The NEWSLETTER

International Hydrofoil Society
P.O. Box 1130, Severna Park, MD 21146

Summer 2018
Editor: Scott Weidle
Contributors: Mark Bebar, Grant Dull, Rod Muller, Ray Vellinga

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PRESIDENT'S REPORT

This has been another good year for the International Hydrofoil Society.

The Mandles Prize continues to attract the interest of progressive hydrofoil students across the globe. Martin and Connie Mandles recently expressed their commitment to fund the Prize past the original five years.

Our membership continues to grow beyond our present 2,500. Intriguingly we have several hundred new user registrations on WordPress. These are people who have expressed interest in the society and are potentially new members. We just need the time and energy to pursue these interesting leads.

Our international contacts continue to expand. While on my annual trip to Paris I had the pleasure of tipping a glass with Mark Muller and Julian Bru of the Seabubbles Company. Not only was the wine good, fruity Provincial red with the lingering essence of cinnamon, but their plans to operate along the seine are fascinating. See the article within.

Rod Muller of Goolwa, Australia, and I almost connected - like we've been trying for a couple of years. I was in Paris and Rod was flying around the world for pleasure and to inspect the steam engine he built and installed on a pleasure boat owned by an architect in Worms, Germany, on the Rhine river. Perhaps next year we'll make contact.

For those many of you who camp out by the mailbox each January and July waiting for the next the IHS newsletter, you will recall the last edition featured Rod in the article titled "The Joy of Flying". Rod responded to my encouragement to video his flying progress. He has sent two 16 GB SDHC microchips. One is filled with good quality flying videos and still photos of his hydrofoil I call, "The Down-under". (Or should it be, The "Up-lifter"?)

The other chip is filled with a video tour of the FHE 400 Canadian military hydrofoil, Bras d'Or. Both of these videos will be edited and uploaded to Youtube for linkage to the next newsletter. For a early peek in a couple of months search for Ray Vellinga Channel on YouTube and look for it among the latest ~40 hydrofoil videos.

Of course, the Bras d'Or is of special interest for those of us who will be going to the 100th anniversary celebration of the speed record made by Alexander Graham Bell and Casey Baldwin at Baddeck, Nova Scotia. It's a relatively short 670-mile ride from Baddeck to the Bras d'Or Museum in L'Islet-sur-Mer. Rod enjoyed the beautiful drive.

Ray Vellinga
IHSPresident2016@gmail.com

DUES ARE HISTORY

As a key part of the incoming new administration, annual dues have been eliminated. The new program is to rely on Sustaining Member and donations from any member that volunteers to make tax deductible. Advertising in the Newsletter, Web Page, and Facebook will be made available for nominal contributions. Please inquire with Ray Vellinga to place an advertisement.

THE INCREDIBLE BRAS d'OR

Rod Muller

In October 2017 I decided it was time to start organizing my next bi-yearly overseas wander for 2018. At the top of the list was to swing by Baddeck, Nova Scotia on the Cape Breton Peninsular. It was the home of Alexander Graham Bell's museum along with the Maritime Museum in L'islet a little town on the Saint Lawrence Seaway in Quebec. It was time to have a close look at the now grounded Canadian military hydrofoil, Bras D'Or.

I set off on the 2nd of May for Frankfurt via Hong Kong heading in the direction of the Ukraine and Belarus. My next stop would be a week in Greenland and Iceland before flying to Halifax.

The trip ran very smoothly until I got to Canada. The 600km plus drive in the rental car to Baddeck was a little stressful, but I got there and back in a day with no dramas.

The Museum was not exactly what I was hoping it may have been. It certainly covered much of Alexanders work over the time he lived there and worked on many projects. The focus on his hydrofoil projects was not as in depth as I had hoped. It is not really a technical museum. Rather than being oriented to hydrofoil fanatics, it has more of a historical tourist theme which appeals to the more typical visitor.

I got back to Halifax that evening, returned the hire car and packed up ready to move on early next morning to Quebec City via Ottawa. However due to the G7 conference and huge security problems I missed 3 flights and ended up taking two others. That made me seriously late picking up my hire car for the 120 kms drive to L'islet.

To me, this was the most important part of the whole 7-week trip, so I cancelled the rental car and and went out to the taxi stands. It was a stressful day, raining cats and dogs, and peak hour traffic was approaching. I estimated a taxi could get me up there, half an hour to take the video, and then back to Quebec City.

I found a guy who was willing to do it for $250 so we set off and wow what a ride! I actually had to ask him to slow down a few times but that's another story.

We got there at about 4.55pm too late for a look inside. But it stopped raining and brightened up a bit so I clambered around with the Gopro and took 10 minutes of video and 20 mins of still photos.

There are many interesting aspects of the foil/strut designs and lots of questions to be asked. Sadly, there are some spare parts missing. For example, the outer legs of the 'W' trim foils are not fitted. They simply lie on the ground. The main lift foil between the struts is not the original. It is a dummy steel one, but I knew that because it was written up in one of the books. The original was cracking and was discarded along with a number of covers and cowlings.

Generally, the ship is in very good condition. It has been kept well painted and has not suffered any sort of vandalism. It is sad that she sits on the dirt gutted of its engines, but that is certainly much better than if it had been chopped up for scrap.

Certainly, it was a buzz to visit this truly serious flying boat/hydrofoil. Despite her teething troubles she made her mark in time. She had a great old Pratt and Whitney gas turbine that turned out 30,000 hp. I can imagine the enormous roar she makes in majestic flight.

I would definitely recommend this trip. Go there and have a close look.

For the next edition, I will write a technical article and run through all the questions and thoughts I have on how they did stuff back in the late 60s early 70s that interested people might like to comment on.

Rod Muller is a hardworking member of the IHS. Rod's hobby is building small outboard powered hydrofoil boats. He is the owner and operator of Strath Steam Company in Adelaide, South Australia. They make steam engines for boats and other purposes.

SEVENTY48

Grant Dull

Seventy48. What's that? Another aeronautical ratio? Nope – it's a race. Open to any human powered vehicle, starting in Tacoma Washington and finishing seventy miles later in Port Townsend. There are just three rules: 1) Human power only. No motor. No sails. No battery. 2) No outside assistance. No support boats. No supply depots. And 3) If the race committee decides it's necessary to consult a lawyer to figure out if you are disqualified or not, you are automatically disqualified**.**

Pretty simple really – each team (no limit on the number of team members and no limit on length of boat) has 48 hours to travel 70 miles. The race - staged by the Northwest Maritime Center - started at 5:30 PM on June 11. The race finished just before the Race to Alaska, otherwise known as R2AK. First place prize? Each team puts $100 in the pot and the winner takes all. There are currently 121 entries so…. winner takes $12,100! Second place? Nada. Nothing. Pride in finishing.

Why should the hydrofoil community be interested? Because all the entries are old-fashioned displacement boats. The Race to Alaska, the spectacle that has given birth to Seventy48, was originally meant to be a contest between human power and sail power. Again, no motors. Race organizers claim:

it's like the Iditarod, on a boat, with a chance of drowning, being run down by a freighter, or eaten by a grizzly bear. There are squalls, killer whales, tidal currents that run upwards of 20 miles an hour, and some of the most beautiful scenery on earth. The race starts every year in mid-June, when the winds are notoriously fluky, and the days are long. However, in just four short years, R2AK has become a race for striped down uber-fast sailboats. The course record was set in 2016 when three guys in a Marstrom 32 open catamaran traveled 750 miles in 3 days, 20 hours and 13 minutes. Their prize was $10,000. Second place got a set of steak knives. The

first human powered boat took 13 days, one hour and 59 minutes. Today, if you are serious about winning, you sail. Sure, people still row or paddle or – yes – someone finished last year on a standup paddleboard. But first-place glory is owned by sailboats.

Back to Seventy48. Again, human power only. Entrants in this year's Seventy48 included 34 kayaks, 29 standup paddleboards, 20 sliding seat rowing shells, 19 fixed seat rowing boats, 7 out-rigger canoes, 5 standard canoes, 3 peddle-boats, 3 surf-skis and one prone paddleboard. And the winner? Greg Barton and Kevin Olney in an Epic surf-ski. Time of 9 hours and 39 minutes equates to 7.25 miles per hour or 11.67 kph. Greg Barton is a four-time Olympic medalist. His partner Kevin Olney described the race this way: "*It's a combination of feeling really, really good and really, really not good*," he explained. "*Everything hurts. That's what happens when you paddle with a gold medalist.*"

For more information about the race, see https://www.seventy48.com/ We all know that a human-powered hydrofoil is faster than a human-powered displacement hull. But can a human-powered hydrofoil stay on foils for seventy miles? Perhaps.

If you have ideas about how a human-powered hydrofoil can cover 70 miles, in the dark, with and against some tidal flow, maybe some wind, and small bits of seaweed, please share them.

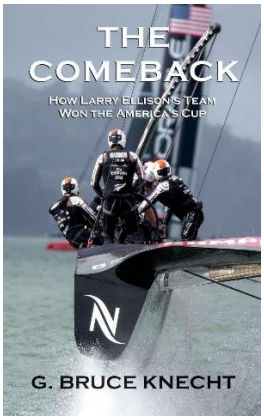
One hour into the inaugural race, eventual first place finisher on the left, second place on the right, and third in the middle.

BOOK REVIEW

Ray Vellinga

The Comeback – How Larry Ellison's Team Won The America's Cup.

Written by G. Bruce Knecht, 2016.



Cover: www.amazon.com

It's September 2013 in San Francisco Bay and the 162-year-old America's Cup is in jeopardy. The score is 6 for Team New Zealand and -1 for America's Oracle Team USA. (The minus one was from one of two penalties). The Kiwis need only 3 more wins to take the Cup. The Oracle boat is losing due to several key problems. For example, in a tack Oracle is slowing to 8 knots while the Kiwis maintain12 knots. During each tack Oracle is losing at least 50 feet. Adding to the injury, the Kiwis are faster on the upwind leg.

At this time the Americans concluded that to win their boat must quickly become foilborne following a tack and be cleanly foilborne during the upwind leg; something the Kiwi's have not been able to consistently do. Presently, for the Americans to reach the speed required to rise up on their foils, they are needing to sail some 20 degrees off the optimum upwind course until the take-off speed is reached. This is a big handicap in the short and narrow race course.

To more rapidly achieve foiling speed after tacking, the Americans decided to try a technique called "sail pumping". Pumping the sail is common to small boat sailors, windsurfers. and birds. Flapping of wings/sails increases the speed.

There is just one inconvenient problem: rule 42 forbids sail pumping. The sails may be adjusted as often as is needed to maintain good trim, but it may not be moved to transmit power from the grinders to the boat.

On the positive side, this pumping maneuver is difficult for the judges to see. Here's how it works: to power the pumping action the two previous grinders were replaced by six. Furthermore, rather than waiting for orders to turn the cranks they were told to continuously input power, providing for an instant response to a demand for power.

Kyle Langford was in charge of pumping. He mentioned he didn't realise the rules were against it so he performed in best way possible. He is quoted as saying "at the start of each cycle, he let 3 feet of the wing sheets (rope) slip through his hands to let the wing out by the same distance. Seconds later he tightened his grip on the line until it locked onto the spinning winch.

This enabled him to rapidly retrieve the line -- and the wing -- by the same amount. As soon as a wing return to its original position, he again eased his grip to allow 3 feet of line out. As soon as (he) released it, (he) brought it back in. Let it out, reel it in, let it out, reel it in".

Now, to gain enough speed to become foilborne, the boat needs to fall off course only 10 degrees rather than the 20 degrees previously required.

At the time of this change, the score is 6 to 0.

Although the making of the hydrofoils was done using 30 designers and 10,000-man hours, there were still problems. For example, the cavitation was so bad the boat travelling at 45 mph bounced and shook "like driving over speed bumps at 100 miles an hour", claimed helmsman Jimmy Spithill. The cavitation also affected directional stability and boat would slip sideways – rather scary. Furthermore, the foils and struts were rapidly eroding at the cavitation sites.

The problem was reduced by creating fairings at the junction of the rear foils and their struts. The shape of the fairing was estimated to be roughly that of the shape of the cavitation cavity.

Still problems plagued the team. At the end of race 10 the score was 7 to 1. Oracle lost once again and the score was 8 to 1. To win the race the Kiwis needed only one win, but the Americans needed 8 consecutive wins.

But luck returned and combined with the changes, the Americans were now winning consistently. Of course, rumors started to circulate that rules were being broken. One speculation was that Oracle used a computerized stability augmentation system that would keep the boat flying at a constant height and stable pitch. These were false rumors. In fact, these flight characteristics were still being controlled by the helmsman rapidly manipulating his 6 buttons on the steering wheel. The reviewer's personal speculation is that the constant input by the grinders allowed the helmsman to take more rapid and precise control of the foil's angle of attack resulting in a relatively smooth & accurate ride.

After 3 weeks of racing, the series stood tied at 8. The Cup would be decided by a sudden death finish for the first time in 30 years.

45 minutes prior to the final showdown the Americans discovered what appear to be a fatal fracture in their wing. It was a near miracle that they were able to hoist a repair-man halfway up the 131-foot mast, cut into the wing, and use carbon fiber fixed with fast setting resin to repair the broken strut.

The Americans maneuvered to the starting line as the resin hardened, the fix held, and they went on to win. It was the biggest comeback in America's Cup history, California's richest resident, Larry Ellison, had spent in-excess of $200,000,000 to retain the Cup.

Available:
https://www.amazon.com/Comeback-Ellisons-Americas-Kindle-Single-ebook/dp/B01CGPZ0PG

HYDROFOIL NEWS

Foiling Part 2: "From Niche to Market"

Building upon his first article, "Foiling, Part I," Dieter Lobner has written in Professional BoatBuilder about the historical perspective and current state of hydrofoil development. Read more at https://www.proboat.com/ and "*embark on a trip around the world to examine contemporary designs that (re)interpret foiling craft.*"

SeaBubbles Lives

Ray Vellinga

It's July, 2019 (or maybe 2020). Imagine you have just descended from the top of the Eiffel Tower and you have been separated from your tour group. They are going to have lunch in 20 minutes at Tour d'Argent 2 kilometers upstream on the left bank, you have prepaid €200, and tomorrow you leave Paris. There are no taxis on the Quai Branly, and anyway the traffic is *embouteillage*. What is a traveler to do?

The obvious answer: Seabubbles! Of course, if you have been in a coma for the last couple years, you would not think of this hydrofoil solution. But thanks to the ingenuity and persistence of Alain Thebault, Anders Bringdal, plus enthusiastic cooperation from Anne Hidalgo, the mayor of Paris, this brilliant answer to transportation along the Seine solves your dilemma!

From their website, here's the story: 100% electric, the Bubble is autonomous during its rides and is charging while people are getting in and out, while stationed at the Dock.

People can enter from the side door, with the help of a hostess, and take their seats into the Bubble.

Once the doors are closed and the Bubble secured, it will get out of the Dock and start moving.

When reaching 12 km/h (7.5 mph), the Bubble will start flying above the water, preventing from any seasickness, sudden movements or waves rolling.

Once the ride is over, the bubble slowly comes back to the water level to reach the Dock, letting its passengers out and waiting until the next ones are ready to board.

More at: www.seabubbles.fr

So,
barring any unexpected difficulties such as someone forgetting to pay the electrical bill, strike by the transportation workers, or riots in the Seventh arrondissement, you may possibly be taking your next hydrofoil ride soon through the *centre de ville, Paris. Bon voyage*.

Special thanks to Seabubbles teammates, Mark Muller and Julien Bru, Paris.

Return of the Jetfoil

Ship & Boat International

"Last year, the builder's Kobe Works site secured an order, placed jointly by Tokai Kisen Co. and the Japan Railway Construction, Transport and Technology Agency (JRTT), for what will be KHI's first Kawasaki Jetfoil newbuild since 1995." A total of 15 Jetfoils were constructed, read more about recent developments in the March/April 2018 issue of S&BI at https://www.rina.org.uk/sbi.html

MANDLES PRIZE FOR HYDROFOIL EXCELLENCE

Mark Bebar

Thanks to the generosity of Mr. Martinn Mandles, a long-time member of IHS and his wife Connie, IHS is once again sponsoring the Mandles Prize for Hydrofoil Excellence competition. The competition, now in its 5th year, includes up to $4,500 annually in IHS hydrofoil achievement prizes for students, with a $2,500 First Prize and up to two $1,000 Honorable Mention awards.

In order to open the competition to a wider spectrum of qualified entries, submissions by students based on work completed since 2013 is eligible for the Mandles Prize. The due date for Application Forms was extended to 1 June and submission of final reports is due by July 1, 2018.

This is an outstanding opportunity for the next generation of hydrofoil developers to be acknowledged for their efforts to advance the state of the art in hydrofoil and hydrofoil-assisted craft engineering, design and construction. Background on the Mandles Prize and Rules for the competition can be downloaded from the IHS website (www.foils.org)

Based on the 2017 entries and award winners, we anticipate a very exciting competition and look forward to receiving many high-quality entries. Questions on the Mandles Prize can be emailed to

Mark Bebar at:
mark.bebar@csra.com or
Ray Vellinga at:
IHSpresident2016@gmail.com

FROM THE ARCHIVE:

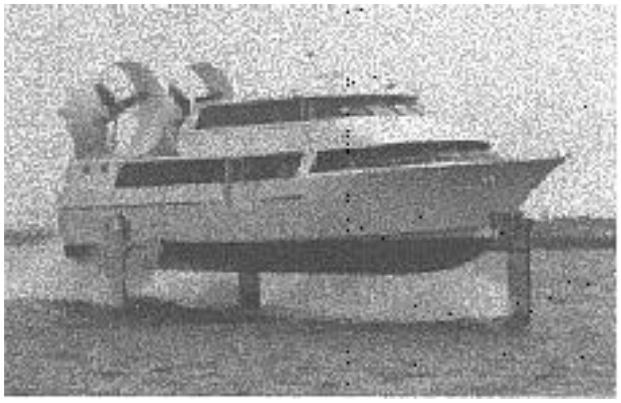
DEVELOPMENT OF A HULL FORM

Barney C. Black, John R. Meyer

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

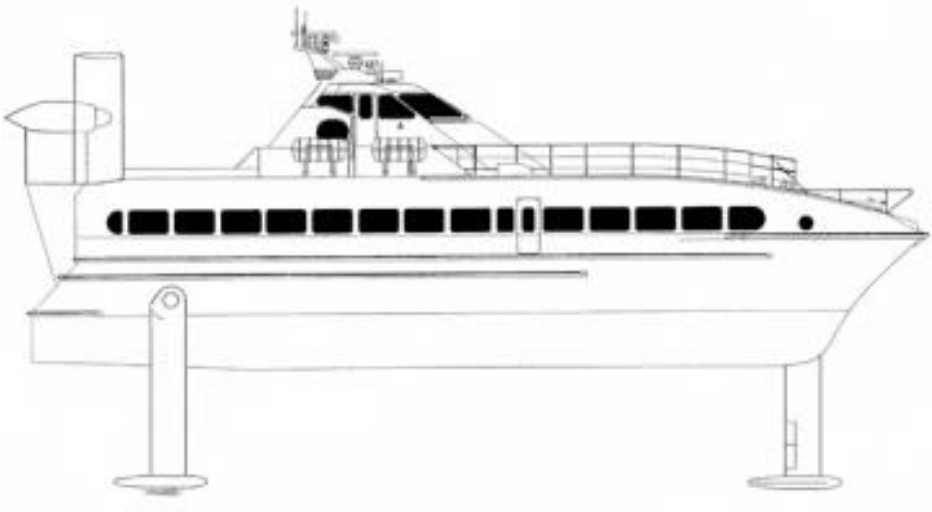
FOILCAT 2900

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



WESTFOIL

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



Navatek's NAVAFOIL Due to Begin Construction in 1998

According to Michael Schmicker, Navatek's VP of Business Development, "The NAVAFOIL design will also feature refinements and enhancements developed by

our in-house engineering staff. These include improved microprocessor technology, electronic performance, air propeller technology and composite and other materials, and advanced servo motors." Finally, the NAVAFOIL adapts the foil arrangement and ride control system pioneered in the Boeing JETFOIL.

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

FEATURE VIDEOS

This issue, we are featuring videos of aircraft that use hydrofoils to assist in takeoff and landing in water. Here are some examples:

Model of Piaggio P.C.7 Pegna

https://www.youtube.com/watch?v=YK9rx0VcxBc

Grumman Goose seaplane tests:

https://www.youtube.com/watch?v=yolgS1bn7P8

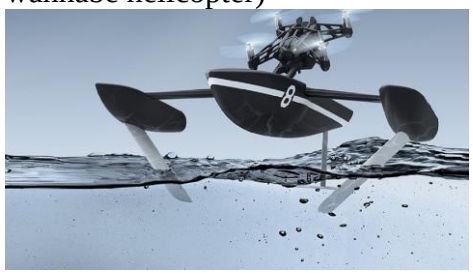
The French Akoya, Amphibious Light Sport Aircraft.

https://www.youtube.com/watch?v=cxD4YdHpQFo

Convair Sea Dart (wannabe a hydrofoil)

https://www.youtube.com/watch?v=SOrj2cSDO-M

Parrot drone/hydrofoil (hydrofoil wannabe helicopter)



https://www.youtube.com/watch?v=ik84x2gNXxQ

IHS WEB CONTENT

Check it out (click on link):
http://foils.org/
SmugMug
Facebook Page
YouTube Channel

OUR ASSOCIATE, THE FOILING WEEK. SEE THIS VIDEO:
http://www.foilingweek.com/

THE NEXT ISSUE

Remember, if you enjoyed reading articles in this issue of the Newsletter, they were provided with thanks to fellow IHS members. If you are able to share news on new projects or research work and, better still, prepare an article for the Newsletter, please email: IHSpresident2016@gmail.com