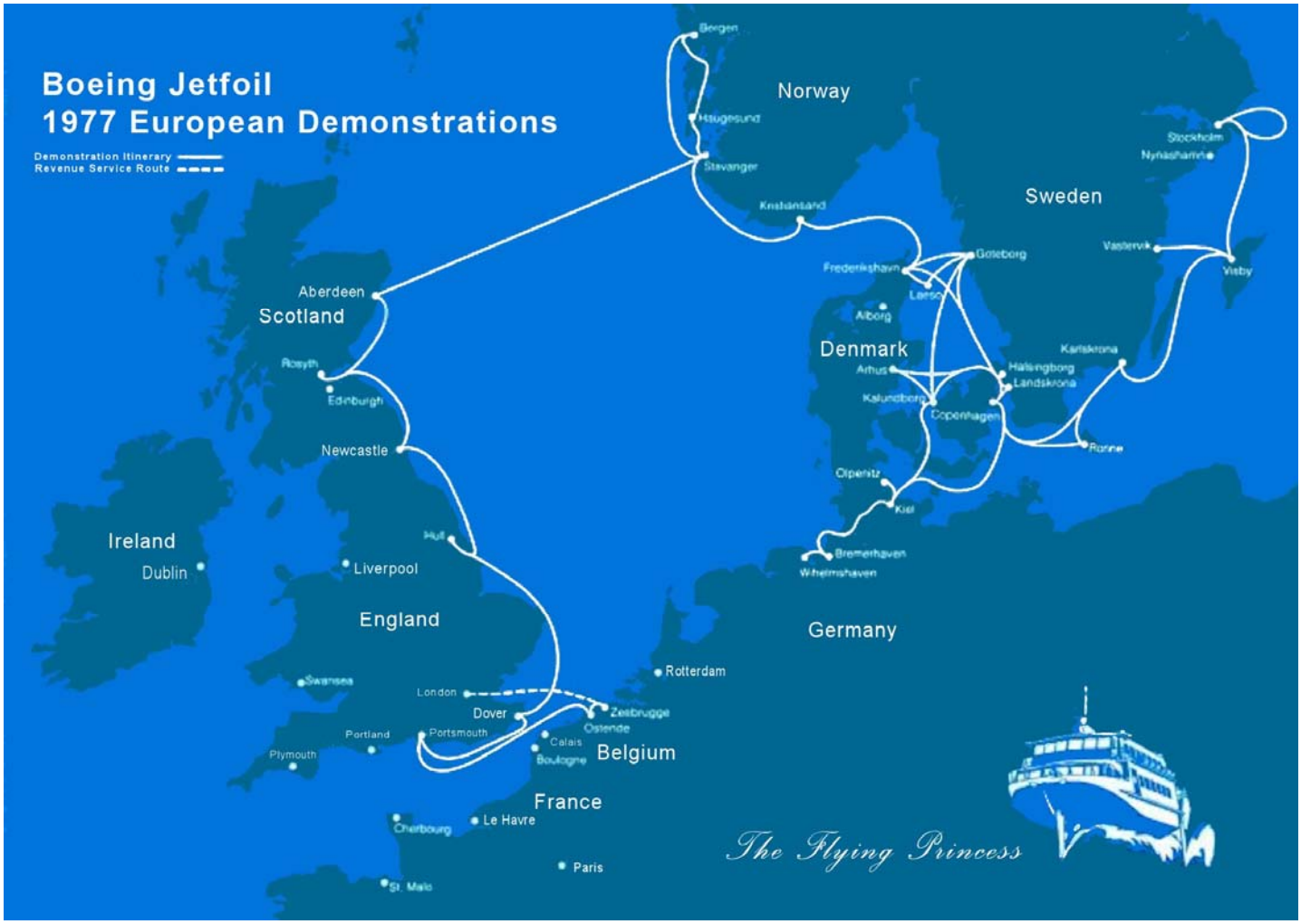
Jetfoil—the Good

(Continued from page 3)

necessary for the navigation on the Thames River and Thames Estuary. I was the first person to ever pilot a boat up and down the Thames River at over 40 knots. On June 1, 1977 P&O passenger service started from Zeebrugge to London which was about 136 miles and took about 3½ to 4 hours depending on the state of the tide in the upper reaches of the Thames. We made one round trip per day, and the crew and pilots stayed overnight in Zeebrugge. This was an unusual but necessary situation because we would have to stop at each pilot station four times a day adding at least another hour each way. We really did not need the pilots after the first couple of trips but it was one of those marine labor agreements that could not be ignored. On the Belgium side, our P&O first officers were from Belgium and had pilotage for Zeebrugge and Oostende. Boeing Supersonic Transport (SST) flight crews were shuttled back and forth from Seattle to cover the charter which ended in September1978 as P&O was awaiting delivery of their Block II boats (013 & 016) due to arrive in 1979.

Back in Seattle, boat 009, the *Okesa* was launched and delivered to Sado Kisen, Japan in June 1977. In January of 1978 Sea Flight shut down its inter-island service in Hawaii, and boats 001, 003, and 004 were sold to Far East Hydrofoil Co. Ltd. (FEH). The Venezuela operation also shut down in 1978 due to collisions with marine animals and a host of injury law suits. Boats 006 and 008 were also sold to FEH. The next boat to be launched was the *Flying Princess II* (010) the other uncommitted P&O boat, and the last Block I. The boat was leased to Washington State Ferries (WSF) for a six-week summer demonstration in 1978. WSF and Boeing each put in $50,000 for the demonstration to be offset by fares from curious would-be riders. As soon as the wet charter was agreed to by WSF and Boeing, the MMP (Masters, Mates & Pilots) & IBU (Inland Boatman's Union) claimed their right to man our vessel during the demonstration. They wanted an engineer, deck hands, and captain on every voyage of the *Flying Princess II*. This of course was outrageous because we had trained five crew members that ran the boat and serviced passengers. These union bureaucrats wanted to double the size of the crew and wanted to be paid their normal un-

(Continued on page 12)



IHS Membership Dues for 2012

It is time to pay your dues for 2012… unless of course you have already paid! Individual membership options are: US$30 for one year; $56 for two years; or $82 for three years. Student membership is still only $10 per year. Sustaining memberships are available to corporations, non-profits, and other organizations and groups for $250 per year.

You can pay online by credit card via PayPal. Go to *www.foils.org/membership.htm* and follow the instructions. This works from inside or outside the USA. Alternatively, you can mail a check drawn in US dollars on a USA bank to IHS; PO Box 51; Cabin John MD 20818; USA.

The IHS Board of Directors, Officers, and Staff are volunteers, and they pay dues like all IHS members. IHS dues do not go for salaries. They pay the service providers for two IHS websites (foils.org and hydrofoilworld.org), the BBS, newsletter publication, and miscellaneous expenses. Dinner meetings in the Washington DC area are funded by admission fees, not by IHS dues.

Have YOU Hugged a Hydrofoiler Today?

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To view the youtube videos, 83% of viewers used computers and 13% used cell phones. Only 8.1% of viewers were female. What? You thought your hydrofoil is a chick magnet?!

About 75% of viewers are 35 to 64 years old. By far the most watched video is of Kotaro Horiuchi's OU-32. That video went viral. Within a few weeks, its view count will exceed 2,000,000 out of a present total of 4,194,740 for all 22 *rvell7829* videos. For number of views, 2nd and 3rd place goes to the *Flying Banana*, AKA *Hifybe*. Harry Larsen's *Talaria IV* is next followed by Human Powered flight, and in 6th place, is my advice on how to save $20 by not buying my book.

Of the viewers who chose to vote, 70 liked what they saw and 6 didn't.

So who cares about hydrofoils? A lot of people do. And the interest comes from all parts of the world.

Jetfoil — The Good

(Continued from page 11)

ion wages which were twice our crew's salaries. WSF could not come up with any more funds, so Boeing kicked another $50,000 with a compromised proposal with the unions for one captain observer and one deck hand. They just stood around and got in the way and collected their paychecks. The *Flying Princess II* visited eight ports of call on scheduled runs from Seattle to other ports in Puget Sound, Strait of Juan de Fuca, San Juan Islands, and Canada. The operation was a success, but ridership was poor and didn't even pay for the fuel.

Back in Europe, P&O awaited delivery of their first Model 929-115-013 boat the *Jet Ferry I* which arrived in September 1979. P&O wanted a 2-boat operation so it chartered the *Flying Princess* for the London-Oostende service.

Welcome New Members

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deltalloydsolarboatteam.com for info). The solar boat will participate in the "Dong Energy Solar Challenge" www.dongenergysolarchallenge.nl/ and the "Zeeuwse zonnebootrace" www.zonnebootrace.nl/, which are two races for solar powered boats in the Netherlands. The Delta Lloyd Solar Boat Team has built three boats up till now, finished in 2006, 2008 and 2010. The first two were optimized to have a very efficient hull. Since the speeds became as high as 6 to 7 [m/s] in 2008, hydrofoils became interesting. After research by the 2010 team, hydrofoils were used in the 2010 boat, which has a cruise speed of 8 [m/s]. The 2012 boat, which is currently being designed, will also use hydrofoils. Michael is one of the hydrofoil designers on the team.

Tacoma Maritime Fest

The 19th Annual Tacoma Maritime Fest will take place Saturday and Sunday, August 25th and 26th from 10:00 am to 6:00 pm at Thea's Park and Foss Waterway Seaport in Tacoma Washington USA. IHS is coordinating participation of hydrofoils as exhibits, historical artifacts, static and R/C models, and operating hydrofoils. Attendance at the event is also encouraged—obviously. See the website for info: www.maritimefest.org/activities/. Several hydrofoil "greybeards" are helping out and planning to participate, and the level of enthusiasm is high. Every question and answer seems to lead to other issues and opportunities.

If you are interested in participating within your own hydrofoil interests and experience, or if you would like to help IHS coordinate and organize, please email *tacomaevent@foils.org*.

The NEWS LETTER

International Hydrofoil Society

PO Box 51 - Cabin John MD 20818 - USA

Editor: John Meyer | Second Quarter 2012 | Sailing Editor: Martin Grimm

FLAGSTAFF REVISITED

By Irwin (Irv) Palmer

The following article is from my own experience with the FLAGSTAFF (PGH-1) as her Project Engineer and Program Manager from concept design through delivery to the Navy, and for some of her combat service in Viet Nam. The comments herein are mine alone, and do not reflect approval or concurrence of Grumman or the US Navy.

My association with this program began in the Preliminary Design Group (later re-named Advanced Systems) of Grumman's Engineering Department, where the hydrofoil concept was being studied and tested, with several designs and full-scale vehicles under construction. The most notable of these was the H.S.Denison for the US Maritime Administration. She was a 90-ton, 60-knot test-bed with a retractable surface-piercing foil system, 15,000HP GE gas turbine power plant, and single supercavitating propeller. (I might add that

FLAGSTAFF on Trials

See FLAGSTAFF, Continued on Page 3

SUSTAINING MEMBERS

YOUR 2012 IHS DUES ARE DUE

See Full Announcement on Page 2

INSIDE THIS ISSUE

PRESIDENT'S COLUMN

To All IHS Members

As I reported in recent Newsletters, I was in a very serious auto accident on June 3 of last year, and have been slowly recovering. Barney Black has filled in as Newsletter editor for the last two Newsletters, and has done a super job. I am now picking up the task starting with this NL.

The last NL referred to the Tacoma Maritime Fest that will take place on August 25 and 26 of this year. Ray Vellinga has prepared a follow-up article about some of the participation of the IHS and others; see page 9. We encourage participation of IHS members. Please make contact by email: tacomaevent@foils.org

YOUR 2012 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.

We are looking forward to the PHM/IHS "gathering" in Key West, Florida. Frank Horn reported on key conclusions of the planning committee. See page 9 for his brief report.

IHS member, Michael Bosworth, acting chief of the NAVSEA Technology Office, SEA 05T, spoke to a joint dinner meeting of the SNAME SD-5 (Advanced Ships and Craft) Panel and the International Hydrofoil Society on Wednesday, 8 February 2012, at the Army Navy Country Club in Arlington, Virginia. He spoke on the subject of "Amphibians, Unmanned Vehicles And Arctic Initiatives". See page 8 for more details by Allen Ford. A slide show of Mike's presentation can be found on the IHS website.

I am pleased to report that we have enrolled quite a few new members this year so far largely due to the efforts of Frank Horn. He has spearheaded our efforts along with IHS members, Joel Billingsley and Joel Roberts, in cooperation with ASNE events such as the one described by Frank on page 9. We always encourage our members to recruit their colleagues and others to swell the ranks. I hope that we can exceed last year's numbers by a reasonable amount this year.

I mentioned before that the Fast Ferry International magazine will no longer be published. See comments on the subject by Bill Hockberger in the article: "From the Board Room" on page 9.

As your President and Newsletter Editor, I continue my plea for volunteers to provide articles that may be of interest to our members and readers. Please send material to me (jr8meyer@comcast.net). I will be pleased to hear from you.

Best regards.

John Meyer,

IHS President

WELCOME NEW MEMBERS

Paul B. Appel – Paul is a recreational boater with an interest in recreational hydrofoil design and fabrication. He is a former Naval Aviator and is C.E.O. of RRC Audio Visual, an event technology production company founded in 1984, and based outside of Washington, DC. His areas of expertise include both mechanical and electrical engineering, and he is a Certified Audio Recording Engineer and a Certified Technology Specialist. He also heads the Media Experts Group, a web based content creation, capture and management enterprise, and is a founding principal with Millennial FX Consulting, which is a consortium advising Fortune 500 companies on Gen Y recruitment, retention and reward strategies.

Mark D. Wecht- Mark is a Principal Engineer with Maritime Applied Physics Corp. (MAPC). MAPC builds hydrofoils and other watercraft for Military and Commercial applications. Mark manages the software group and provides architecture and systems engineering support for the development of electro-mechanical control systems for MAPC watercraft and mechanisms. His expertise is in hardware/software boundary embedded systems design and telecommunications protocols. He has been developing embedded hardware and software since 1981 in the medical, industrial, and telecommunications industries. Prior to joining MAPC in August 2011, Mark founded, in 1996, and was the President of Embedded Systems Design, Inc. (ESD) until July of 2009. ESD

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Flagstaff

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the foils on Denison were designed to break away cleanly in an accident, and this, indeed, happened in a foilborne grounding on the Cape Fear river. Hence, the concept was incorporated in the FLAGSTAFF design, but never tested or proven!)

In response to a Navy Request For Proposal for a hydrofoil gunboat, Grumman and Boeing submitted their designs which differed greatly in foil and propulsion configuration. As there was no clear-cut winner, both Company's designs were contracted, with Grumman's design given the Navy's designation PGH-1, and Boeing's design given PGH-2. (We liked to think that this produced lots of resentment in the Boeing camp, but I'm certain there was no hidden meaning to the numbering system.) The vessel's names, FLAGSTAFF and TUCUMCARI, were derived from cities along US Highway 66, as were the names for a new class of high-speed ships (PGM's, I believe) which, incidentally, had their main power plants of GE LM1500 gas turbines, which were prototyped back on the HS DENISON hydrofoil. *[Note: An article about Tucumcari appeared in the 2nd Quarter 2011 Newsletter.]* (A little-known fact here is that we coerced GE into selling us that turbine for $1, for the publicity and whatever. But years after the DENISON program was finished, the local GE representative dropped by my office for our usual coffee/bull session, and informed me that we had never paid the dollar to GE. Whereupon I tried to get Grumman to send them a check: Do you know what it takes to accomplish that???? And he wouldn't accept a dollar from my pocket. He wanted a Grumman check!!!)

FLAGSTAFF's main engine was a Rolls-Royce Tyne gas turbine, and it was happy to run with Rolls-Royce parts and English hardware. As the San Diego homeport for FLAGSTAFF was a bit shy for maintenance parts, the local Grumman rep and I paid a visit to the maintenance hangar of Flying Tiger Airlines up in Los Angeles, as they were flying Tyne engines in their fleet of CL-41 cargo planes. And of course, they graciously offered us access to their stockroom. But while walking through their hangar, under the wing of one of their planes, I noticed a puddle of oil directly beneath one of the engines. With my comment that "Your Tynes leak also!", their maintenance director assured us that those engines are "leakers" but the most reliable in the air, and they can live with a little leakage.

That leakage had me worried during our Florida sea trials on a non-stop foilborne test to prove the vessel's design range. As it turned out, the day was almost ruined anyway when we struck something "heavy" near the end of the flight, likely a shark or porpoise, and the skipper had instantly pulled back the power. When we saw the bloody mess in our wake we signaled him to keep going. The NAVSHIPS rep who was aboard for this trial thought we touched down during the "glide", and therefore invalidated the trial. But later examination of our wake during other power-off glides showed that it took several seconds for the craft to settle down, which is much longer than we had the power off after that impact. That shark or porpoise sure took the edge off a lo-o-o-ng day! (I don't know if the vessel's speed or range is still Classified after all these years, but you didn't hear it from me!!)

For the shipment of the FLAGSTAFF to California after her Navy acceptance, we used the SeaTrain OHIO for deck cargo, loading it in the port of Palm Beach, which was our base for sea trials. (It was at this time that our Company President and CEO congratulated me with a pat on the back and the comment that this was the only program at Grumman showing a profit!!) (A nice fat raise would have done more for my morale!!)

We lifted FLAGSTAFF to her steel cradle dockside, and using a tracked crane, we then lifted the whole rig onto the top deck of the OHIO. Getting her over the edge of the deck while about 70' in the air, at the limit of this crane's reach, and expecting the crane to topple into the OHIO, I just couldn't watch this last few feet of movement. When I heard the crane operator shut down without dropping the load or hitting the ship, I couldn't resist shouting to the team "Good Show! I'm buying!!!!" (Remember, these men were Union, and we Grummanites were non-union: a perfect scene for an "accident".) (Shortly after the loading was completed, one of the managers from Florida Power and Light adjacent to our slip came over to ask us how much weight we were putting on the ground there, because their main cooling water intake was directly beneath the loading operation. The crane guys knew but didn't bring it up! Can you imagine: Our parting gift to the City of Palm Beach could have been a power-plant shut-down of the whole city!!!)

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Flagstaff

(Continued From Page 3)

Flagstaff"s future for possible deployment to Viet Nam was not yet clearly defined, but her home base was to be in San Diego, for her final acceptance trials and additional crew training. The INSURV Board on their final inspection and sea trials found her to acceptable for service, hence her shipment to Viet Nam was scheduled and planned for transport in the well-deck of a very old, and slow LSD, the USS Gunston Hall, for the Pacific crossing.

I had the pleasure of meeting the FLAGSTAFF crew in DaNang, Viet Nam, after her unloading from the USS Gunston Hall, to help get her operational. I was accompanied by the Grumman shop foreman who supervised her construction, the theory being that the two of us should be able to iron out any shipping or other technical problems. But the FLAGSTAFF crew had already made her seaworthy by the time we arrived. This crew was some team! They had spent months in Florida during the sea trials and troubleshooting, and even went through an informal "school" with the Grumman engineers on all of the ship's systems. I was impressed with this crew's ability and determination, and firmly believed that if I was younger and had to serve my country, I'd want to be on their team. (I served my country in the Korean War, but that's another story.) These "kids" were so sharp that when our autopilot manager was giving them their "final troubleshooting exam", he told me privately that he "sandbagged" them by shoving rags into the autopilot acoustic altimeter sensors. It took them about 5 milliseconds to locate that "fault", with the words "Corny!!"

Interestingly, this team found the source of a problem that hounded us since the boat was built. We were experiencing overheating in the hydraulic system in Florida, so the quick solution was to increase the oil cooler capacity and the problem went away. We also would occasionally get an awful howling noise while foilborne which would stop when we tried to isolate it. In Viet Nam, these kids theorized that it had to be hydraulic, and related to the original overheating problem. With their ears and quick reactions, they located the source of the howling: a hydraulic pressure relief valve, which upon disassembly showed a piece of metal jammed in the seat of the valve, which kept the valve open constantly, and causing the hydraulic pumps to work harder to make up for this bypassed, and hot flow. Needless to say, after the valve was cleaned, the hydraulic oil temperature became "normal" and the howling stopped for good!
[Part 2 will appear in the next NL.]

JETFOIL - THE BAD

This is the 4th part of a 5-part series of articles by **Bruce Bryant, IHS Member,** on the subject of Jetfoil. The 3 previous parts were included in the 3 previous IHS Newsletters.

P&O Ferries was all set to start service from London to Oostende in the summer of 1979 with their new Block ll boat (013) the Jet Ferry 1 and the leased Flying Princess.

Due to delays related to the dock location in London, from St Katherine's locked in dock to a site next to the Tower Bridge, the service date was pushed to February 1980. The Flying Princess was moored in Oostende, Belgium and had been reconfigured for the P &O charter since the end of the Europe demonstration which concluded in September 1978. With no work scheduled until 1980, Boeing negotiated an offer to support the newly established cross-channel operator Jetlink Ferries. Seajet had started service from Brighton, England to Dieppe, France in 1979. Boat 012, the Normandy Princess had been performing poorly and the Flying Princess was used for backup during the high season.

The Flying Princess

The Block ll boats, (Model 929-115) 011 and on, were a bit faster and had slightly better rough water performance. This was due to reshaping the foils from thick and rectangular, to thin, swept and tapered the way they should have been in the first place. What the project group was thinking when they designed the Block 1 foils is a mystery. Even though the Block ll showed signs of improvement by being a couple of knots faster, it was still a sea state four boat.

While in Europe I was assigned to train crews and route prove the new Seajet operation and aid in the certification of the Normandy Princess in 1979. Soon after the start of passen-

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JETFOIL - THE BAD

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ger service, boat 012 experienced a turbine failure requiring dry docking and the Flying Princess was put into passenger service. While the Normandy Princess was in dry dock I went to Dublin, Ireland to support the installation of the new B & I docking facility on the River Liffey. A new operator, B & I, was starting service with a single boat (015), the Cu Na Mara, from Dublin to Liverpool across the Irish Sea in 1980.

These were the trying times in Europe's Jetfoil history. The P & O service was finally launched in February 1980 with Jet Ferry1 and the Boeing leased Flying Princess. In June P & O's second boat Jet Ferry ll (016) arrived and replaced the Flying Princess. The two new boat operation from London - Oostende ended that year with only one season of operation and the boats were sold to Far East Hydrofoil (FEH). The unemployed Flying Princess was leased to Trasmediterranea, the Canary Island service between Las Palmas, Gran Canaria and Santa Cruz, Tenerife pending delivery, in 1981 of the company's first owned boat (018), Princesa Guayarmina. The B & I one boat operation started service from Dublin to Liverpool in May 1980 with a scheduled two trips per day. Within a couple of months it was obvious that it was not intended to operate in the Irish Sea. They were lucky to make two trips a week and only ventured out when the weather was calm. After a hopeless first season the Cu Na Mara was dry docked for the winter and stayed there until it was sold to Sado Kisen, Japan in 1986. The Seajet operation from Brighton to Dieppe across the English Channel also shut down after the 1980 season and the Normandy Princess was sold to FEH.

Another Jetfoil worthy of mention was HMS Speedy, a special version of a Block ll boat (929-320-014), which was delivered to the Royal Navy in 1979 for the Fishery Protection Squadron. The P296 was a special military version that was outfitted by Vospers in Portsmouth, England. The Speedy was no match for the nasty weather and sea state in the English Channel and North Sea and was decommissioned in 1982. Eventually Speedy was sold to FEH in 1986 and converted to a passenger configuration. On the Bad side, all services in Europe, Hawaii and Venezuela were shutting down and ten boats including the Flying Princess were eventually sold to FEH and one to Sado Kisen.

Back in Seattle in April 1980, the third very popular trans Canada demonstration got underway from Seattle to Victoria with the Flying Princess ll. The leased Jetfoil made two round trips per day and the Princess Marguerite ferry made one and shared the same berthing on both ends. The BC Steamship Co and Boeing shared the costs and supplied the crews. These seasonal ventures were successful and popular but again not very profitable. That winter the Montevideo Jet (017) was delivered to Alimar in Argentina for the Buenos Aries- Colonia and Montevideo fast ferry service.

Another glitter of hope came when RMT (Regie voor Maritime Transport) started a two boat (019 & 020) service between Oostende and Dover in 1981 across the Strait of Dover which are the narrows between England and France. This route had limited exposure to rough water by hugging the North coast of France then due West across the Strait to Dover. The service to Dover was changed to Ramsgate in 1994-98. I trained the RTM crews and consider this Jetfoil service to be one of the more successful ventures and probably would have lasted longer if the Chunnel hadn't been built.

My on again, off again European assignments were concluded in 1981 and I went back to flight testing newly launched Jetfoils for delivery. Jetfoil construction continued in 1981 with five new boat deliveries to the Canary Islands, Belgium and Indonesia. The PHM program finally got underway with the construction of boats 02 through 05 after five years of testing and playing checkers with Pegasus. The pier 91 facility in Seattle was moved to a newly refurbished pier 90 and was hub of activity in 1981 with PHM's and Jetfoils lining the dock. In July the second Trasmed boat Princesa Guacimara (021) was launched and scheduled for delivery in the Canary Islands by the end of the year. Prior to her shipping I was captain for a short demonstration for BC Steamship Company on the Vancouver-Squamish (Whistler Ski area) route on Howe Sound. The last boat built in 1981 was the first of five Indonesian Jetfoils. The Bima Samudera 1 was launched in October 1981 delivered to PT Pelni in December for passenger service around Jakarta, Indonesia. After about a year of service in Argentina the Boeing Co bought back boat 017 and it was shipped back to Seattle in May 1982.

The lack of ridership was sighted as the reason for the shut down. This was the first Jetfoil to be repurchased by Boeing since most of the

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JETFOIL - THE BAD

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used boats went to FEH. She was renamed the Aries and repainted red and white. I don't recall why they named her Aries since one of the PHM's had the same name but I recognized the FEH paint scheme. That's ironic because boat 017 was eventually sold to Tokai Kisen of Japan. Since Boeing was still trying to sell Jetfoils, Boeing negotiated with Alaska State Ferries to use the Aries for a summer and winter evaluation in Southeast Alaska. The summer demonstration in August-September 1982 would last for 4 weeks with service to 10 ports of call. The first order of this venture was to create a navigation plan that would take us up and back the inland passage to Southeast Alaska and all the passenger demonstration routes. It took over a month to update the charts, write the navigation plans and to schedule each day of the demonstration. This included about one week of transit time up and back from Southeast Alaska and about three weeks visiting 10 different ports.

The next venture with Aries was the actual trip to Southeast Alaska which will be continued in the next Newsletter.

FRESH-1 UPDATE

By Sumi Arima, IHS Member

Disclaimer: The following is based mostly by verbal and email communications, with no documents to substantiate the information provided herein.

FRESH-1 was built by Boeing under contract with the Navy. After acceptance trials, the Navy contracted with Boeing to store and maintain the ship in operating condition. Once the Navy decided that high speed hydrofoils were no longer of interest, FRESH-1 was delivered to the Hydrofoil Special Trials Unit (HYSTU) and stored at Inactive Ships in Bremerton Washington. Naval Sea Systems issued a letter on 8 August 1979 that authorized HYSTU to dispose of FRESH-1. She was put on the auction block in 1982 and the winning bidder was Sam Kleinman, a Los Angeles surplus dealer with a bid of $12,900.

Sam Kleinman who originally wanted the instrumentation determined it was not worth the cost and effort and thus wanted to sell the ship. With no buyers, he made a deal with the Mayor of Bremerton to display the FRESH-1 near the Inactive Ships pier. During this time, two different activities occurred. William Knuth,

FRESH-1 in Her Better Days

working in Anaheim California and having some hydrofoil experience was contacted by two Arabs (Names unknown) to remove the instrumentation. Upon doing so, the Arabs did not have any money to pay for the services, and thus gave Knuth ownership of FRESH-1. Knuth did not really want the ship so he donated it to California Maritime Academy. It appears California Maritime Academy never physically claimed the ship.

Meanwhile, Sam Kleinman was asked to remove the FRESH-1 from the property where it was presently located. He had a Marina owner (name unknown) in Tacoma take care of the situation. Dave Symington, a land developer in the Bremerton area negotiated with this Marina owner and was told he could have the FRESH-1 if he could move it from the present location. Symington relocated the FRESH-1 to his property north of Bremerton where it sat for a number of years. Symington contacted HYSTU identifying himself as the owner of FRESH-1 and was treated as such. Eliot James negotiated with Dave Symington and as of May 2010, Aries Hydrofoil Museum became the new owner. FRESH-1 was dismantled and shipped to Missouri where it is undergoing restoration.

RODRIQUEZ 38M FSH UPDATE

This article is based on a technical paper entitled "Development of the New Rodriquez 38m FSH Fully-Submerged Hydrofoil", by R. Rossi and G. Biancuzzo of Rodriquez Cantieri Navali, presented at the 9th High Speed Marine Vessels Symposium held in Naples at the end of May 2011..

The Rodriquez Shipyard has recently completed development and construction of two fully-submerged hydrofoil (FSH) prototypes followed by sea trials.

The first prototype FSH is equipped with a foil system having a "totally new concept", while the second one is equipped with two contra-rotating propeller propulsion units.

The final goal of the research activity is to acquire the necessary data, knowledge and technology to com-

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RODRIQUEZ 38M FSH UPDATE
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mercially produce hydrofoils having improved safety and greater speed and comfort characteristics than current fully-submerged hydrofoils.

First 38m FSH on Trials

The two prototypes have been developed based on innovation and Rodriquez scientific and technology advancements, such as:

- New foil profile based on scientific data.
- Contra-rotating propellers optimized based on new research.
- Ship motion and passenger comfort control system already applied to other commercial boats.
- Possibility of using a diesel engine as propulsion prime mover having a weight/power ratio equivalent to the gas turbine units used on the previous generations of hydrofoils to obtain high speeds.
- Possibility of using a double speed gear unit to optimize the propeller both during take off and cruise phases.
- Possibility of using manufacturing materials for the foil having innovative characteristics in term of welding, strength and corrosion resistance and consequently lower maintenance costs.

The new system has been studied, designed and manufactured applying new techniques of simulation and innovative technology, in particular regarding the use of special materials, applying advanced measurement instrumentation, and mathematical models.

Fully submerged hydrofoil equipped with traditional shaft propeller external view.

Fully submerged hydrofoil equipped with contra-rotating propeller POD external view

The development of the new hydrofoil was carried out with two variants. The first hydrofoil is characterized by a new foil system in combination with a traditional propeller shaft line, while the second one is equipped with the counter-rotating propeller POD.

To make a comparison, Rodriquez Cantieri Navali used, as a benchmark, the performance of an actual surface-piercing hydrofoil. Generally speaking the fully submerged hydrofoil operates in the same way as a surface-piercing foil. The principle in fact is the same and is based on using the lifting surfaces to carry the weight of the ship and allow it to take off and fly above the sea surface. The main difference is the draft of the two different kinds of foils. Fully submerged foils operate at greater depth than surface-piercing foils and for this reason they are less affected by the perturbation of wave orbital motion. This condition results in less variation of the ship motion amplitude and therefore a higher level of passenger comfort.

In addition the greater depth results in a foil system with improved efficiency. This results in a lower drag with equal lift, and consequently a lower overall resistance and a higher cruise speed.

However the fully submerged hydrofoil is intrinsically unstable, and needs a redundant and robust control system to maintain flying height, trim and roll.

Towing Tank Tests

Towing tank tests were performed by the hydrodynamic department of the Krylov Shipbuilding Institute and were divided into different stages. During the initial and preliminary stages of the work several investigations were carried out by Rodriquez Cantieri Navali and KSRI to choose the main parameters of the craft. In particular the following activities were performed:

- Investigation of characteristics of profiles NACA-16 with different relative thickness in a flow of viscous liquid.

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

RODRIQUEZ 38M FSH UPDATE

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- Determination of hydrodynamic characteristics of bow and aft foils with regard to interaction between foils.
- Tests in a cavitation tunnel of different versions of T-shaped foils.
- Analysis of previous experience in designing and building craft with fully-submerged controlled hydrofoils.

On the basis of these investigations as well as an estimation of strength and construction of the foils, the main characteristics of the craft and the foil system were chosen. During this stage the investigation of foil geometry, taking into account cavitation characteristics of the foils, was performed to select the foil main parameters (foil profile, foil span, mean chord, tip chord, and area),

Sea Trials

Sea trials of the first prototype verified the following major advantages in comparison to current commercial vessels.

- Improved passenger comfort.
- Better sea keeping, and the possibility to provide service in unfavorable sea conditions.
- Lower resistance and therefore lower fuel consumption.
- Higher cruise speed.

The Rodriquez fully-submerged hydrofoil characteristics are:
- Full load displacement: 145 tons
- Passengers: 240
- Maximum speed: 45 knots
- Manoeuvrability: (Foilborne turning radius): 200 m
- Diesel Engine: 2X2300 kW

Conclusions

The full-scale tests have confirmed the steady motion and the relative resistance at the maximum cruise speed (about 42 knots) and during take off (25-27 knots). The maximum speed was 42.5 knots, lower than the project speed of 45 knots. The speed at take off is about 27 knots. The flap angle amplitudes during take off and at the maximum cruise speed are slightly higher than calculated. The maximum power and fuel consumption was within the projected range.

In the next months the Roriquez Cantieri Navali engineers will be engaged in an effort to increase the capability of the Prototype 1 vessel. In particular, a set of dedicated sea trials will be focused on improvement of the control system to guarantee the same steady motion in any sea condition. Improving the control system will decrease flap motion and consequently reduce the total resistance and in the end increase the speed and improve take off performance.

Within the year a second prototype equipped with a counter rotating propulsion POD will be ready for full scale tests. Rodriquez engineers expect that this propulsion arrangement will have better performance from the point of view of the maximum speed due to the higher efficiency of the counter-rotating propellers.

JOINT MEETING

By Allen Ford, IHS Member

Mr. Michael Bosworth, acting chief of the NAVSEA Technology Office, SEA 05T, spoke to a joint dinner meeting of the SNAME SD-5 (Advanced Ships and Craft) Panel and the International Hydrofoil Society on Wednesday, 8 February 2012, at the Army Navy Country Club in Arlington, Virginia. He spoke on the subject of "Amphibians, Unmanned Vehicles And Arctic Initiatives".

He said that the NAVSEA technology office, SEA 05T, was formed in 2009 and has three divisions focusing on technology development and transition. Some initiatives are funded in-house (six programs in SEA 05T), some by partners (ONR, DARPA, industry, foreign, etc.), and others are areas of interest seeking resources. The present funding level is about $40 million per year; but this contrasts with much higher overall US Navy investments in this area in previous decades.

Speaker M. Bosworth and Master of Ceremonies W. Hockberger

Mr. Bosworth reported that there were three divisions making up the NAVSEA Technology Office (Sea 05T); these are: 05T1- Technology Transition Division; 05T2 - Naval Energy Technology Division; 05T3 - Mission Systems Technology Division

He then zeroed in on three areas that hold potential for advanced marine vehicles to be part of the solution(s): Amphibious vehicles (tracked or wheeled), especially fast amphibians; Unmanned marine vehicles, especially unmanned surface vehicles with operational autonomy; Naval

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JOINT MEETING
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responses to the warming and future opening of the arctic seaways

He showed slides of previous operational and proposed vehicles, and ones that are in the pipeline for operational use for each of the categories.

A slide show of Mike's presentation can be found on the IHS website.

IHS AT ASNE DAY 2012

By Frank Horn

The IHS participated as an exhibitor at ASNE DAY 2012 at the Hyatt Regency Crystal City, VA on 9-10 February. There were over 60 Exhibitors and over 600 attendees participating in the 2 day program. Keynote speakers for the main sessions included VADM Kevin M McCoy USN , Commander NAVSEA, The Honorable Robert J. Whitmann (1ST Congressional District of Virginia), The Honorable James P. Moran (8TH Congressional District of Virginia) , and The Honorable Sean Stackley, Assistant Secretary of the Navy (RD&A).

The large number of attendees gave the IHS booth wide exposure. Our exhibit was a laptop presentation of a variety of military, sailing, recreational, human powered, and commercial hydrofoils. The presentation was well attended during program breaks at which time we provided to those who were interested with IHS fliers, tutorial overview pamphlets and membership applications. The interest shown in the presentation resulted in the signing up of several new members to the Society. The booth was manned by Joel Billingsley, Joel Roberts and Frank Horn.

Shown here is Bolaji Bedu from The American Shipbuilding Suppliers Association drawing the winning ticket for an IHS coffee mug.

Bolaji Bedu and Frank Horn

We are again grateful to the ASNE Officers who make it possible for IHS to participate as an exhibitor in their professional forums. We particularly thank Mike Huling the Senior Manager, Corporate Relations & Development for his efforts.

FROM THE BOARD ROOM

Bill Hockberger reported that the publication Fast Ferry International has gone out of business. In its final issue he noted that the number of fast ferries delivered in 2011 is the worst in the 26 years covered since figures were first published. The 33 vessels total delivered was lower than the previous worst totals of 37 in 2009 and 39 in 2005. The 30 vessels currently on order is not quite the lowest; in 2000 the total was 29. There have been no new developments in the US. That includes ferries for the Potomac, since, despite apparent interest in a service, there is no money for them.

PROPOSED PHM/IHS "GATHERING" IN KEY WEST – Frank Horn reported on key conclusions of the planning committee. Event will be held in Summer of 2013, will be open to anyone in Navy hydrofoil program, will be self-funded, and the agenda is envisioned as primarily social but will include a program with an emphasis on operational highlights. Many feelers are underway to collect information.

FOSS WATERWAY SEAPORT MUSEUM MARITIME FEST PLANNING, TACOMA, WA 25-26 AUG 2012 – Bill Hockberger reported that the organizer is showing high interest in a program featuring hydrofoils and discussions are well along. Considerations include an IHS booth, demonstrations of personal hydrofoils, static displays, radio-control models, and racing events of sailing or human-powered hydrofoils.

TACOMA MARITIME FEST WELCOMES THE IHS

By Ray Vellinga, IHS Member

The International Hydrofoil Society has been invited by the Foss Waterway Seaport to have a booth at this year's Tacoma Maritime Fest. This is the 20th anniversary of the Fest. More on the Seaport at: http//www.fosswaterwayseaport.org/

The Fest will be on the 25th and 26th of August 10:00am to 6:00pm at Thea's Park, 535 East Dock St. Tacoma and the Foss Waterway Seaport nearby.

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SAILOR'S PAGE

L'HYDROPTÈRE DCNS FOR LOS ANGELES TO HONOLULU VOYAGE IN 2012

***Adapted* from www.hydroptere.com**

The sailing hydrofoil trimaran, *l'Hydroptère*, which remains the world speed sailing record holder in its class, will from 2012 be sailing in the colors and logos of the French group DCNS and will fly under the new name of *l'Hydroptère DCNS.*

Artists impression of *l'Hydroptère DCNS* in her planned new color scheme.

After the campaign to achieve an outright speed record concluded in late 2009 with an absolute record of 50.17 knots average speed over a one nautical mile, *l'Hydroptère* was re- configured for offshore sailing for two seasons. The opportunity was also taken during that period to showcase the technology in the craft to new audiences around Europe.

In 2012, with the support of DCNS, the team will again start to seek out sailing speed records but this time over extended open ocean passages. This goal is consistent with the original dream of Eric Tabarly and Alain Thebault, both of whom were instrumental in the development of *l'Hydroptère*. The first stop for *l'Hydroptère DCNS* will be in the Pacific where the team will be competing for the sailing record between Los Angeles and Honolulu.

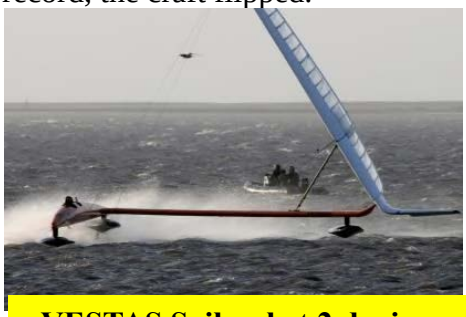
As of February this year, *l'Hydroptère DCNS* was disassembled and loaded on a barge in the harbor of Seyne-Sur-Mer, for transportation to La Ciotat where it was brought to shore at the docks of the H2X shipyard. There the craft will undergo its winter refit under cover in a hangar.

For the technical team of *l'Hydroptère DCNS* composed of Pierre Tocny, Warren Fitzgerald, Jeff Mearing and advised by François Cazala this marks the start of a period of intense work to configure the craft for the Los Angeles to Honolulu voyage which includes fitting of a new bowsprit to increase speed potential downwind. It is anticipated that *l'Hydroptère DCNS* should re-emerge from refit in her new livery in just under three months. Following this, four weeks of testing and training are planned prior to departing for Los Angeles.

Vestas Sailrocket 2

Extracted from: http://www.sailrocket.com

The Newsletter previously reported on Vestas Sailrocket (VSR1), which was briefly the world's fastest sailing boat over 500m (excluding windsurfers and kite-boats) achieving an average speed of 47.36 knots at Walvis Bay, Namibia, on 3rd December 2008. In a subsequent attempt on the same day to raise the record, the craft flipped.



VESTAS Sailrocket 2 during World Record Attempt.

The Sailrocket team, lead by Australian, Paul Larsen, has since returned with a new craft, Vestas Sailrocket2 (VSR2). This is a summary of the craft condensed from their comprehensive website. On 30 November last year, again at Walvis Bay, this craft surpassed the record of VSR1 by achieving a new record for B Class sailboats of 49.19 knots over a 500m course. The team reported achieving a peak speed of 52.78 knots though there are no official records for such peak speeds.

The Objective for VSR2

Since the Sailrocket team started with the first boat in 2002, the speed sailing record has gone up by almost 9 knots or around 20%. The current

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Vestas Sailrocket 2
(Continued From Previous Page)

outright world speed sailing record is held by American kite surfer, Rob Douglas, at 55.65 knots set in Luderitz, Namibia in October 2010. To achieve an average speed of over 56 knots, peak speeds of around 60 knots would be likely over a 500m course. The Sailrocket team considered it would not be worth trying to build a very expensive and complex boat just to go a little quicker than a kite surfer for a year or two. The new boat had to do more than that to justify the effort. As VSR2 was being built, Paul Larsen remarked, "The first boat did what it was supposed to do… although she briefly emerged as the fastest boat in the world, she never achieved the outright speed record. The record was like a mirage: as we got faster, so did the record". He went on, "I still believe our first boat could break that record but I also know she is near her limits. As a team we are now well positioned to design and build a much better, safer and above all faster boat which is more suitable for the challenges to come."

Design Concept

In conventional monohulls and multi-hulls the sail heeling moment is typically countered by weight and buoyancy righting moments. This results in limits to stability in both the roll and pitch directions and so has the consequence of limiting the driving force that can be applied. Such craft are also sensitive to wind gusts

VSR2 employs a concept first proposed by Bernard Smith in the 1960s in which the sail and keel elements are positioned so that aerodynamic and hydrodynamic forces are in alignment so there is virtually no overturning moment and no net vertical lift. When correctly implemented, this results in a boat which has no obvious stability limits and for which the only significant response to gusts is an increase in speed. This allows the boats to handle large sail powers without tipping over. When the boat is traveling at 50 knots, a 20 knot breeze translates to a 50 knot gale over the wing sail at a point where all the drag is balanced by the sail thrust. Calculations suggest the boat should be capable of a boat speed to wind speed ratio of 3:1.

Profile and plan views of Vestas Sailrocket 2

The boat is supported by three floats with sufficient volume to provide adequate slow speed stability. These are all V-shaped stepped planing hulls optimized for low hydrodynamic drag at high speed but also as low an aerodynamic drag as possible even when flying at 20 degrees to the direction of the wind. The front float has a very strong floor to deal with the pounding it will get at high speed.

The boat will lift onto the curved portion of the foil keel element at around 25 knots. At higher speeds, the leeward float and aft float are intended to fly clear of the water and only the main foil, the rudder and the 'step' of the forward float should remain in contact with the water.

The "fuselage" is angled at 20 degrees to the direction of travel so it points directly into the direction of the 'apparent' wind at high speed to both reduce drag and increase stability. In fact, the entire boat including rigging has the equivalent aerodynamic drag of a 74 cm diameter sphere.

The fuselage has been designed to accommodate a passenger. For a given wind force, the addition of an 80 kg passenger is estimated to reduce peak speed by around 2.5 knots, which corresponds to sailing with only the pilot in 1 knot less wind.

At low speed, the boat will be predominantly steered by moving the beam and wing forward by up to 3 meters to help the boat turn away from the wind. As the boat accelerates the beam is moved aft until it is at 90 degrees to the fuselage.

Design Criteria for VSR2 include:
-Dynamically stable in a number of conditions including a total main foil failure at 60 knots.
- Able to handle sailing loads over 60 knots including a 1G turn with a realistic safety margin.
-Operate over 50 knots in winds from 20-30 knots and in much rougher water than the first boat.
-Wing must be very easily managed and fully de-powered when the main sheet is eased.
-Must be able to carry two people at world record speeds with no reduction of safety margins.
-Highly configurable, modular and easily folded to fit in a 40 ft. length container.
-Enough structural reserve to upgrade for faster future attempts if necessary. [Note: Part 2 of this article will appear in the next NL.]

WELCOME NEW MEMBERS
(Continued From Page 2)

provided embedded engineering services to the intelligence community. Mark received his BSEE degree in 1991 from Johns Hopkins University.

Tony Wilcoxson- Tony is the Marine Business Development Manager for Vericor Power Systems located in Atlanta GA. Vericor is the OEM for the well-known TF series of marine gas turbines as used by the US Navy on the LCAC. Vericor is currently delivering engines for the LCAC SLEP program as well as other naval and commercial programs worldwide. Tony has had the pleasure of working on a number of interesting craft development programs and keeps abreast of hovercraft, SES and hydrofoil and similar programs and opportunities worldwide. Tony has a BS in Mechanical Engineering from the University of California and has worked in the gas turbine and aerospace industry for over 25 years. He recently served as chairman of the International Gas Turbine Institute Marine Committee and when not talking to yacht builders, shipyards or foreign navies about the advantages of gas turbine propulsion Tony is usually on Lake Lanier in his 20 ft SeaRay (not turbine powered though).

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IHS OFFICERS 2011 - 2012

John Meyer	President
Mark Bebar	Vice President
Frank Horn	Treasurer
Joel Billingsley	Secretary

Tacoma Maritime Fest welcomes the IHS
(Continued From Page 9)

Here is an incomplete, but growing, list of hydrofoil events in various stages of commitment and planning for the Tacoma Maritime Fest of August 25 & 26:

-Harry Larsen will do hourly demonstration Flights of Talaria IV.

- Jim Chismar, president of United States Hydrofoil Association, may provide demonstration flights of the Air Chair and Sky Ski. Possibly, he will allow some spectators to take a test ride on the Air Chair. See http://www.hydrofoil.org/Contactus.html

- Little Squirt static exhibit is hoped for, but someone needs to work with Boeing.

- All American Marine, Bellingham WA, may provide a hydrofoil assisted catamaran ferry for exhibition: http://www.allamericanmarine.com

- Greg Jacobs has volunteered to provide a Rave and perhaps a Slatts 22. Greg may request local assistance. Contact Greg at: gregjacobs @wavecable.com

- Bob Kertell, Seattle Naval Architect, is working to put together a booth or joining with the IHS booth to display his proposed world record breaking hydrofoil sailboat. The present record is held by L'Hydroptere of France. See Bob at: http://www.linkdin.com/pub/robert-kertell/43/39a/b60

- Sam Bradfield, Tom Haman, and Mike McGarry have volunteered to provide demonstrations of their latest Osprey hydrofoil sailing boat. The boat was designed by Hydrosail. Hydrosail also designed the Rave sailing hydrofoil.

- Ray Vellinga has offered to allow showing of all 22 videos now posted to Youtube.com (listed under the Youtube channel: rvell7829):

Volunteers, so far, to man the IHS booth and/or other booths: Ray Vellinga, Bill Hockberger, Frank Horn, Sumi Arima, and Bob Kertell.

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

2009-2012	2010-2013	2011-2014
Mark Bebar	Sumi Arima	Joel Billingsley
Dennis Clark	John R. Meyer	Martin Grimm
William Hockberger	Joel Roberts	Captain Frank Horn
George Jenkins	William White	John Monk

The NEWS LETTER

International Hydrofoil Society

PO Box 51 - Cabin John MD 20818 - USA

Editor: John Meyer | Third Quarter 2012 | Sailing Editor: Martin Grimm

FLAGSTAFF REVISITED
Part 2

By Irwin (Irv) Palmer

During the vessel's deployment to Viet Nam, we Grummanites weren't invited along on their combat patrols, where their function was the interdiction of local sea traffic sneaking down in sampans from North Viet Nam, carrying all sorts of contraband, mostly explosives, and rocket parts, to supplement those coming down the Ho Chi Minh Trail inland. The Operational Code Name was Markettime. (We were only about 20 - 30 miles from the DMZ, so there was a lot of traffic.) So we hung around and toured DaNang when we could hitch a ride. We also stopped in at the airbase to see how our other Grumman products were holding up. (Oh yes. Grumman built many of the aircraft in use there.) But there in downtown DaNang, tied up at the waterfront was the German hospital ship HELGOLAND, which offered free medical help to the civilian people, ill or wounded, VC, it didn't matter. In return for this, many of the injured often passed along info to the ship's crew about impending rocket attacks, so from our base on the other side of the harbor, we kept a careful eye on the HELGOLAND: If she leaves, hold your ears! Well she left one afternoon, and

Flagstaff Dockside at Da Nang

See FLAGSTAFF, Continued on Page 3

SUSTAINING MEMBERS

YOUR 2012 IHS DUES ARE DUE

See Full Announcement on Page 2

INSIDE THIS ISSUE

PRESIDENT'S COLUMN

To All IHS Members

I want to let you all know that I have given this a lot of though during the last several months and concluded that I should step down as President of the International Hydrofoil Society at this time. I have been serving as President since April 1991. That is a long 21 years, and I have reached the age of 89 (this October). So now is the time for younger blood to take over.

As a result, at the July 18 Board of Directors meeting, the following officers were elected to serve during the 2012-2013 time frame: President, Mark Bebar; Vice President, Joel Roberts; Secretary: Joel Billingsley; Treasurer: Captain Frank Horn. Also at this meeting, John Monk, Nominations Chairman, presented the results of the recent election of the Board of Directors for the Class of 2012-2015. They are Mark Bebar, George Jenkins, Leigh McCue-Weil and Raymond Vellinga.

YOUR 2012 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.

The last several Newsletters referred to the Tacoma Maritime Fest that will take place on August 25 and 26 of this year. Ray Vellinga prepared a follow-up article about some of the participation of the IHS and others; see page 9 of the second quarter NL. We encourage participation of IHS members. Please make contact by email.

Also, we are looking forward to the PHM/IHS "gathering" in Key West, Florida. Frank Horn reported on key conclusions of the planning committee. See page 9 of the second quarter NL for his brief report.

I call your attention to 2 events in which IHS participated. A joint meeting was held with SNAME SD-5 Panel on June 12 at the Army- Navy Country Club in Arlington, VA. Robert Wilson and Dr. Alfred Skolnick spoke on the subject: "T-Craft — What, Why & How?" See page 7. Also, IHS had a booth at the American Society of Naval Engineers hosted High Performance Craft Expo (HiPer Craft 2012) on June 26-27, 2012. This special event focused on suppliers, operators, maintainers, and equipment vendors in the high performance boat and craft community (see page 7).

On the subject of new IHS members, we always encourage our members to recruit their colleagues and others to swell the ranks.

As your NL Editor, I continue my plea for volunteers to provide articles that may be of interest to our members and readers. Please send material to me. I will be pleased to hear from you.

Best regards.

John Meyer, IHS Past President

WELCOME NEW MEMBERS

W. Scott Weidle – Scott is a Naval Architect at the Center for Innovation in Ship Design (CISD), Naval Surface Warfare Center, Carderock Division in Carderock, Maryland. At CISD, Scott undertakes projects relating to conceptual future ship designs and new systems integration on current vessels. Scott studied ocean engineering at Virginia Tech (VT) and graduated in May, 2011. He is currently undertaking graduate studies at VT and pursuing an MS degree part-time. As a member of SNAME's T&R Panel SD-5 and IHS, he has a genuine interest in advanced marine vehicles and currently manages the SD-5 microsite.

Kevin W. Silbert - Kevin is a 1992 graduate of University of Maryland College Park, MD where he majored in Mechanical Engineering. His first job was with Fusion UV Systems where he worked on UV Curing equipment, Microwave powered lamps and their support equipment. After some time as a NASA contractor, he went to work for TriMech Solutions, demonstrating, teaching, and performing technical support for the SolidWorks line of 3D CAD software. He later joined MAPC where he has been working on some basic mechanical hydrofoil structures projects. His latest projects include an improved electromechanical track tensioner for the Bradley Fighting Vehicle, and several proprietary marine testing programs for government clients. He has a PE license in Maryland and is currently volunteering as the Chair of the SAE International Baltimore Section.

FLAGSTAFF
(Continued From Page 1)

that night, about 2 AM, all hell broke loose. The next day, I found 2 bullet holes in my locker, and a hole through one of my shirts. Sighting through the 2 holes in the sides of the locker, I could see a house across the highway alongside our fence, obviously having some unfriendly folks, so from then on we minimized the use of lights in the barracks. (These were the original French barracks, and were open all around for ventilation.)

FLAGSTAFF (and TUCUMCARI) crews lived aboard and complained about the heat. (Ventilation was, but air conditioning was not part of the Navy's Spec.) But it didn't take long before the enterprising FLAGSTAFF crew "found" ("rescued", "appropriated", "acquired") a big commercial air conditioning package, with water-cooled condenser, which they got working on the dock alongside. The unit got "lost" on its way to the Air Force side of the DaNang airstrip, where all quarters were air-conditioned. However, the Marine Corps pilots lived in tents on the opposite side of the airstrip. They called it "Dogpatch"! TWA had a small shed alongside the airstrip to handle a weekly supply flight. Its sign said "Teeny Weeny Airlines", but they weren't selling any tickets!

Another irony of this war: The Marines had devised a sneaky way of getting infiltrators, by hanging empty cans as noisemakers on the barbed wire fencing. It was effective. We were awakened one night by a lot of small-arms fire just behind our barracks, which daylight disclosed to have been caused by a couple of cows who wandered into the noisemakers. They were rendered quite dead. But we heard later that the farmer who owned them was suing the United States for a small fortune: Those cows had to be the finest and most valuable in the world!

During one of FLAGSTAFF's night missions, she hit something while foilborne. Daylight showed that the leading edge of one of her aluminum foils was damaged in the form of a series of large gouges, each gouge being about ½-inch deep, and shaped like a wire rope. We never did figure that one out, but theorized that Charlie had hung some steel cables under some buoys (not visible on radar) to trip us up. Another theory was that we ran through fishing nets, similar to those strung out off the coast of Rhode Island, but the intelligence guys said that their fishing equipment isn't that modern or heavy duty.

Which brings up another interesting difference between the FLAGSTAFF and TUCUMCARI: Our foils were machined from aluminum forgings (of 7075 alloy, as I remember), while theirs were of machined stainless steel. The fatigue life of aluminum in seawater is quite low, but with the proper coatings, it could equal or exceed that of uncoated stainless steel. As the foils were to be retracted while hullborne, we believed that we could achieve lower CG height and better stability with aluminum foils. (We still had to meet the Stability and Buoyancy Criteria for US Naval Surface Ships for the design to be acceptable.) The leading edge repair involved some eyeball grinding and filing, and coatings. The resulting shape operated well enough that we couldn't detect any performance change.

Part of FLAGSTAFF's life on the California Coast after returning from Viet Nam involved other tests and challenges, some of which to this day I believe that Boeing helped formulate. One test involved the FLAGSTAFF flying near an underwater explosion of 10,000 lbs of RDX. (If I were a crewmember, I'd be thinking about a transfer to a desk job after that one.)

Another project involved installing and firing a 155mm howitzer turret on the foredeck, and being able to hit a target ashore while foilborne. She not only hit the target (a tribute to the FLAGSTAFF's Gunner's Mate) but she easily withstood the recoil impact (a tribute to Grumman Iron Works!).

As a final comment on this program, I have to admit that it was very interesting and challenging, and I'm glad that both hydrofoil crews did their thing and got out with no losses. I'm also certain that the Navy learned some very valuable lessons about these vessels, and the viability of the concept.

FLAGSTAFF flying near an underwater explosion

JETFOIL- THE UGLY

This is the last of a multi-part series by **Bruce Bryant, IHS Member** of experiences, observations and comments of his 25 years with BMS as a test engineer and manager from 1962 to 1987. All personal comments are my own and do not reflect the opinions of other employees or the Boeing Co.

In 1982 over half the Jetfoil services had shut down. The survivors were Hong Kong, Japan, Belgium and the Canary Islands. Our Alaska State Ferry demonstration with the Aries was designed to expose Jetfoil to Southeast Alaska. This would be BMS last major attempt to sell more Jetfoils since the number of customers was dropping faster than we were adding new ones. In other words, things were getting **ugly** at BMS.

After a month of preparations it was finally time for the Aries (017) to embark on her four week Southeast Alaska summer demonstration. It took us three days to get to Ketchikan with overnight stops and refueling at Port Hardy and Prince Rupert, Canada. The demonstration officially started in Ketchikan Alaska with a visit to Metlakatla and various other trips to bays, sounds and glaciers.

We spent three days in the Ketchikan area before preceding North through the Wrangell Narrows to Petersburg. The next day we visited Wrangell where we gave all the city officials a ride. On the way North to Juneau we stopped at Kate and did the same routine. The next couple of weeks we ran scheduled passenger service out of Juneau, the Capital of Alaska.

The ARIES at Hoonah Alaska, Winter 1983

The westward routes included stops at Hoonah, Angoon, Tenakee Springs and Sitka. The northward stops were at Haines and Skagway on the Lynn Channel. The Aries returned to Seattle after the summer demonstration, then returned again in January 1983 for a three week winter evaluation. The mission was to access the harsh winter weather and rough water conditions around the Juneau area. Unfortunately the winter of 1983 in Southeast Alaska wasn't all that severe but we did experience some high winds, sea state 4, and lots of icing from spray. We went as far West as we could, up Icy Strait, past Glacier Bay, into Cross Sound to the Pacific Ocean and North up the Lynn Canal. The Aries again returned to Seattle completing two successful demonstrations in Southeast Alaska. It seemed at the outset that Alaska State Ferries System wanted a high speed ferry that would carry passengers and cars. This was another misunderstanding between the BMS Sales department and the customer.

Another Jetfoil worthy of mention was a special rendition built for Saudi Arabia. This was boat 023 the "Aziz ll" that was jazzed up with gold fixtures and elevator to the upper deck. Boeing built the bare boat and Lockheed did the opulent outfitting. The Aziz ll was delivered to Saudi Arabia in 1984 to support the royal yacht Prince Abdul Aziz.

There was a break in Jetfoil production between 1981 and 1984 due to a lack of new orders and a saturated used boat market in Asia. The next two Indonesian boats were 929-119-024 and 025 which were special military versions a lot like Speedy with a single deck. These boats were launched in 1984 and delivered to the Indonesian Navy in 1985.

Launch of Indonesian Boats, Renton in 1984

The last Canadian demonstration was for Island Jetfoil from April through September 1985. The leased boat was the Aries and was renamed the "Spirit of Friendship" and as many times before ran out of Seattle with Boeing crews. The morning run was a round trip to Victoria and a afternoon round trip to Vancouver with a stop in Victoria. Again this was a very successful and popular demonstration with only a few schedule delays. We all enjoyed these times because we knew it was our last. Boeing sold boat 017 to Tokai Kisen in Japan. The last boat Boeing built was a 929-117-026 launched and delivered in 1985 for Kyushu Yusen in Japan. There were two partially constructed Jetfoils on the production line at Renton and I think they were the last incompleted

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JETFOL - THE UGLY

(Continued From Previous Page)

boats for Indonesia (929-120- 27 and 28) but I am not sure.

Boeing stopped production of Jetfoils in 1986 and the patents, naming rights and over a million dollars in materials were sold to Japan's Kawasaki Heavy Industries in 1987. Boeing also sold the remaining 350,000 out of the one million gallons of fuel it had bought and stored at the pier 91 fuel farm in 1973.

In 1987 the BMS SST (Ship System Test) group was disbanded since there was no more testing or Demonstrations. Product Support took over what was left of BMS supplying field expertise and updating manuals to existing customers. After shoveling paper work for about six months I was asked to find another job or be laid off. In retrospect the Jetfoil program did result in a legacy in that most of all the boats Boeing built are still running with a predicted service life of 25 years. Most of the boats ended up in Hong Kong, Japan, South Korea and Indonesia. Added to the Boeing fleet of Jetfoils there were 15 Kawasaki and a couple of PS-30 boats built in China from 1989- 1994. It's ironic that all the military hydrofoils except for a couple museum pieces that Boeing built or supported are just piles of scrap and that was their legacy. The fact is that submerged hydrofoils was a technology looking for a mission and there was no defined military mission. The commercial submerged hydrofoil was rated superior in comfort and rough water capabilities which seemed at the time to be fundamental characteristics for any high speed passenger carrying boat. The question is, how much are customers willing to pay for characteristics that are not really necessary? In Asia, where there are many Jetfoils, they are competing with Flying Cats, Foil Cats and Tri Cats which are cheaper to build and cost less to operate and maintain and offer the same type service. The reason there are so many Jetfoils still operating in Asia is because they failed to operate in other parts of the world due to nasty weather and heavy seas. Besides most are used boats bought for a substantial discount from Boeing customers that went out of business.

The real winner here is FEH (TURBOJET) who picked up 14 used Jetfoils in the 70's & 80's with some sold to South Korea for a profit. The 15 Kawasaki 929-117 boats built from 1989-93 were all sold to Japan. The two PS-30's that were built in China in 1994 went to FEH and later one was sold to South Korea.

Of the 30 years I spent at Boeing the first 10 years (1962-72) were the most rewarding with all the hydrofoil related R & D projects. The next 15 years were very stressful with lots of travel to customer locations running charters, training crews, launching and testing new boats and of course the countless demonstrations. The last 5 years were spent on meaningless jobs with Boeing Aerospace Division until I retired in 1992. As I look back at my 25 years at BMS I was proud of our accomplishments and to be part of a technology that only Boeing could have achieved. Yes, there were mistakes, misunderstandings and personality problems but the Boeing Marine Systems Division reflected Boeing's diverse aerospace expertise that could be applied anywhere at anytime even though it cost them millions of dollars.

REMEMBERING JEAN EMIL BUHLER

Jean Buhler, 94, passed away February 29, 2012. A resident of Miami for many years since 1931, he and his brothers founded Miami Shipbuilding Corporation, the largest employer in Dade County during the Second World War. He went on to a distinguished sixty-year career in varied fields of the marine design and construction industry.

Jean was born October 7, 1917 in Hazleton, Pennsylvania. Jean spent his youth in this small anthracite coal town and beautiful hills and valleys surrounding it. In 1931 he went off to attend The Hill School, a prep school in Pottstown, PA where he graduated in 1936. In the meantime Jean's father retired due to health reasons and the family moved to Miami.

Jean attended the Stevens Institute of Technology in Hoboken and then the University of Michigan, where he graduated with a degree in naval architecture in 1941. He then returned to Miami where the family had purchased the old Fogal Boat Yard on the Miami River in 1935 and founded Miami Shipbuilding Corporation (MSC), which became one of the largest employers in Dade County. During World War II Jean worked as a designer of various vessels constructed for the US and

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REMEMBERING JEAN BUHLER

(Continued From Previous Page)

Allied Navies. MSC constructed PT Boats 1 and 2 and hundreds of 63' Aircraft Rescue or 'Crash" Boats. Jean continued at MSC and became involved in the 1950s with development of a pioneering hydrofoil vessel for the Navy as well as other designs for the Navy and CIA.

After the family relinquished control of MSC in the 1960s Jean formed a team to develop passenger hydrofoils, designing several vessels that saw testing and use in the Bahamas, New York and the Great Lakes, years ahead of their time. In 1973 he joined inventor and oceanographer Edwin Link, who was developing the Harbor Branch Foundation oceanographic institute in Ft. Pierce.

After returning to Miami, Jean continued to work as a consultant and designer well into his 80s. Among his projects were a hydrofoil feasibility study for Congress, stability tests for major cruise ships world-wide, conversion of vessels for use as casino boats and service as an expert witness on vessel stability in courts in the US and Europe.

Jean was a Life Member of the Society of Naval Architects and Marine Engineers, where he helped to found and chair the Southeast Section. He was also active with the International Hydrofoil Society, the Stevens Institute of Technology Alumni and Chi Phi Fraternity Alumni, and organizations devoted to research and preservation of the 63' Air-Sea Rescue Boat. He authored a number of articles and papers published in professional journals and gave presentations on aspects of vessel design to a variety of organizations.

THE FIRST ISSUE

From Fast Ferry International, October 2011

It was 50 years ago, in October 1961, that Kalerghi-McLeavy Publications launched Hovering Craft & Hydrofoil. The magazine carried the strap line "The International Review of Ground Effect Machines and Hydrofoils".

The editorial in the first issue stated, "Eight years have passed since the introduction of the world's first scheduled hydrofoil service on Lake Maggiore. Since then the technical development of the hydrofoil has continued apace, but when compared with the jet airliner — a comparable transport innovation — none will deny that the rate of application of the commercial hydrofoil has been disappointingly slow." However, the editorial continued, "A growing interest in hydrofoils is now apparent, and we believe that their present number will have been multiplied one hundredfold within a few years."

The hydrofoil pictured on the cover of the first issue of Hovering Craft & Hydrofoil was Sirena, a PT50 designed by Supramar and launched in 1960 by Cantiere Navale Rodriquez for the Finland Steamship Company. The PT50 returned to Italy in 1967 and for the next 28 years the renamed Freccia Atlantica was part of the fleet of Aliscafi SNAV, the ferry division of Rodriquez. The vessel was scrapped as recently as 2004.

Hydrofoils

In Washington State, Boeing's interest was in hydrofoils. This had "not become generally recognised until 1960, when the U.S. Navy announced that the company had been awarded a $2 million contract for construction of a hydrofoil subchaser, the 110-ton PC(H) [which] will fly on fully submerged, subcavitating foils."

The US Maritime Administration had become interested in hydrofoils in 1955 and studies had already led to the construction of HS Denison, an 80 ton craft capable of a speed of 60 knots intended to serve as a test vehicle for considerably larger craft.

The hydrofoil was not a recent concept though. In an article entitled 'Design and Operating Problems of Commercial Hydrofoil Boats', Baron H. von Schertel of Supramar wrote, "It has taken a comparatively long period of time (some 50 years) to develop the hydrofoil into a type of craft now commercially applied as a 'new' means of transportation."

Supramar's licensee in Italy was the shipyard of Leopoldo Rodriquez in Messina and the magazine included two pages of photographs of hydrofoils under construction there. "Since 1955 Rodriquez have built more hydrofoil craft for commercial operation than any other concern — fifteen PT 20s and nine PT 50s, delivered to thirteen operators."

Continued on Next Page

THE FIRST ISSUE

(Continued From Previous Page)

Enthusiasm was not in doubt, as the first issue of Hovering Craft & Hydrofoil shows. The magazine provides a snapshot of all that was going on in the hovercraft and hydrofoil industries in 1961, the keen activity on both sides of the Atlantic and the interest reflected around the world. Only developments in the USSR were still hidden behind the Iron Curtain.

JOINT DINNER MEETING

In what has become a tradition, IHS combined forces with SNAME SD-5 Panel for a joint dinner meeting on June 12 at the Army Navy Country Club in Arlington, VA. The after-dinner presentation was on the subject: T-Craft —What, Why & How? by Robert Wilson and Dr. Alfred Skolnick.

Al Skolnick and Bob Wilson

The T-Craft is an amphibious concept combining the best capabilities of the catamaran, surface effect ship and air cushion vehicle. It answers ONR's requirements for a seabase- to-shore "connector" capable of self-deployment across open ocean, high speed while fully- loaded, operation in relatively shallow water, good sea-keeping for at-sea cargo transfer, and fully amphibious delivery "feet dry" on the beach. The presentation covered the importance of the T-Craft concept, its key technologies, development of its configuration by three design agents, and technologies warranting further attention in the near term.

After the presentation and during the question and answer period, Al Ford noted the following: A Commander from the Australian Embassy (Naval Attache) commented that the T-craft might meet their emergent Humanitarian Assistance/Disaster Relief (HA/DR) needs. Mark Bebar recommended that this presentation be given at a meeting of NATO Maritime Capabilities Group 6 [MCG 6], emphasizing the HA/DR mission and the sea state 4 and 5 operational capability.

Michael Wilson asked about the choice of water jets for ocean-going performance, considering that water jet efficiency drops off significantly at 20 knots and below. The answer was that a flat inlet was needed to have the SES catamaran hulls sit on a beach; propellers would not do the job.

David Kaysen stated that LCAC had a requirement to clear 4-foot obstacles, and asked whether T-craft had a similar requirement. The answer was that some model tests were done which included obstacles, but there was no specific requirement for this capability. Al Skolnick asked Robert Moore from Textron Marine what the record speed was of the SES-100B. He said 93 knots (a world record speed for a naval ship).

A copy of the presentation is available on the IHS website:
http://www.foils.org/mtgpapers.htm

IHS AT HIPER CRAFT EXPO

By Frank Horn

The American Society of Naval Engineers (ASNE) hosted the High Performance Craft Expo (HiPer Craft 2012) on June 26-27, 2012 at the Half Moon Cruise and Celebration Center in Norfolk, VA. This special event focused on suppliers, operators, maintainers, and equipment vendors in the high performance boat and craft community.

The IHS participated as an exhibitor at this Conference. There were 45 Exhibitors and over 550 attendees participating in the 2 day program. Many attendees visited the IHS booth that was manned by Mark Bebar, Joel Roberts, and Frank Horn (shown here in the picture). Attendees were provided with a Hydrofoil Overview, and a Brief Tutorial written by John Meyer. In addition, two of our IHS engraved stainless steel thermal mugs were given away on a promotional basis to aid in attracting attendees to our booth. Pictured here is Elmo making the draw for one of the winners.

DO YOU REMEMBER AMPHIBIOUS HYDROFOILS?

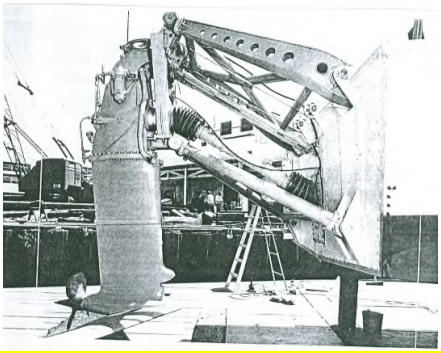
From Ships That Fly

"HALOBATES", designed and completed in 1957 by the Miami Shipbuilding Corporation, was a development that grew out of a desire of the Marine Corps to increase the speed of approach to landing on the beach. They noted that these speeds during the Korean War landings had not changed perceptibly since William the Conqueror headed for a beach in 1066. As a result, a program was initiated in 1954 to evaluate a hydrofoil-supported landing craft, designated LCVP.

Halobates with feeler arms

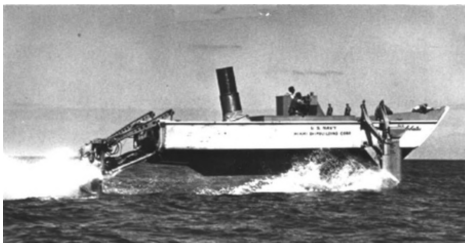
One version of the craft is shown here with "feeler" arms adapted from the Hook system. The name, HALOBATES, was suggested by the Marine Laboratory of the University of Miami since halobates is a sea going insect which has forward extending feelers. The hydrofoil HALOBATES, a modified small landing craft, was 35.5 feet long with a beam of 11.7 feet and a full load displacement of 31,000 pounds. A 630 hp gasoline engine provided power for the craft which demonstrated speeds up to 34 knots in 5-foot waves. The design was complicated by the use of many ball and screw actuators necessary to provide retraction of the foil and propulsion system for the landing craft requirement. However, in spite of its relative success, this configuration led to a comment which in essence said: "If this is the way hydrofoils are to be built, we have no use for them in the Navy!". The feeler concept was certainly objectionable, and so, feelers went their way.

An interesting aspect of the HALOBATES design was associated with the landing craft requirement. Not only did the foil and propulsion systems have to retract, but they were to continue to operate during the retraction process, that is, the craft was to be capable of flying continuously from relatively deep water up to the point it became hullborne as the water became very shallow. The aft propulsion "out-drive", shown in the accompanying picture, had not only to provide thrust during retraction, but remain steerable at all times.



Retractable, steerable propulsion system

Because of objections to its feelers, HALOBATES was reconfigured with an electronic automatic foil control system. The feelers were removed and a step-resistance incorporated along the leading edge of the two forward struts. This feature provided a height signal, based on wetted length, to the autopilot, which in turn controlled foil lift. Also, it was decided to replace the reciprocating gasoline engine with an Avco T-53 gas turbine engine providing about 1,000 hp.



Reconfigured Halobates

The photo here shows the reconfigured craft. The gas turbine installation in HALOBATES marked a notable technological "first" for hydrofoils in particular, and in the marine field in general. The second LCVP(H) was built by Baker Mfgr. Co. in the early 1960s and was named HIGH LANDER. It had four surface-piercing V-foils which were retractable and it could carry a payload of 8,000 pounds to the beach at 40 knots. It was also a modified

High Pockets

LCVP and was designed along the lines of HIGH POCKETS but weighed about 10 tons in the light condition.

During this period the U.S. Army also became interested in the potential of foils to increase the speed of

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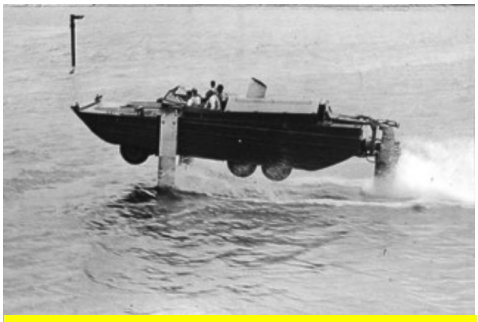
AMPHIBIOUS HYDROFOILS
(Continued From Previous Page)

their amphibious DUKW. Miami Shipbuilding, working with Avco-Lycoming, was awarded a contract in 1957 to demonstrate a "flying" DUKW. An Avco T-53 gas turbine engine was installed along with an electronic autopilot like that in HALOBATES. Retractable submerged foils were attached to complete the modification. Trials were run near Miami, Florida during which a speed of about 30 knots was achieved in calm water compared to the DUKW's normal water speed of only 5 knots.



Flying DUKW

The U.S. Marine Corps continued to have interest in the use of hydrofoils on wheeled amphibians. This led to their award of contracts for two competing designs of an LVHX.

The LVHX-1, was built by Avco-Lycoming, and the LVHX-2 by FMC. Both were designed to meet the same requirement with aluminum hulls 38 feet long and a capability of carrying a 5-ton payload at a speed of 35 knots.

LVHX-I had a submerged foil system and LVHX-2 employed surface-piercing foils forward with a single submerged foil aft.

During the trials program that followed it finally became clear that the

AVCO-Lycoming LVHX-1

FMC LVHX-2

complexities and costs of such features as foil retraction and high speed gas turbine propulsion presented too great a penalty to pay for the increased water speed. As a result, further pursuit of hydrofoil landing craft was terminated.

[Editor's Note: This is another example of the age-old question: "What Price Speed?"]

FLAGSTAFF JOINS THE COAST GUARD

In late 1974 the Navy loaned FLAGSTAFF to the U.S. Coast Guard for several months for evaluation in performing their expanded 200-mile offshore coastal patrol role. The Coast Guard commissioned the ship, manned it with their personnel, maintained it, and evaluated her in actual and simulated missions while operating out of San Diego and other Southern California ports.

During its sojourn there, it was FLAGSTAFF to the rescue! A 40-foot cabin cruiser, several miles off shore late in a winter evening, was reported to have an electrical fire on board. Minutes later, cutter FLAGSTAFF was dispatched from her dock at Port Hueneme, and proceeded at about 55 mph to the search area. A private sailboat reported no signs of survivors on the cruiser, which had quickly burned to the waterline. An accompanying Coast Guard chopper flew a search pattern of the area, dropping flares; but there wasn't a sign of survivors. When the chopper had to return, FLAGSTAFF's skipper took over command of the search operation, and shortly the crew spotted a hatch cover and other debris in the water. Time was of essence! The 55 degree water temperature was no time for a slow boat! Coast Guardsmen entered the water shortly after a shout from one of the survivors.

FLAGSTAFF in U.S. Coast Guard Colors

Later, the official Coast Guard report stated: "Reaction time of FLAGSTAFF-type craft allowed timely arrival of surface craft to participate in an offshore maritime distress".

It was the very next day that a similar distress message was received and FLAGSTAFF again took off in 40-knot winds and 3 to 5-foot seas to rescue two men whose boat had capsized.

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SAILOR'S PAGE

Vestas Sailrocket2

[This is a continuation of the article from the Second Quarter 2012 NL.]

Originally a feathering wing was considered a necessity to allow towing the boat back to the start of the course after each run. However this feature was not seen as a priority on early trials which permits a reduction and simplification of the amount of lines necessary to control VSR2.

Cavitation

Sailboats rely on foils of some form to counteract the side-force of the wind and to stop the boat drifting sideways excessively. At speeds around 60 knots, virtually all foils will experience cavitation. The foils on VSR1 had relied on fully wetted foils. However once these foils cavitate, drag increases substantially while also causing a loss of control.

VSR2 is designed to be dynamically stable. At high speed the pilot should be able to take his hands off the controls. VSR2 is also designed to have enough power and efficiency to be able to drag a cavitating foil through the water at over 60 knots. One of the goals of VSR2 is to confront cavitation head on: "just like the sound barrier, once you are through… you are through". If the Sailrocket team achieves that aim and secure a record, they will have proven a point. However the team does not expect this challenge to be easy or the results to come automatically.

Construction

The boat was designed and built by the Sailrocket team in the VESTAS R&D facilities in East Cowes on the Isle of Wight and took 16 months to construct.

The main structure is made from SP Gurit pre-impregnated carbon fibre with a Nomex Honeycomb core. Titanium is used throughout. The main foil was constructed by Composite Craft in Cowes. The foils were cured in autoclaves at Green Marine.

The wing is based around a tapered, filament wound carbon main spar supplied by Compotech. The ribs are carbon on 38kg Styrofoam (standard for under floor insulation). The leading edges are 80gm glass on 5mm foam core or 200gm SP GURIT carbon at ±45 degrees on a 5mm foam core depending on location. The all up weight of the sail is around 65-70kg. The wing skins are a polyester heat shrink film supplied by HIFI Films.

VSR2 has a Cosworth data logging system measuring everything from wind speed to structural loads. Record runs will be timed using Trimble GPS systems.

Following a 15 month construction period at the Vestas Technology R&D's facilities on the Isle of Wight, the Sailrocket team launched VSR2 on 8 March 2011.

Dimensions

Empty weight:	275 kg
Length:	12.2 m
Width:	12.2 m
Total wing area:	22 m^2
Projected wing area:	18 m^2

The wing was designed by the Sailrocket team but was largely the responsibility of Chris Hornzee Jones and Wag Feng at Aerotrope. Whilst driving area is only 2 m^2 larger than the wing of VSR1, it has a number of features which make it much more efficient and stable. It is thinner with a "reflexed" trailing edge which stops the wing from going into a negative lift when sheeted out. While the thinner is more efficient at speed, it is also more prone to stalling at low speed than the wing on VSR1.

The wing is inclined at 30 degrees to match the inclination of the foil it opposes on the other side of the boat.

As VSR2 is designed to sail in one direction, the wing is asymmetrical. It is set up for a starboard tack to suit the preferred speed sailing site at Walvis Bay, Namibia.

The wing is comprised of seven separate parts, each with a specific role:

The **WING FILLET** forms the "elbow" in the wing where the wing connects to the beam joining it to the hull. This connection is via a large, high-tensile ball joint. A 600 mm stub projects out the top of the fillet section with a steel ball on it. The main mast sleeves over this and has a cup in it allowing the main wing to rotate. The fillet section also has a female sleeve into which the horizontal Wing Extension fits in. The wing fillet is fixed off to the beam at a pre-set angle of 10 degrees to the wind. It is not sheeted whilst sailing but rather used as a sheeting point to control the angle of the Lower Wing which is immediately above it.

The **LOWER WING** with 7m^2 area is immediately above the Wing Fillet. It can rotate around ±45 degrees but is

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Vestas Sailrocket2

(Continued From Previous Page)

limited in its ability to rotate by the strut which holds the wing up in compression. It can be sheeted independently from the cockpit via a small mainsheet which runs to the Wing Fillet. The Lower Wing isn't connected to the main spar. Instead, the spar passes through all the ribs so that they are free to float around it. This way it can spin independent of the upper wing elements and can be removed to fit in a container for transportation.

As the Wing Fillet is fixed in relation to the boat, the wing angle sensor uses a laser to measure the difference in angle between the bottom rib of the lower wing and the top rib of the wing fillet.

The **MIDDLE WING** is the largest component of the wing. All of its ribs are bonded onto the main spar so when the spar rotates, this whole section of wing rotates. It can rotate through 360 degrees as it is not interfered by any shrouds or supporting struts. It can be de-powered when the craft is towed back up the course. It is sheeted via a bridle which also pulls in the Lower Wing at the same rate when the mainsheet is pulled. For towing, the whole wing can be locked together using sliding pins between the sections.

The **TRIM FLAP** on the trailing edge of the Middle Wing is adjustable to alter the "feathering" or de- powering properties of this key section of wing. The flap can be removed to reduce the chord of the wing to fits in a 40 ft. container. The **UPPER WING/WINGTIP** cannot rotate through 360 degrees due to its proximity to the shrouds which attach to the top of the main spar. For this reason it is separate. It is sheeted via a bungee that will stretch if the Wingtip does interfere with the shrouds but has enough strength to sheet in this small section otherwise.

The **WING EXTENSION** adds greatly to the overall efficiency of the wing. Previously, on VSR1, the outboard end of the boat was flown by generating lift from the beam. This proved to be inefficient as a bi-plane effect between the beam and the main wing reduced the lift efficiency of the beam. Chris and Wang who undertook the performance analysis for the wing came up with this new solution. It serves the following purposes:

- Creates an effective lifting lever for the outboard end of the boat, making the outboard end of the boat fly. Working in 'ground effect' due to its proximity to the water reduces its induced drag.

- Has the effect of making the wing a much higher aspect ratio, and hence higher efficiency, whilst maintaining a low centre of effort.

The **WING LIFT FLAP** is actively controlled to increase or reduce the lift of the Wing Extension and thus control the flying height of the outboard (or leeward) end of the boat. It will most likely become fully effective at around 50 knots and be controlled by as simple a system as possible. It can't be fixed as the faster the boat travels, the higher the beam will fly and the craft will then loose performance. It must be regulated to "just" fly the leeward float. The aim is that this will not be controlled by the pilot during a run so the team has a number of viable options for controlling it, ranging from a surface sensing wand as seen in hydrofoiling Moth class sailboats to a simple means of mass balancing it so that it only generates just enough lift to fly the pod in ground effect as per VSR1. The team will start with this latter option.

The wing extension combined with lift flap deployment is only intended to lift the wing and beam at around 50 knots. If the leeward float is flying before this, as found at around 38 knots in initial trials, the whole wing is over inclined and will needs to be stood more upright.

Sailing

Leeward pod flying at only 38 knots boat speed indicates that the whole wing is over-inclined, especially as it is doing it without wing lift flap deflection.

Paul Larsen has found that it is more efficient to turn the whole boat to the wind during the start-up and acceleration phase rather than to simply sheet the wing. This allows the wing to be oriented at 10 degrees such that all the sections line up provide greatest efficiency. As the boat accelerates and the apparent wind increases and shifts forward Paul bears away down the course and continues accelerating. To slow down the approach is to sheet out to about 20 degrees. At the end of a run the wing is eased out to around 30 degrees, followed by bearing away to

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Vestas Sailrocket2

(Continued From Previous Page)

provide room to turn into the wind without hitting the shore.

Conclusion as of late 2011

While sensitive to sheeting angle, the wing is well mannered and appears to be delivering all the power required. The feathering feature is not being used, mainly because the team currently feels it isn't necessary. Aside from the design and construction effort incurred, the penalty of this feature is about 7 kg of extra weight.

Sponsors

The long term and major sponsor of Sailrocket2 is Vestas, one of the worlds leading developers and manufacturers of wind turbines for whom Malcolm Barnsley is a senior test engineer. Gurit (formerly SP Systems) have also provided support from the start with their range of composite materials from pre-preg carbon to epoxy resins and bonding agents. Aerotrope, founded by Christopher Hornzee-Jones, the designer of the solid wing sails on both VSR1 and VSR2, has carried out the structural design of the complete platform and created the simulations of the boat's performance, dynamic stability and control. Other sponsors are listed on the team website.

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IHS OFFICERS 2012 - 2013

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Joel Roberts	Vice President
Frank Horn	Treasurer
Joel Billingsley	Secretary

FLAGSTAFF JOINS THE COAST GUARD

(Continued From Page 9)

sized. In both of these rescues it was the hydrofoils high speed capability in adverse weather that was the deciding factor in saving lives.

Subsequent to its evaluation of both the HIGH POINT and FLAGSTAFF, the U.S. Coast Guard concluded that the hydrofoil's ability to achieve and maintain high speed in a given sea state' are an asset. The conclusions in a report said that hydrofoils are not mysterious craft. The training and experience requirements of hydrofoils are no more demanding than that of the modern conventional cutter. However, the speed factor introduces new concepts of crew response and interrelation. Further, improved navigational and collision avoidance systems are mandatory for high speed craft of all types."

As a result of this favorable experience, agreement was reached in 1976 to turn over the ship to the Coast Guard for operation off the New England Coast. It was accepted as a Coast Guard Cutter with the designation WPGH-I on March 2, 1977 at the U.S. Coast Guard Support Center, Boston, Massachusetts. The ship was employed to evaluate the use of hydrofoils for Coast Guard duties.

FLAGSTAFF was returned to the Navy in September 1978 due to problems with its propulsion machinery, lack of spare parts, and problems related to being one-of-a-kind ship.

In an article in High-Speed Surface Craft of December 1983 it was reported that FLAGSTAFF sat afloat at a small boat pier in a salvor's possession at Warwick, Rhode Island in what was described as "a rather disreputable condition". It was an unfitting end for a true "Trail Blazer". But was it really the end? No, thanks to a real hydrofoiler, who in 1988 was successful in acquiring FLAGSTAFF. John Altoonian was amazed to find that in spite of pigeon droppings and mud, the "ole girl" was still pretty much intact. He had FLAGSTAFF raised and towed her to Point Judith, Rhode Island. With all the foils raised, and two small leaks repaired, he towed the craft to his residence on the Inter-Coastal Waterway at Grassy Sound, New Jersey. One can understand that as people on ordinary boats pass by, FLAGSTAFF always gets a second look. John has renamed his hydrofoil "THE GOLDEN EAGLE" since it is a golden oldie; the Eagle represents flight and the USA where it was built.

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The NEWS LETTER

International Hydrofoil Society

PO Box 51 - Cabin John MD 20818 - USA

Editor: John Meyer | Fourth Quarter 2012 | Sailing Editor: Martin Grimm

IHS AT THE TACOMA MARITIME FEST

By Ray Vellinga and William Hockberger

IHS Members

The International Hydrofoil Society participated in the Maritime Fest sponsored by the Foss Waterway Seaport in Tacoma, Washington, on 25-26 August 2012. IHS staffed a booth, with a second booth alongside staffed by Terry Orme and his team dedicated to the restoration effort on PCH-1 HIGH POINT.

The Maritime Fest, free to the public, is a 20-year-old annual event that features an array of activities celebrating regional maritime heritage. The commercial port of Tacoma is one of the West Coast's most active and important. The Foss Waterway is the gateway to Tacoma's

See Maritime Fest, Page 3

SUSTAINING MEMBERS

YOUR 2012 IHS DUES ARE DUE

See Full Announcement on Page 2

INSIDE THIS ISSUE

PRESIDENT'S COLUMN

To All IHS Members

As you know from reading the Third Quarter 2012 Newsletter, John Meyer has stepped down as President of the International Hydrofoil Society after 21 years of outstanding service and leadership of the organization. After consultation with John and as a result of the July 16 Board of Directors meeting, I was elected to serve as IHS President. In recognition of his contributions to the success of the Society and to hydrofoil technology development over a period of many years, the 1st Quarter 2013 Newsletter will include a retrospective on his career. I want to say that while it will be impossible to fill John's shoes as President, I will do my best to further the objectives of IHS. John has generously agreed to continue as Editor of the Newsletter.

YOUR 2012 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.

By way of introduction, I first became involved with hydrofoil design while employed by the Naval Ship Engineering Center (NAVSEC) in Hyattsville, MD where, in the early 1970s, I worked on in-house concept studies for PHM. After contract award, I was assigned to the Navy team that worked with Boeing Marine Systems on the PHM-3 Series follow ship specifications and critical design reviews. Later in the 1970s and 1980s, I participated on various Advanced Naval Vehicle Concept Evaluation (ANVCE) and Surface Ship Concept Formulation (CONFORM) hydrofoil concept studies. It was during this period that I met John and benefitted from his expertise in hydrofoil and hybrid hydrofoil technology development.

The last several Newsletters have referred to the Tacoma Maritime Fest, which took place on August 25th – 26th. This issue includes an article on the Fest, starting on page 1. I would like to thank a number of IHS members for their superb efforts in preparing for and manning our booth at the Fest, including Ray Vellinga, Bill Hockberger, Martinn Mandles, Mike Terry, Sumi Arima, Frank Horn and Terry Orme.

On the subject of new IHS members, we always encourage our members to recruit their 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 to editor@foils.org He will be pleased to hear from you.

Best regards,

Mark Bebar, IHS President

WELCOME NEW MEMBERS

Howard Apollonio – Howard is a naval architect from Lynwood, Washington, not far from Seattle. Howard made himself known in the heydays of hydrofoils when as a university student he designed and flew a surface piercing hydrofoil sailing catamaran. Howard had driven down to Tacoma to the Maritime Fest and was so impressed with the IHS booth he immediately signed up as a new IHS member. Presently, Howard is engaged in designing foil-assisted catamarans as well as conventional yachts and commercial boats.

Hubert Walichnowski - Hubert was born in Warsaw Poland, May 1979. He did his primary (1986-1994) and high school (1994-1998) there as well as started at a University (1999) in Mechanical Eng and IT – (Programming). He then came to Australia and stayed there. His post University experience was mostly Civil Engineering applied to earth-moving equipment, and recently making bio fuels. He is really interested in renewable energy sources; therefore is concentrating on electrical powered vessel with a hydrogen generator as a power source. Hubert is thinking on building a trimaran with overall length not greater then 45 foot and no more then 18000 lb. He is planning to study Naval Architecture in near future as well as start on building his 1st project as soon as he gets everything organized.

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Maritime Fest
(Continued From Page 1

city center and the recreational harbor. The Fest features boats in the water to see and go aboard, boat tours of the Port of Tacoma, and exhibits in the Foss Waterway Seaport Museum. Tom Cashman, Executive Director of the Foss Waterway Seaport Museum, described the festival as follows:

"In its early years older working fishing vessels would be on display and the public could board them for tours. The Seaport, then known as the Commencement Bay Maritime Center, would have a number of youth activities on hand, and the public could see boat builders at work. The festival also had a mass of vendors selling the typical stuff one finds at public weekend festivals, and lots of typical fair food. At our urging in the last decade the organizers have tried to create more interesting events, with some success. One is a "Quick and Dirty Boat Building" competition in which teams are given a fixed amount of materials and six hours to build a boat they must also row in a race of sorts that same afternoon. That activity is lots of fun. Some years there are also dragon boat races; this year high school kayaking teams competed.

A couple of years ago, 2010, the Seaport decided to get more aggressive and invited eight hydroplanes to put on a demonstration. The 2010 Maritime Fest was the most attended weekend in the event's history."

Late last year Tom proposed that hydrofoils be "the star attraction" at 2012's festival and invited IHS to participate. We were quick to accept, because we thought the Fest would provide an excellent opportunity for telling people about hydrofoils and raising their awareness of what hydrofoils can do to make ships and boats more effective and efficient. The location on Puget Sound is especially good because so much early hydrofoil development and construction occurred there, and there are still people in the area who were involved or were at least aware of it. During that period, the US Navy and Boeing hydrofoils LITTLE SQUIRT, FRESH-1, TUCUMCARI, HIGH POINT, PHMs, Jetfoils, and other hydrofoils were common sights on the waters of Puget Sound.

FRESH-1 on a high speed run

Newsletter readers may recall that last year a few of us in the IHS attempted to find a home for FRESH-1, the jet-powered prototype hydrofoil that flew nearly 100 mph. Tacoma's Foss Waterway Seaport Museum seemed a likely place for her, so Tom Cashman was taken to inspect FRESH-1, then lying in Bremerton, Washington. Martinn Mandles made a generous offer to sponsor her for the exhibit, including preparing her and transporting her there, so Tom and the Museum considered refurbishing her and making a permanent exhibit. This project seemed a natural. After all, Tacoma is the home of J. M. Martinac Shipbuilding, which built the hulls of FRESH-1and High Point under contract to Boeing. (In fact, Joe Martinac, President of the company and son of the man who headed it when these ships were being built, attended the Fest and stopped by to see our booths and talk. He recalled hearing about them from his father and eventually seeing and riding them.)

As the project progressed, however, it was disappointing to discover that FRESH-1 is too large for the indoor Seaport Museum. (Shortly thereafter, FRESH-1 was acquired by IHS member Eliot James and moved to his USS ARIES Hydrofoil Museum in Brunswick, Missouri.) However, this project evolved into a related idea.

Ray Vellinga and Harry Larsen drove Tom Cashman to Paine Field, in Everett, Washington, to see LITTLE SQUIRT, the earlier and smaller water-jet-powered Boeing hydrofoil prototype. Tom expressed interest in displaying the more-manageable LITTLE SQUIRT, and this still remains a possibility. However, in view of the present state of LITTLE SQUIRT it was clear that more would have to be done to make it presentable in the Museum, so it was dropped as a candidate for this year's Fest.

LITTLE SQUIRT in her heyday

After months of preparation, the booths and the boats materialized at the Seaport to introduce thousands of

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Maritime Fest
(Continued From Page 3)

visitors to the world of hydrofoils, past, present, and future. IHS President Mark Bebar (recently taking on this position from retiring John Meyer) and IHS member Bill Hockberger flew out from the east coast to join with west coast IHS members Sumi Arima, Bruce Bryant, Mike Terry, and Ray Vellinga to set up the booths and interact with the public. As the photograph on page 1 shows, our IHS displays included three large monitors, each with a DVD player, continuously showing videos of hydrofoils in action. Many photographs of hydrofoils, organized to illustrate the major categories and types, were displayed on tall panel systems. Mark Bebar also brought some informative handouts for kids about boats and ships and information on ship design education at the Webb Institute of Naval Architecture. Our poster advertising next year's hydrofoil reunion in Key West was displayed prominently and should help boost attendance there.

One of the monitors played IHS's action slide show of military hydrofoils, while another played a new show assembled for the Fest composed of 590 hydrofoil slides collected over the years. The third monitor played a compilation of Ray Vellinga's 24 videos on YouTube.

PCH-1 Booth

Terry Orme, Jr., Terry Orme, Sr., Fred Nachbar, and Randy Kecey operated the adjacent booth on PCH-1 restoration. Their photo display of HIGH POINT and other military hydrofoils was popular with visitors. HIGH POINT is now located at the former seaplane base at Tongue Point, Astoria, Oregon. Incidentally, the Ormes are hoping to move HIGH POINT into the Tacoma-Seattle area for continuing restoration and are open to any relocation ideas. Anyone wishing to contribute funds, labor, or location should contact Terry Jr.

Harry Larsen flew his TALARIA IV, a 24-foot Bayliner cabin cruiser he converted to fully-submerged foils, down from nearby Vashon Island. Harry provided exciting demonstration flights on Friday to calibrate his maneuvers in the waterway. However, overnight water leakage resulted in damage to the craft's flight control electronics, making TALARIA unable to fly during the weekend, which was disappointing.

The spectators' attention gravitated to the boats on display around the two booths. These craft were a major attraction and caused many to stop and then visit our booths for further explanation and information. Having them there also made it possible for people to see and feel what a foil is like.

Greg Jacobs brought his RAVE two-person sailing hydrofoil trimaran down from Port Orchard, Washington. With its bright yellow color, high mast and low foils, it was a magnet for curious passers-by. Greg was there to explain to all how it is sailed and how well it performs.

Harry Larsen's TALARIA IV

Spotless and gleaming, Bruce Bryant's HYCAT is a fine example of craftsmanship (he built it himself) as well as a promising direction for hydrofoil-assisted catamarans. Bruce first worked with Dr. Dale Calkins in the 1970s to develop the concept and conduct model tests and analysis.

Bruce Bryant's HYCAT

Dan Kaseler, his 4 year old son, Cascade, and wife, Jacque, traveled from Seattle to display his home-built hydrofoil Moth. We all hoped to see him fly, but Tacoma, a haven for power craft, often lacks the winds sailors depend upon. Dan also displayed a hydrofoil wake board similar to an Air Chair.

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Maritime Fest
(Continued From Previous Page)

Martinn Mandles was present in spirit, if not body, as he and wife Connie were away on a long-planned cruise aboard a Russian icebreaker near the North Pole. Besides his offers of substantial support to get FRESH-1 or LITTLE SQUIRT to the Seaport Museum, Martinn donated an excellent custom-built model of TUCUMCARI, which was a major feature of our display.

Model of TUCUMCARI

The Foss Seaport Waterway Museum is currently being remodeled, and Tom Cashman and his assistant Earla Harding are assuming command of the entire Maritime Fest for next year. This year the visitors we had were short of the numbers estimated to pass by the long boardwalk displays, at least on our end of the exhibition (although we did have enough of the right kind of people for our purposes). However, Tom and Earla have said that next year all displays will be consolidated and the IHS will be more centrally located. We plan to participate, and it promises to be another big event for the IHS.

By the way, Washington State is gorgeous in August, and the weather during the event was perfect. Not hot, not cold, mostly sunny, no rain. It is probably the best place in the world to be in August, and next year promises to be another great event. Try to fit it into your plans.

Here and on the next page is a collection of photos taken at the Maritime Fest by Ray Vellinga and Mark Bebar.

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Maritime Fest *(Continued from previous page)*

Is MANU WAI the Last Complete Rodriquez PT 20 Hydrofoil?

By Garry Fry, IHS Member

Australian IHS member Garry Fry has provided an update on the recent history of the Rodriquez-built PT 20 MANU WAI and is keen to hear from any IHS members who may be able to offer a sound proposition for the long term preservation of this hydrofoil.

PT 20 MANU WAI foilborne on Sydney Harbour some years ago.

Garry is a dedicated hydrofoil enthusiast living in Sydney, Australia, who, as a result of a childhood dream to be a hydrofoil captain, came to be the owner of MANU WAI. This hydrofoil started her service life as a commuter ferry between Auckland and Waiheke Island in New Zealand 1964 and operated on that route until 1972 when she was laid up over an industrial dispute between the owner and the Seaman's Union and was destined never to re-enter service as a commuter ferry in New Zealand.

In 1989 she was given a new lease of life as a corporate charter boat for the America's Cup which was hosted in Auckland in 1990. She was stripped of all fittings and rebuilt and modernised from the keel up in a NZ$1.3m refit.

A more comprehensive review of the operation of MANU WAI was provided in the December 2001 issue of the on-line magazine *Classic Fast Ferries* that was edited by one time IHS member Tim Timoleon. That review also covered the history of Garry's involvement with MANU WAI from 1995 through to 2001.

PT 20 MANU WAI shown moored at Berries Bay, Sydney, August 2012.

In 1995 Garry became owner of the vessel in conjunction with two business partners with the aim of operating MANU WAI as a tourist excursion boat on Sydney Harbour. The hydrofoil was shipped to Australia and restored to operational condition by repairing damage that had been incurred in New Zealand after it had run aground in shallow water. Unfortunately the Australian business failed shortly after start up in 1996, and the boat was laid up afloat pending sale or relocation. This was the start of what was to become a 12-year marathon by Garry to preserve the boat and where necessary restore equipment on board without significant assistance from that point forward.

MANU WAI was hoisted onto a hardstand in Sydney between late 2006 and October 2009 to undertake significant repairs required to deal with the effects of the extended lay-up with a view to putting the hydrofoil back into Class survey and operate commercially again. However as a private venture it has been an overwhelming task at times for essentially one person with limited help from a retired friend. Garry continues to work full time as a Ferry Master on Sydney Harbour so this preservation and restoration work had been undertaken during periods of annual leave and rostered days off.

Following a recent major setback with the propulsion engine seizing (though at idle under no load), Garry recognizes that unfortunately the time has come where he has reached the end of the road in his restoration efforts without significant help from others. He feels the engine is quite repairable for anyone who wishes to tackle this task. The engine seizure

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Is MANU WAI the Last Complete Rodriquez PT 20 Hydrofoil?

To the best of Garry's knowledge, MANU WAI is the last surviving completely intact PT 20. While there may still be some other PT 20's lying around the waterfront in Europe or Asia waiting to be broken up, Garry is unaware of any others still afloat anywhere in the world but would be interested to hear otherwise.

The PT 20 was the world's first high speed ferry approved for limited coastal use by Classification Societies and as such Garry rightly feels an effort should be made to preserve and restore MANU WAI. He is concerned that without a white knight coming forward, the risk is that MANU WAI will eventually end up being scrapped or converted into a pleasure craft minus its foils such that it is barely recognizable as a hydrofoil.

To that end, Garry has made some initial enquiries with other parties who may be in a position to take over ownership of MANU WAI but with the intention of preserving her as a true hydrofoil. One difficulty that Garry recognizes is that MANU WAI is now located in Australia where her significance isn't well recognized. There might be better prospects for preservation in her birthplace of Italy or her home country for many years, New Zealand.

If you can offer help or good suggestions for preservation of MANU WAI, Garry Fry can be contacted at: garry_fry@optusnet.com.au.

L'HYDROPTÈRE in Los Angeles and San Francisco

Adapted from www.hydroptere.com

In the second quarter 2012 Newsletter, we reported that the L'HYDROPTÈRE team will be competing for the sailing record between Los Angeles and Honolulu.

L'HYDROPTÈRE DCNS in her new colors

Having arrived in California at the start of July on a cargo ship, L'HYDROPTÈRE has been fine-tuned and is awaiting suitable weather for her transpacific record attempt. The trimaran hydrofoil is now lighter and with increased sail area and has foils fitted that suit offshore use including an auto-pilot system for the aft stabilizer to improve directional stability in heavy seas. The team will be attempting to beat the existing record set by Olivier de Kersauson, at the helm of GERONIMO, which covered the 2,215 nautical miles between the Fermin Point lighthouse south of Los Angeles and the Diamond Head lighthouse offshore of Honolulu, in a time of 4 days, 19 hours and 31 minutes, at an average speed of 19.17 knots (35.5km/hour).

To determine the optimum departure time for the record attempt, the team is running weather and velocity prediction models. The ideal time frame for the attempt apparently begins in mid June and continues to early September. If a window emerges, the team expects to make headway at an average of 25 knots increasing to about 30 - 35 knots. In transit some of the crew will permanently be monitoring the weather and running the routing software for feedback to the skipper.

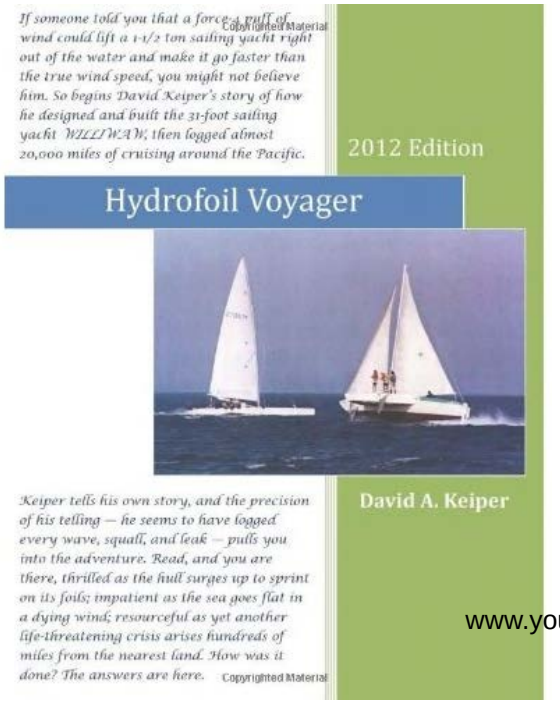
While waiting for a weather window, L'HYDROPTÈRE was sailed up to San Francisco Bay during late August giving an opportunity for the trimaran to cross tacks with the America's Cup AC45s, which were racing in the Bay during this period. On 31 August, L'HYDROPTÈRE achieved an average speed of 37.5 knots (or 69.5 km/hr) over a nautical mile in San Francisco Bay, apparently a sailing speed record on the Bay (pending approval by the Yacht Racing Association). They also unofficially took part in the Ronstan Bridge to Bridge Race organized by St Francis Yacht Club.

Meanwhile, Alain Thébault, who is the L'HYDROPTÈRE DCNS designer and skipper of , is preparing his third book to be released next spring.

REPUBLISHED: 'HYDROFOIL VOYAGER' BY DAVID KEIPER

Via Barney Black, IHS Life Member

We previously reported in the Newsletter that IHS members Barney Black, Ray Vellinga, Tom Speer and Scott Smith have assisted Steven and Alison Keiper with plans to re-publish the book *Hydrofoil Voyager* written by their late father, David A. Keiper. Following a final review of the proofs for the new edition by Steven Keiper, it is pleasing to be able to report the book is now available for sale at Amazon.com in 8-1/2" by 11" softcover format (go to www.amazon.com and search in Books for Hydrofoil Voyager). The full title of the new edition is: *Hydrofoil Voyager: WILLIWAW, From Dream To Reality and Toward the Sailing Yacht of the Future.* The price listed on Amazon (excluding shipping) is US$15.00. The original book has long since been out of publication and is seldom available, even on ebay.com and other sources of used books.



David Keiper, who passed away in 1998, had designed and built the 31'-4" sailing trimaran yacht WILLIWAW and thereafter logged almost 20,000 miles of cruising around the Pacific in the 1970's to test and fine tune the yacht which is the focus of the book.

One review of the book is as follows: "It's great to see this adventure book available again after such a long time being out of print. This is David Keiper's own story with photos and sketches; how he designed and built a unique hydrofoil yacht and sailed solo around the Pacific Ocean. It is a riveting adventure story that also includes many hard-earned design, manufacturing, safety, and financial tips. The book is distinguished by vivid, active prose that puts you there in the picture; experiencing the unfolding adventure as Dave experiences it, and solving unexpected, disconcerting, and possibly life-threatening problems with Dave as they happen. Will be enjoyed by anyone who likes adventure, and is must reading for anyone who wants to design and build a high performance hydrofoil sailing yacht… or to dream about it." Additional reviews on amazon.com are needed and will be appreciated.

The new edition has several added maps and written material from David Keiper's files. To draw attention to the re-issue of the book, Ray Vellinga has recently posted a video showing WILLIWAW and its voyages around the Pacific. Here is the video's URL:

www.youtube.com/watch?v=1cYXxZiL4

www.youtube.com/watch?v=1cYXxZiL4B8

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 workboat tender based on its proven SWATH boats but with a single hull and says the new design will be tested in autumn.

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).

A&R SWASH

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,

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SAILOR'S PAGE

FOILER MOTH VELOCITY PREDICTION PROGRAM

Information provided by Dane Hull and Jonathan Binns

During 2011, Dane Hull, an undergraduate Bachelor of Engineering (Naval Architecture) student at the Australian Maritime College (AMC) at Launceston, Australia, completed a thesis project titled "Speed Sailing Design & Velocity Prediction Program" under the supervision of Dr Jonathan Binns at AMC. The thesis project was prompted by an earlier proposal for a student project to develop a versatile Velocity Prediction Program (VPP) suited to studying the relative merits and performance of a range of different high speed sailing craft designs.

As the original thesis proposal was too broad and complex to be able to undertake in the time available for an undergraduate thesis project, it was decided early in the project to narrow the focus to examining the sailing performance of foiler moths, thus producing a valuable outcome in its own right while forming the building blocks for a more general VPP.

The Moth World Championships had been hosted in Australia at the start of 2011 thus providing working material (including photos and measurements of foiler moths) for Dane to use for validation of a Foiler Moth VPP he had further developed from earlier work by Christian Bogle as a Master's thesis at TU Berlin in 2010 ("Evaluation of the performance of a hydro-foiled moth by stability and force balance criteria").

On the advice of Dr Binns, who himself has a research interest in sailing craft performance and hydrodynamics, the basis for the VPP code adopted by Dane was "Future Ship Equilibrium", an open modular style program based on programmable force modules. Refinements over the original VPP by Bogle included incorporation of T-foil lift and drag coefficients obtained from towing tank measurements of the full scale rudder T-foil of a Foiler Moth undertaken previously at the AMC towing tank by Jonathan Binns and other co-researchers.

The thesis presents results for a VPP implementation including both a 4 and 5 degree of freedom model of the dynamics of a Foiler Moth. For the 4 DOF model, forces in the x (surge), y (sway), and z (heave) directions and moments about the x axis (roll) are considered and a solution is sought in which these are balanced for sailing in equilibrium. For the 5 DOF model, moments about the y axis (pitch) are also balanced. The only degree of freedom not explicitly balanced is that of yaw. Dane contends that this can be balanced with rudder action without having a significant effect on the overall performance of the boat.

The resulting VPP was validated against a limited set of full scale racing results which suggested good correlation could be obtained for sailing on tacks to windward and that the 5 DOF model more closely approached the ability to predict the leeward sailing performance of a moth foiler than the simpler 4 DOF model.

In the process of undertaking a literature review for this thesis, Dane uncovered a number of research papers into the dynamics of Foiler Moths and these are provided as references.

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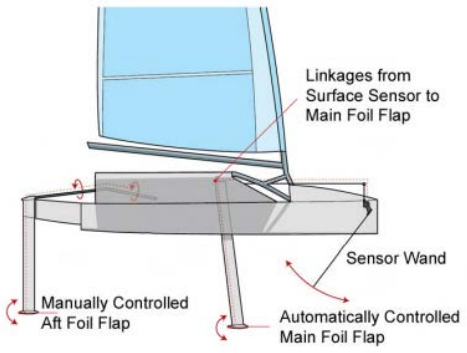
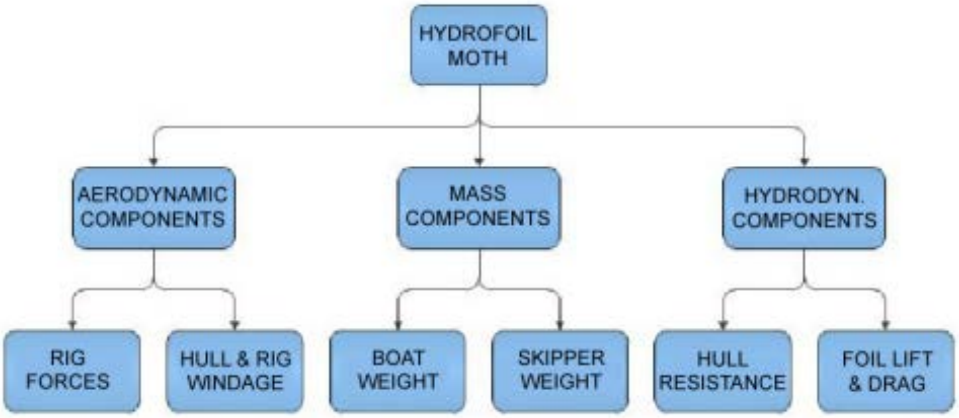


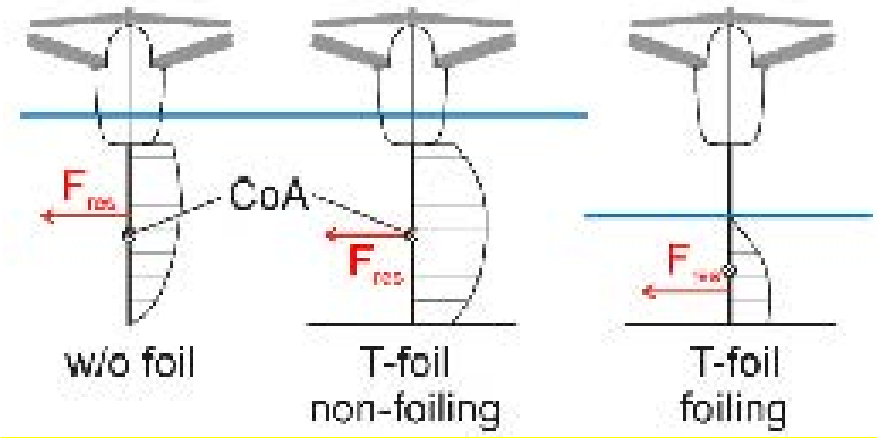
Profile of Foiler Moth illustrating its configuration.



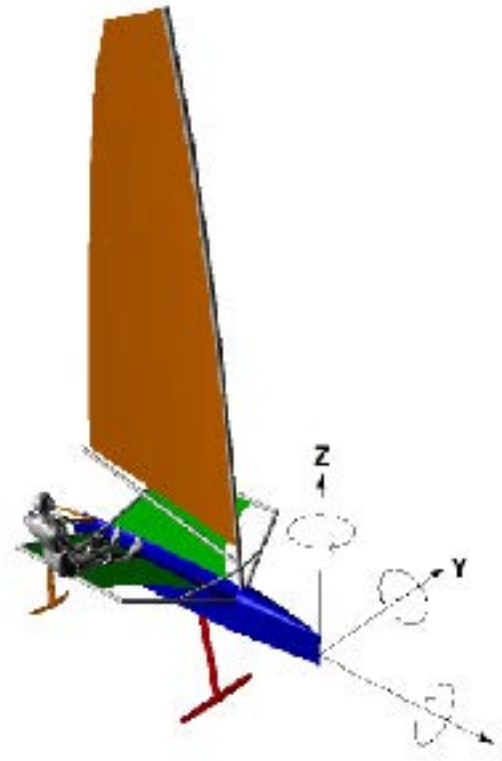
Force components on a hydrofoil as considered in the VPP.

FOILER MOTH VELOCITY PREDICTION PROGRAM *(Continued from previous page)*

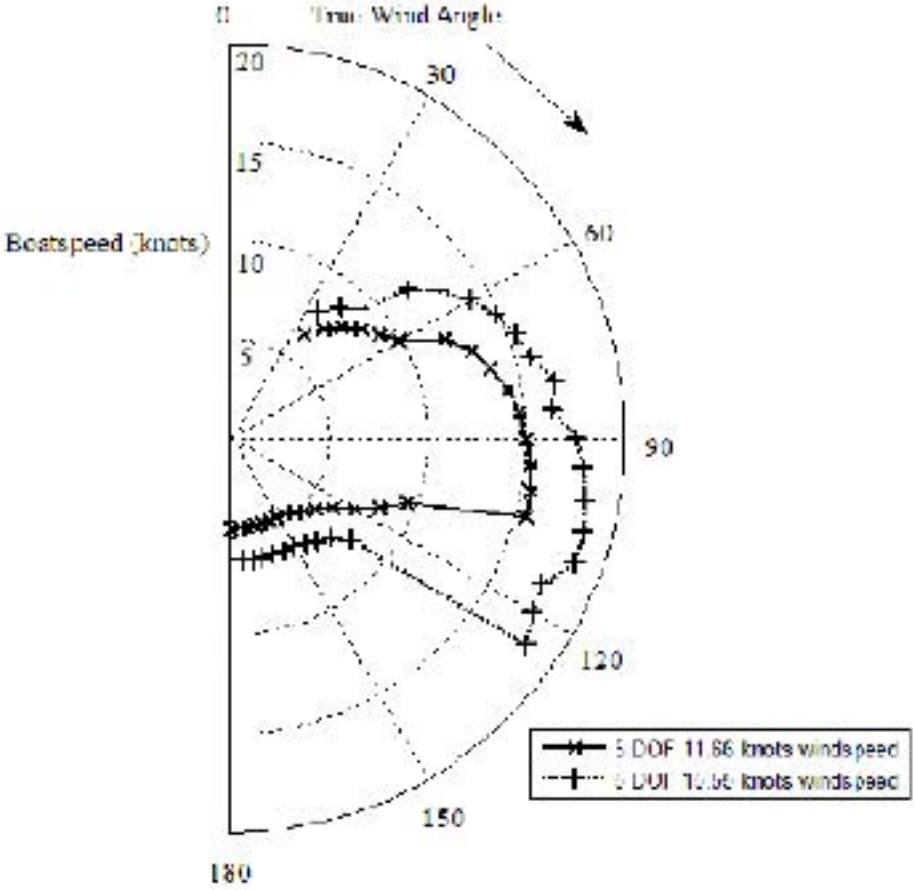
[For those interested in a copy of the thesis, the thesis supervisor, Dr Jonathan Binns can be contacted at jr.binns@amc.edu.au or via the sailors page editor: editsail@foils.org]



(above) Consideration of the pressure distribution acting on a keel with or without a T-foil attached and for hullborne and foilborne conditions (from Bogle).



(above) Perspective of Foiler Moth with the Body Fixed coordinate system employed within Future Ship Equilibrium.



(above) An illustration of the speed polar plot for the 5 Degree of Freedom VPP implemented by Dane Hull showing predictions for two different wind speeds. The sudden discontinuities of speed for changes in true wind angle correspond to the situation where operating foilborne is no longer possible. A true wind angle of zero represents head winds.

A&R SWASH

(Continued From Page 9)

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.

SWASH under construction

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 vessel's deck and superstructure are aluminum and closely resemble those of standard SWATHs. 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.

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.

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