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The NEWSLETTER

International Hydrofoil Society
P.O. Box 8911 Reston, VA. 20195

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REPORT ON:

50th Anniversary of IHS

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IHS 50th Anniversary Celebration & Conference

SUMMARY

By Mark R. Bebar, Vice-President, International Hydrofoil Society

IHS celebrated its 50th Anniversary from 20 October – 19 November 2020 in the form of a virtual conference. A small, dedicated planning group assembled an excellent program with presenters from a number of countries, including the U.S., South Africa, The Netherlands, Japan, Russia, Switzerland, Australia and Sweden. Author bios and presentation abstracts can be found at: https://foils.org/50th-anniversary-celebration/

All sessions were conducted using Zoom and recorded in order to capture discussion and Q&A. Attendance during the Zoom sessions ranged between 10 – 30 participants and each session concluded with discussion and Q&A. Videos of the presentations can be seen at: https://www.youtube.com/channel/UCHZDDNMvsa9JFi6YcFfrooQ

Although the number of in-person participants was low (in part because of the inconvenient times for many when trying to accommodate people all around the world), the videos have been watched very many times because of their availability on YouTube.

For reference, the last major milestone was the 25th Anniversary Celebration and Conference, held 14-16 June 95 at the Army-Navy Country Club in Arlington, Virginia. This is discussed in more detail on our website. https://foils.org/25th-anniversary-celebration-and-conference/

The 50th Anniversary Celebration began with a welcome and opening remarks by IHS President Ray Vellinga. This was followed by an outstanding keynote address, "Fifty Years of Foiling", by Dr. Neil Baird. Dr. Baird, in partnership with his wife Rose, founded Baird Publications, now Baird Maritime, in 1978. They rapidly established themselves as one of the world's leading maritime publishers and event organizers. As a ship and boat obsessive from early childhood, Neil's life and career gave him a unique opportunity and perspective from which to observe, study and experience all manner of vessel design and construction developments over more than half a century and over practically the whole world.

Dr. Baird's address spanned over 50 years of hydrofoil development. At a young age, he experimented with the use of sailing craft centerboard, which, when the craft was heeled over while driven by the sail would help support the boat. Thereafter he encountered hydrofoil operations around the world. He shared his views on the potential future developments for hydrofoils. It is fitting that Dr. Baird's address was made on 20 October 2020, 50 years to the day after the IHS held its inaugural meeting in London. His full keynote address can be seen at: https://www.youtube.com/watch?v=P0GVW_pbt2A

IHS was honored that Neil accepted our keynote speaker role. It brings us full circle after 50 years, given Countess Juanita Kalerghi, the former editor and founder of the similar trade magazine "Hovering Craft and Hydrofoil" had encouraged and supported the establishment of the IHS in the lead-up to the founding of the Society.

The Society received many accolades from those who participated in the 50th Anniversary Virtual Conference. Given the challenges of hosting a conference across multiple time zones during a global pandemic, as well as the learning curve associated with using Zoom, it can be said that the conference was a success, and follow-on discussions with some of the presenters is underway to promote information exchange and identify opportunities for collaboration

KEYNOTE ADDRESS

Fifty Years of Foiling

By: Dr Neil Baird

Fiftieth Anniversary Virtual Symposium

October 2020

In partnership with his wife Rose, Neil Baird founded Baird Publications, now Baird Maritime, in 1978. It rapidly established itself as one of the world's leading maritime publishers and event organisers. As a ship and boat obsessive from early childhood, Neil's life and career gave him a unique opportunity and perspective from which to observe, study and experience all manner of vessel design and construction developments over more than half a century and over practically the whole world.

Among the many trends he has studied and, even at a young age, experimented with, has been the development of hydrofoil craft. He remains very interested in them in all manner of commercial, leisure and naval operations. He travelled on an ancient and decrepit Kometa as recently as *twelve months ago. Nowadays he is delighted to frequently see one-man electric hydrofoils and foiling windsurfers and catamarans slicing across the cove at the bottom of his Sydney garden while wishing he we were young enough to sail on one of the latter.*

Given the commonality of his own history and that of the International Hydrofoil Society, he is honoured and delighted to be giving this Keynote Address to kindred spirits. He sees a very exciting future for hydrofoil craft.

Background

In 1963, when I was 16, my father and I built a 6 metre X 3 metre Attunga Class plywood sailing catamaran. It was a beautiful boat and, for its time, very fast. Designed by Peter Hooks, an eccentric World War II fighter pilot, who became a noted building architect, it incorporated several aero and hydro-dynamic features inspired by Peter's wartime Spitfire and Mustang adventures.

Peter was something of a kindred spirit and mentor who inspired me at that young age to follow the Amateur Yacht Research Society. I devoured its publications, always looking for ways to make my boat go faster. While hydrofoil craft had been around, at least since Alexander Graham Bell's amazing contraption of the early 1900s, they were only starting to become commercialised and weaponised in the mid to late fifties in Switzerland, Italy, Russia, USA and Canada.

My Attunga Class catamaran flying but not foiling in 1964.

Reading about hydrofoil boats in AYRS journals and *Popular Mechanics* and the like, I became intrigued by the small but fast Swiss Supramar ferries, designed by Baron Hanns von Schertel, one of the founders of the IHS. I felt that if I got the foil shapes and structures right, I would be able, in a good breeze and flat water, be able to make my Attunga catamaran fly. Well, after numerous sheer snapped centreboards and rudders, we started to make them strong enough and it did. We began to be able to see daylight under the leeward hull while flying the windward one. While we only flew for a few hundred metres at a time and couldn't change direction significantly, at least we were up there. How I wish we'd had access to modern FRP materials like carbon fibre then.

I sailed that boat with my brother in Melbourne, Hobart and Sydney for several years, having a lot of fun and winning numerous races and regattas and often setting long-standing records. Once, coming in through Sydney Heads, the boat literally flew from one wave to another.

We then "grew up" and went ocean racing as crew for other, older, richer, people in big yachts. Great fun and a great learning experience but not usually as exciting as faster, smaller sailing boats.

Meanwhile, I was, like many members of the IHS, no doubt, becoming interested, most particularly, in ferries, patrol and assault craft and yachts. I was especially interested in going faster at less cost, in greater comfort, with less wash and with much greater safety. All these factors pointed directly towards hydrofoils. I became fascinated with and an advocate for fast ferries. I was fortunate to be able to indulge my passion and experience in almost all the commercial hydrofoils.

The "Foiling Ferries" to Manly

Having moved to Sydney in 1969, though, I began to experience and study the technical and other attributes of hydrofoil ferries. On prior visits, I had ridden on several including the original little Supramar designed, Hitachi built 19 metre, 75 seat *Manly III* in 1967. The fact that, with operating speeds of 34 knots, they halved the voyage times of the traditional Manly ferries was exciting. I was then hooked on fast ferries and wanted to learn how they worked. I frequently rode on and became even more interested in the bigger Rodriquez RHS 50, 140 seater boats that were introduced in 1966.

It was disappointing, even though I could understand why, that the hydrofoils began to be withdrawn from service from 1988. Unaffordable fuel costs were blamed. I was no longer living in Sydney then but visited frequently and maintained my interest in the hydrofoil ferries. It was interesting to investigate why they were withdrawn and, mostly, scrapped after only just over 20 years. It seemed sad for aluminium craft to be so readily discarded. Fuel costs were a problem as were their berthing peculiarities and the vulnerability of their foils. I suspect, too, that their steel foils connected to riveted aluminium hulls may have suffered from corrosion problems. And, as so often happens around the Australian waterfront, there were union difficulties.

An early Rodriquez RHS 140 'Curl Curl' on Sydney Harbour.

The Rodriquez boats were good to travel on. I experienced several of them in Sydney, the Solent and Italy. Smooth, fast enough for short distances and with comparatively low wash but noisy and smoky.

The slow death of the Rodriquez boats coinciding with the rise of the Boeing/Kawasaki Jetfoils

Rather putting the lie to the fuel cost excuse, it was interesting to see the almost simultaneous rise of the gas turbine powered Jetfoil compared with the decline of the diesel Rodriquez boats. They overlapped from the mid-70s to the late 90s. Few Rodriquez boats remain in service. However, they were out competed more by fast catamarans than by Jetfoils. The cats are easier to own. The Jetfoils, though, offered and still offer, a premium Concorde-like, service. They are fast, smooth and expensive. They are fast and smooth, of course, unless they happen to hit a whale, wreck or container at speed. That has happened with fatal consequences.

I have travelled on numerous Jetfoils in the North Sea, Korea, Indonesia and, mostly, the Pearl River Delta in China. I have experienced some very rough conditions and incredible congestion, both of which were handled with aplomb. Needless to say, I always wore my seatbelt. If you can afford them, Jetfoils are great to travel on.

The Jetfoils arose from the development of the USS *Pegasus*, a 48 knot foiling missile boat of which six were built. Interestingly and importantly, the *Pegasus* class was pushed and strongly promoted by my illustrious predecessor in the role of Keynote Speaker to the 25th Anniversary IHS Conference, the remarkably forward-thinking Admiral Elmo Zumwalt USN. However, like most navies, the US Navy has never been keen on small vessels so the 41 metre Pegasus class was quickly doomed despite Admiral Zumwalt's status as Chief of Naval Operations. It is a pity that naval prejudice prevailed as they were very promising boats. Indeed, the fast missile boat concept has been picked up and developed by China's PLA Navy with their, ironically, as things have turned out, Australian designed Houbei catamaran FAC.

Boeing, however, spread its significant development costs over the civilian version, the 43 knot Jetfoil, of which they built 28. Fifteen were subsequently built under licence by Kawasaki in Japan and two built in China but styled slightly differently. Interestingly, after a hiatus of 25 years, Kawasaki launched another example earlier this year.

The Boeing developed and built hydrofoil missile boat USS Pegasus.

Meanwhile, Rodriquez, after building some 250+, mostly commercial hydrofoils, experimented with some large, steel hulled Ro-Pax that were unsuccessful. That adventure seems to have destroyed the company which is now a division of the yacht building group Intermarine. Anyway, Rodriquez faded from the scene after 1999 as the catamarans were faster, cheaper to build, buy and run and, importantly, safer.

In the late nineties I had a delightful dinner in London with three of the Rodriquez family. I was most impressed with their concepts and philosophies but felt they were struggling somewhat with the rapid advance of catamarans. As the real pioneers of commercial hydrofoils, indeed of fast ferries, I felt rather sorry for them. I liked their boats.

Boeing/Kawasaki Jetfoils are the "Concordes" of foiling ferries.

A Russian built Kometa hydrofoil ferry operating in Greece.

The Russians were coming

Simultaneously with the Rodriquez and Boeing developments, the Soviets, naturally, had to enter the market. As always, they commenced as military craft. Designed and built by several design "bureaux" and naval shipyards, hundreds of their Raketa, Meteora and Kometa hydrofoil ferries were built. Many were exported. They commenced delivering 33 knot commercial ferries in 1957 and Kometas are still being built today. Not a bad production run.

They were generally sold at uneconomic prices, that is, "dumped". The Soviets did not have a commercial clue. The boats were also heavy fuel consumers and maintenance was very expensive due to poor quality Soviet engines and largely riveted construction from often dodgy materials.

I have ridden on many Meteoras and Kometas in Russia, Greece, China and Vietnam. Except in Greece, most were roughly finished, poorly maintained, smoky "tail draggers". One in particular, on the Mekong River in Vietnam, was disintegrating with the aluminium structure, believe it or not, reinforced with galvanized steel! My most recent trip on a Kometa was almost exactly a year ago, from Thassos to the mainland in Greece. The boat was in better condition than its Vietnamese cousin but it still poured out massive amounts of exhaust smoke, was very noisy, and barely got up on its foils. It travelled at about 20 knots, leaving a substantial wave wake.

Soon after Glasnost, in the early nineties, I managed to be taken on an illegal tour of the Almaz Shipyard on the Neva River in St Petersburg. It was then still very much a Soviet style defence shipbuilder but, in addition to the huge military hovercraft being constructed there, they were still turning out Kometas and other commercial and military hydrofoils. Very inefficiently, I should add.

The wider market

Other hydrofoils, I know, came and went but mostly "went" without trace. The Russians tried numerous naval versions but they seemed to come to nothing – they probably spent too much on WIG craft! Another way of flying over the water. So, my commercial interest remained mostly focused on the Rodriquez, Boeing/Kawasaki and Russian boats. They were the only ones I rode on personally. However, I did read about examples such as the Fijian built *Drodrolagi* , launched in 1995 and capable of carrying 60 passengers at 37 knots. I've not heard of it since. The latter was more of a "foil assisted" boat, like the excellent HYSUCATs from South Africa's renowned Professor Hoppe and the *Monostab* ferries that Rodriquez unsuccessfully experimented with twenty or so years ago. New Zealand naval architecture firm Teknicraft Design has made a specialty of the HYSUCAT concept with, effectively, a hydrofoil "wing" connecting the keels of the two hulls of a catamaran. Numerous patrol, yacht, passenger and research vessels have been built incorporating that hydrofoil concept.

A Teknicraft Design hydrofoil assisted catamaran ferry built in the USA

The mighty Thunder Child. Frank Kowalski's creation is available in patrol, rescue and yacht versions.

They are highly regarded but I have never experienced one. They do much of what I hoped hydrofoils would do when I first thought about them.

Australia's One2Three Naval Architects designed an interesting and successful trimaran motor yacht utilising the system in 2009. I understand the concept has been taken still further using the trimaran configuration of Frank Kowalski's magnificent *Thunder Child* built by his Safehaven Boats.

In the mid-nineties we published two editions of *The World Fast Ferry Market,* a survey that turned out to be amazingly prescient. It is now really even more interesting to read than when it was first published in 1997. We were twenty years ahead of our time and I suspect that is a trait we share with many hydrofoil developers. Even then, though, among the 44 fast ferry types currently in production, there were only Rodriquez, Kawasaki and Kometas listed as building hydrofoils. Importantly, though, we highlighted the growing desire for ferries having lower resistance, wash, emissions and fuel costs combined with greater safety, comfort and speed. The catamaran ferries were achieving most of those objectives then but the addition of hydrofoil technology has "supercharged" them.

Foiling leisure boats

While foiling commercial and naval vessels have developed slowly, except, perhaps for the Teknicraft boats, in the 25 years since Admiral Zumwalt stood here before you, leisure applications of hydrofoils have exploded. Hopefully, some of that explosive force will be directed towards commercial and naval activities. There is no doubt that many of the leisure developments have great potential in those other, more real, worlds.

As an avid reader of *Yachting World* and a constant observer of the sailing activity on Pittwater, outside my window, I have, frankly, been amazed and delighted by the advances I have seen over the past twenty years or so. From the first flimsy foiling Moths to the Americas Cup catamarans and today's large foiling monohulls, the change has been phenomenal.

Hydrofoils have been more than super-charged sailing boats. The speed increases achieved have broken the sailing "sound barrier". In twenty years, speeds of sailing craft have more than doubled.

Of course, these developments apply almost solely to racing boats but, as with Formula One racing cars, plenty of them eventually transfer to normal road cars. I suspect this will happen, also, with boats. Indeed, I expect that ultimately much of what is happening in top level yacht racing will eventually trickle through to engine powered commercial and military vessels.

The foiling catamarans competing in the last couple of Americas Cups were routinely flying around the course at 40+ knots.

In 2009 the large foiling trimaran l'Hydroptere achieved 51 knots over a measured nautical mile. It actually exceeded 55 knots during the speed attempt.

These hydrofoil sailing boats are doing everything we want in ferries, patrol and other commercial and military vessels. Strong, lightweight, low resistance boats require less power and less fuel while giving a smoother ride and making less wash. Jetfoils, for example, offer a wonderful ride and high speed but wouldn't it be great if you could achieve that with significantly less power? I'm sure it will happen before long.

Apart from the very highly developed foil shapes, it is obvious, even to a non-naval architect, that much of the advance is due to the use of modern FRP based materials. Basically, they are incredibly light and strong and, so, encourage hydrofoil development. How I wish I had them back in the mid-sixties!

How long before this electric hydrofoil technology will be transferred to the commercial world?

An interesting "fully integrated" electric hydrofoil 'Sea Bubbles' water taxi service launched recently in Switzerland, the home of commercial hydrofoils.

I confidently expect such a transfer of hydrofoil technology from the leisure to the commercial and military sectors. There will, I am sure, be many more foiling ferries, water taxis, patrol, assault, pilot and other craft over the next few years. They will undoubtedly incorporate those light strong foils. I expect to see and experience many of them and look forward to that. However, the keynote address at your 75th IHS Symposium will be really fascinating. I'm sorry I'm unlikely to be here long enough to participate.

Foiling windsurfers show clearly how little power is required to get them flying.

Meanwhile, I wish the IHS well with this, its fiftieth anniversary symposium. I look forward to following your deliberations and learning of many further advances in foiling.

** Picture credits. All pictures have been sourced from Baird Maritime and Wikipedia Commons.*

IHS@50 CELEBRATION: VIDEOS
"HYDROFOILS" CHANNEL https://www.youtube.com/channel/UCHZDDNMvsa9JFi6YcFfrooQ/videos

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2021 Mandles Prize for Hydrofoil Excellence

Thanks to the continued generosity of Mr. Martinn Mandles, a long-time member of IHS and his wife Connie, we are once again sponsoring the IHS Mandles Prize for Hydrofoil Excellence competition. The competition, now in its 8th 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 2016 will be eligible for the 2021 IHS Mandles Prize for Hydrofoil Excellence. The official due date for application forms is May 1st, 2021 but we will accept applications through the end of May.

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 and Rules for the competition can be downloaded from the IHS website (www.foils.org)

We anticipate a very exciting competition in 2021 and look forward to receiving many high-quality entries. Questions on The IHS Mandles Prize for Hydrofoil Excellence can be e-mailed to IHS Vice-President Mark Bebar at: markbebar@juno.com or IHS President Ray Vellinga at: IHSpresident2016@gmail.com

IHS RESPONSE TO QUESTIONS

From
Gijsbert Marrewijk and Johan Schonebaum
Co-Founders of Flying Fish
18 February 2021

Flying Fish is a Dutch company with the goal to make the naval sector greener and more sustainable through smart innovation. The company was founded in 2018 after the co-founders won the Dutch Maritime Designer Award and the 2017 IHS Mandles Prize for hydrofoil excellence. Flying Fish has a strong vision on the future of hydrofoils, electric drives and digitalization in the naval sector. In all of these fields they are currently performing innovative projects. With a world that is moving towards zero emissions mobility, technologies like hydrofoils are essential to reduce energy usage.

Today, Flying Fish consists of 15 young, ambitious and talented engineering professionals with strong ideals for a greener world. Most of them are alumni from Delft University of Technology. The specialisations of the team members are in Aviation, Control Systems, Dynamics, Mechatronics, Computer Science, Vibrations and Structures. Approximately half of the team joined the TU Delft Solar Boat Team during these studies. There they gained their knowledge and first expertise in hydrofoils and efficient drivetrains for boats.

Flying Fish is always open for new engineering challenges from any company. Topics of interest that we are working on now and questions we are internally discussing and researching:

1. Foiling yachts: why did they not take off yet?),
2. Foiling simulator: what do companies need in such a tool?)
3. Foil control: what are the requirements for a generic foil control module? Filtering of waves and modular design?
4. Hydrogen or battery-electric propulsion: an option for larger foiling vessels?
5. Hydrofoil maintenance: has this indeed been the financial barrier for application in larger vessels?

Harry Larsen Response

Foiling Yachts

The notable fact is that hydrofoils have been rather successful in fast passenger ferry markets. The rivers of East and West Asia and Eastern Europe have hundreds of Russian designed hydrofoil ferries. They have been operating ~ 60 years. In the Mediterranean, Russian and Rodriguez hydrofoils have operated between islands since the 1960's. And, of course, the Jetfoil is operating in Hong Kong and Japan/Korea and has been since the 1970s – 1980s. Last Year, Kawasaki launched a new Jetfoil, restarting its Jetfoil construction. Unlike most ferry services the hydrofoil passenger ferries are largely not subsidized, thus they are particularly successful.

As naval craft many navies have tried hydrofoils, the USN, Canada as a research vessel, the UK as a fisheries patrol vessel, the Israeli Navy, the Italian Navy, the Japanese Navy, and the Russian Navy. None of these vessels are in service. One can find various reasons for each of these navies to scrap their fleets, but in each case, they chose to expend their resources on more conventional vessels.

Sailing hydrofoils have been around since the 1950's. They became "popular" only when introduced into sailboat racing. The America's Cup brought them to our attention, but the Moth class popularized them. Today their success is largely in the racing classes that have allowed hydrofoils. In such classes, due to the hydrofoil's performance, one must use them to be competitive.

From this history, a principle can be deduced:

A distinctly new technology cannot be sold into an existing market without a compelling reason.

For the passenger hydrofoil the compelling reason is bankruptcy. A conventional passenger ferry operator cannot compete with a hydrofoil operator on a route suitable to a hydrofoil.

For a navy there is no compelling reason. There are many other established technologies that in combination can perform the various patrol boat missions. And although there may be some missions that can be performed better by a hydrofoil, their advantage is not so great as to make them indispensable to a critical mission's success. The hydrofoil technology is thus not necessary.

For sailboat racing, in a class that allows hydrofoils, they are necessary to win.

Candela is yacht and is being sold. It is being sold to persons who are strongly motivated by ecological issues – global warming, CO2, an issue that is compelling to those buyers. Thus, it is sold because it is a better electric boat. That is, in addition to being electric it has the merits of a hydrofoil, relatively fast, efficient, good ride, small wake. It is not being sold into the recreational market, but rather into a new market driven by CO2.

That reason persons buy yachts is fundamentally sociological. The reason the recreational market is not buying hydrofoil yachts is that the social structures does not yet exist.

They are, however, developing. As hydrofoils become more common as fast ferries, in sailboat racing, and as commuter craft, we will have the sociology. As hydrofoil related employment increases the marine industry will become supportive, the negative attitudes will go away, and many will discover that it is fun to fly.

And there could be some compelling reasons. Some years ago, on Puget Sound, a foil assisted fast ferry was bought due to a lawsuit for shore damage due to its predecessor's wake. Now we have several foil-assisted fast passenger ferries on the Sound. And, when will the US EPA issue a regulation banning the CO2 emissions of recreational yachts?

Foiling simulator

There are two issues that may be appropriate for simulation, takeoff and waves.

The roll authority needed during the transition from hull to foil supported operation is perhaps best dealt with via a simulation. The dynamics in waves, in particular, during the broaching of foils, is an issue suitable to a simulation.

Foil control

This is the wrong question. The question should be. Who would buy a generic foil control module? Anyone who has the capability to develop the control laws would view this as a non-issue. There are so many options, a drone flight control computer, an Arduino or Raspberry Pie, single board computers, . . .

So far, each submerged foil hydrofoil developer has developed their own solution. To do, so they have employed an engineering staff. There are other issues that would be more useful to the would-be hydrofoil builder, the actuation system, the sensors, dealing with the marine environment, even the display, and of course the control laws.

Hydrogen or battery-electric propulsion: This is already happening.

Hydrofoil maintenance

I know of no reason to believe that this is a special problem for hydrofoils. Hundreds of passenger hydrofoils have been operating for the last 60+ years without subsidies. The economics can't be too bad. In general, the hydrofoil specific support structure does not exist, so it is necessary that the builder provide that continuing support. For example, Kawasaki created a subsidiary to provide the necessary product support, as is done by airplane companies. As hydrofoils become more common the marine industry will create the product support infrastructure, except for product specific support, but until then product support must be provided by the hydrofoil developers.

Tom Speer Response

Foiling Yachts.

Foils are expensive. Foils require building to close tolerances, and carbon fiber composites add a lot of cost to the boat. The Moth dinghy, which is only 11 ft long, costs over $20,000. And then there is the added cost of the actuators, hydraulic system, and sensors needed for the control system, plus maintenance of the same in a hostile environment. Foils need to be engineered to a high degree. It is not enough to design a hydrofoil boat by eye or rules of thumb. This is a barrier to entry for many boatbuilders. There are significant safety implications for flying. A boat can crash down suddenly and without warning if it hits something or if a foil ventilates. The flying height means the hull has time to develop an unusual attitude before it hits - just look at the gyrations of the AC75s or Sailrocket. A hydrofoil needs to be operated within a restricted range of conditions and operating parameters, and this is not conducive to safe operations by untrained Bubba and his buddies. Foiling simulator developing a simulation of a hydrofoil is more difficult than developing a simulation of an aircraft. The reason is the presence of the free surface. This is more than just the hydrodynamic effects of the free surface, although those need to be taken into account as well. With an aircraft, you can characterize the aerodynamic forces and moments by the angle of attack, angle of sideslip, Mach number, and control deflections. It doesn't matter what the attitude of the airplane is - it will produce the same aerodynamic forces at the same angle of attack regardless of whether it is upright or rolled on its side. And the wing area does not change. That isn't true for a hydrofoil. As a hydrofoil climbs, pitches, or rolls, different amounts of hydrofoil wings and/or struts are immersed. The hydrodynamic forces are affected by the proximity of the free surface, which also is different as the craft climbs, pitches, or rolls. In addition, the angles of attack and sideslip are also changing, depending on the direction of the boat's velocity vector. As a result, the number of independent variables in a hydrofoil simulation is much higher than for an aircraft simulation. This causes an exponential explosion in the size of the tables needed to represent the forces and moments, and the number of CFD cases that must be run to generate them. Relationships that are linear for an aircraft simulation are nonlinear for

hydrofoils and cannot be neglected. For example, the coupling of height to vertical lift through leeway that stabilized the AC72 and AC50 foiling catamarans is entirely a non-linear phenomenon. There are several levels of simulation, with different purposes. The lowest level is the offline engineering simulation. This is used to predict the dynamic stability of the boat and the loads on various components. The engineering simulation is typically by and for engineers and cannot be run by lay people. The next levels up from the engineering simulation are the software-in-the-loop (SIL) and hardware-in-the-loop simulations (HIL). The software-in-the-loop simulation uses the actual operational flight program to exercise the control laws. The SIL requires modeling of the sensor and actuator dynamics with enough fidelity to generate all of signals that come and go from the hardware to the software. The HIL requires a test bench capable of hosting the actual hardware and simulating the electrical signals of the sensors. An iron bird simulation takes the HIL a step further to replicate the lengths of the hydraulic runs and the inertias of the control surfaces. As you can imagine, there is a significant cost associated with HIL and iron bird simulations. Even a SIL requires a lot of computation - often multiple computers running in parallel. For example, the operational flight program (OFP) may be running on one computer, with the dynamics of the boat being simulated in another. If the simulation is to be used for crew training, then the cockpit environment needs to be replicated. This requires a vision system and control loaders that replicate the feel of the control inceptors. It may be necessary to have a motion base so the pilot and sail trimmer can react to the feel of the boat's motion. The crew stations also need to be replicated, although they may not need to have a motion base. If both hulls of a catamaran are to be represented so the crew can practice running from side to side during maneuvers, that requires a fair amount of floor space. All this is to say what companies need for a simulation depends a great deal on what the objectives of the simulation are and how it is to be used. The resources needed can be considerable, even for a simple engineering simulation.

Foil Control

In a digital aircraft flight control system, approximately 75% to 80% of the software is devoted to executive and redundancy management. Only 20% to 25% of the software is concerned with the control laws that actually affect the airplane. This gives some idea of the effort that has to be devoted to providing a control infrastructure with high availability and fault tolerance. In the 1980s, I surveyed all of the flight control related mishap reports from the F-16 and F-18, which were the only fly-by-wire fighters in service at the time. I categorized the mishaps according to cause - computer hardware, software, sensors, actuators. I found that actuator failures were by far the most common cause of mishaps. None were caused by software errors and computer failures were rare. Although a crash of a hydrofoil is not as likely to be immediately fatal to all on board the way an aircraft crash would be, there is still considerable potential for injury or death in the event of a control system failure. This is not the case with typical marine control systems. Crashing is considered an acceptable cost of business for small, unmanned aircraft. Racing crews accept a higher level of risk than would typical recreational boaters. So, while UAV flight control systems may be cheap and readily available, they may not meet the requirements of a commercially produced hydrofoil. Product liability from one accident could wipe out a hydrofoil company. There are two ideal approaches to flying in a seaway. The first is platforming, in which the craft flies at a constant altitude above the mean water level and waves pass beneath it without influencing the motion. The second is contouring, in which the craft flies at a constant altitude above the actual water surface, going up and down with the waves. In practice, some combination of both of these is used, with the craft platforming small, high frequency waves and contouring swells. The shorter the wavelength of the waves, and the faster the boat, the higher the frequency and the larger the amplitude of the vertical accelerations will be. The figure on the next page shows some requirements for passenger ride quality. The low frequency requirements are based on how long it takes for a specified proportion of the passengers to become seasick. (I don't recall just what that percentage of

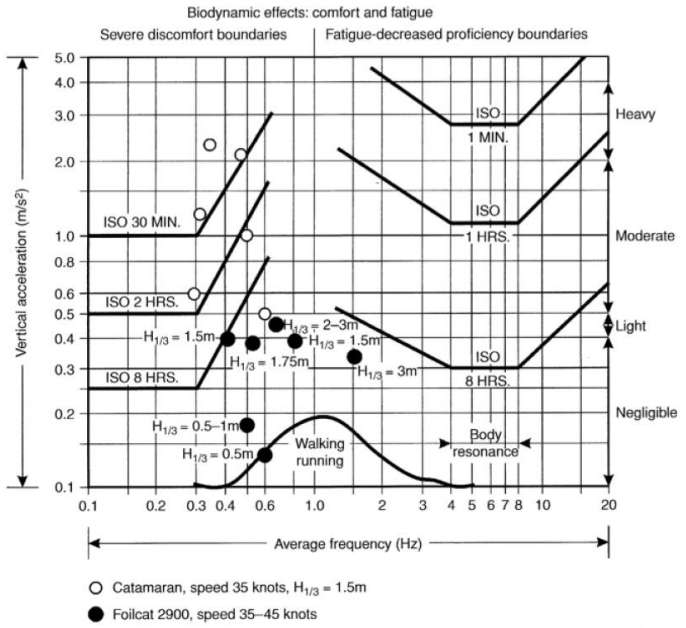

Figure 6.22. Comparison of different levels of comfort onboard a foil catamaran (Foil Cat 2900) with overall length of 29.25 m and onboard a conventional catamaran of similar length at different sea states. Active control is used for the foil catamaran (Minsaas 1993).

passengers is in the ISO standard.) The high frequency requirements are based on fatigue.

With regard to filtering of waves in the height control loop, my preferred approach would be to use a complementary filter to estimate the flying height and provide feedback signals. The rate of change of vertical velocity is the flight path angle times the speed. At a constant speed, the angle of attack is approximately constant and the changes to pitch attitude are the same as changes to flight path angle. As a result, pitch attitude feedback is proportional to height rate feedback - the first-time derivative of height. Vertical acceleration is the second time derivative of height. A complementary filter for height would take in sensed values of height, pitch attitude, and vertical acceleration. It would low-pass filter height, bandpass filter pitch attitude, and high-pass filter acceleration in such a way that when the filtered values were all added together the result would be an estimated height that is good at all frequencies with no phaser lag. The corner frequencies of the filters would be chosen to filter out different surface wavelengths. Thus, the estimated values of height, height rate, and height acceleration would not see the shorter wavelengths and the craft would platform them, because the feedback from those frequencies would come from the inertial sensors. But the long wavelengths would come through and the craft would contour those, because those frequencies would come from the height sensor. Electric propulsion for larger vessels See the Bieker Boats/Glosten fast ferry project: https://biekerboats.com/project/foiling-fast-ferry/

Hydrofoil maintenance:

I have no experience in this area.

Martin Grimm Response

Foiling yachts:

It seems that foiling yachts are gradually taking a bigger hold: Moth class has effectively transitioned to foiling. No hull borne Moth would be competitive anymore now. The America's Cup seems to have moved to foils (of various types) and I can't see them reverting back to displacement hulls. There are many and varied foiling sailboats now compared to years back. I accept they still are not mainstream though.

Foiling simulator

I think it would be best for Flying-Fish Tech to ask potential clients and also approach the major maritime simulator companies, or perhaps gaming companies with a proposal / offer of services.

Foil control

I have never been involved in this, so it is hard to comment. I would say the aim would be (1) safe operation in first instance followed by (2) smoothest operation as far as passengers are concerned. There may be other considerations, such as foil loading, fatigue and cavitation avoidance.

Hydrogen or battery-electric propulsion

This is certainly worth looking at, but it may be best for Flying-Fish Tech to team up or work with people like Candela or Bieker / Glosten? I did some number crunching on this some years ago (for an RHS 140 sized hydrofoil). Back then, achieving sufficient endurance for a passenger hydrofoil still seemed like a struggle. I can pass on the estimates if Flying Fish is interested in updating them. Hydrofoil maintenance It is hard to get this operating economics data. I have a

few technical papers on the typic that could be scanned and sent to Flying-Fish Tech, but they are old and fairly generic. Garry Fry and I also did a calculation of the relative operating economics of hydrofoils vs. catamarans on Sydney Harbour service. We used our best estimates of maintenance costs of surface piercing hydrofoils at the time. If of interest to Gijsbert and his colleagues, I can forward our spreadsheets once I relocate them as there is nothing commercially sensitive in them. At the time, our realisation was that Australian shipyards simply considered pure hydrofoils to be too expensive to build in comparison with catamarans. But I think this may have been influenced by their familiarity with catamarans and unfamiliarity with hydrofoils. One key question to consider is, "what is the commercial advantage of higher transit speed?" Even though hydrofoils (at least diesel-powered ones) may be more fuel efficient than other HSC's at the high speeds at which they operate, operating at such high speed still involves high fuel consumption.

SAVING RODRIQUEZ RHS 140 'SPARGI' FORMERLY 'CURL CURL'

By Martin Grimm, from Curl Curl Facebook page

IHS member Andrew Heighway, 49, has been a hydrofoil enthusiast since his youth when he visited Sydney, Australia, when his father had been a British Airways pilot. Here he experienced the surface piercing hydrofoils operating on Sydney Harbour between Manly Pier and Sydney's Circular Quay. The route was a relatively short 6 nautical miles allowing hydrofoil crossing in as little as 12 minutes on what had predominantly been a commuter service.

Later in his life, living in the UK, Andrew sought to discover what had become of the Sydney hydrofoils of his childhood. Initially fearing all had been scrapped, some years ago Andrew discovered that one of them had somewhat miraculously survived intact.

That hydrofoil was a Rodriquez Cantiere Navale RHS 140 originally named 'Curl Curl' which had been built in Messina, Italy, in 1972. Rodriquez had originally built PT 20 and PT 50 hydrofoils under licence to Supramar of Switzerland however from the early 1970's onwards, it began building hydrofoils of the RHS series. The RHS 140 at 65 tons and with seating capacity ranging from 111 to 150 was the Rodriquez successor to the PT 50. The yard built 13 of this type between 1971 and 1977. 'Curl Curl' had been the sixth of the type built.

'Curl Curl' was shipped to its original operator, the Port Jackson and Manly Steamship Company in Sydney where it commenced operations in April 1973. 'Curl Curl' continued to operate on Sydney harbour until 1991 but was then sold and shipped back to Italy along with the three other remaining hydrofoils in February 1992. Thereafter, 'Curl Curl' was renamed 'Spargi' and operated with Ustica Lines from 1995 and

'Curl Curl' being unloaded following arrival in Sydney from Italy. John Darroch Collection.

'Curl Curl' being loaded onto Regina in Sydney for shipment back to Italy in February 1992. John Darroch Collection.

later with Alimare in Mediterranean waters until 2005.

'After retirement, she has been sitting on dry land in a ship maintenance yard in Messina for the last sixteen years, not far from where she had originally been built. Considering the hydrofoil is approaching 50 years of age and had been working consistently for many of those years, she remains in remarkably good condition.

Andrew made a bid for the craft and was successful. He aims to restore 'Spargi' to operational condition however this is no minor task, an in particular requires funding beyond what Andrew currently has available. Consequently, earlier this year, Andrew established a crowd funding campaign. Funds pledged will be allocated towards immediate costs associated with preserving the hydrofoil, however with additional funding, restoration to an operational condition would become possible.

Andrew ultimately aims to bring 'Curl Curl' back to Australia on a Homecoming Tour in time for her 50th anniversary of commencing operation in 2023, how. Australians, tourists and hydrofoil fans would be able to take trips on her around the Harbour and enjoy this incredible experience once again. In the interim, significant work will be required, notwithstanding that the hydrofoil remains intact and in generally good condition.

Help is still needed to protect her short-term future and do essential work that will allow her to float once again, and to be towed to a new location should that become necessary. Andrew hopes that hydrofoil enthusiasts from around the world will get behind his campaign to save 'Curl Curl'. Andrew can be contacted at: mail@andrewheighway.com. He is also the administrator of the Facebook 'Hydrofoil Blog' and a regular contributor to the private Facebook 'Hydrofoils of Sydney' page where enthusiasts share their memories and photographs of the Sydney hydrofoils.
https://www.facebook.com/curlcurl.hydrofoil.1

Andrew Heighway alongside 'Spargi' in Messina, Italy. Andrew Heighway photo.

In current condition as 'Spargi' at a ship repair and storage yard in Messina, Italy. Andrew Heighway photo.

'Curl Curl' operating on Sydney Harbour in 1973. John Darroch Collection.

DEPARTED MEMBERS, IN MEMORIAM

Juanita Kalerghi Rothman
(IHS Life Member)

Following publication of the previous IHS Newsletter, the Society sadly became aware of the passing of Juanita Kalerghi Rothman at her home in Cheltenham, England, on December 11th, 2019.

Juanita had been instrumental in the formation of the Society and subsequently became an IHS Life Member. An obituary by her godson, Tony Platt, provides a personal insight into Juanita and her life: https://goodtogo.typepad.com/tony_platt_goodtogo/2020/01/get-cracking.html. This tribute in part draws upon on that as well as recollections of the late Bob Johnston and her own contribution to "Fast Ferry International" in 2001, at the time marking 40 years of the journal under various titles.

As Juanita Masur she grew up in South Africa, the daughter of a Hungarian mother born in the United States and a South African businessman, both Jews. Apartheid and the Second World War shaped her antifascist politics. At Witwatersrand University, she received a degree in political philosophy and economics, and also took on the role as editor of the campus newspaper. Juanita ran a clandestine school teaching literacy to Black South Africans. In the 1940s, the Nazis murdered one of her uncles in Germany, while her brother joined the Canadian air force and died during the war in the Netherlands. At the time, she helped her mother administer a camp for 90,000 prisoners of war. After graduation, Juanita worked as an assistant editor at the Johannesburg Sunday Express.

By the 1950s, as South Africa's racial lines hardened, Juanita exiled herself into the world, no small feat for a single woman in a pre-feminist era. She lived for a while in Greece before moving permanently to England.

Juanita's personal life defied the convention of her time: she married three times and divorced twice. Following her first divorce, and as a parent, she focused on a career as a writer and journalist, initially in Greece where she wrote for United Nations publications. Here she married Count Nicholas Kalerghi Mavrogeni, an official in the Ministry of Justice.

In 1961, after her second divorce and a move to England, she became the publisher and editor of the newly established journal, Hovering Craft and Hydrofoil. Juanita recalls that prior to this, she had been editing an educational journal for a small publishing firm. When this was sold to a large publishing company, she decided to start her own publishing venture. Fixing on a subject hadn't been easy. She dismissed the ideas of food, clothing and shelter, as these were already abundantly covered in journals of their own. However, the national press had recently carried small items of information about hovercraft and hydrofoils and these had captured her interest and imagination. And she didn't want any competition! There followed six months of intensive preparation with invaluable help from Christopher Cockerell, Christopher Hook, Baron von Schertel and the Rodriquez family - to name but a few of the pioneers. They became staunch supporters, mentors and friends. Juanita's first office was a rudimentary basement offered rent-free for six months by the landlord who ran his own advertising business in the upper floors of the building. Juanita's first appeal to potential subscribers went out in five hundred letters.

The first issue of "Hovering Craft & Hydrofoil" was published in October 1961 with fifteen hundred copies then costing three hundred pounds. For the first two years of the journal's existence Juanita had enlisted the part-time help of Roy McLeavy, who was then working for an aviation journal. He later went on to edit Jane's Surface Skimmers. Over the following 50 years, the title of the journal changed twice, first to "High-Speed Surface Craft" and then to "Fast Ferry International" (with the final issue published in December 2011). Between 1961 and 1983, it was edited, and for most of that time also published by Juanita Kalerghi, who also contributed a monthly editorial. Juanita recalled: "The most challenging and exciting years of my life were those of my involvement with the high-speed surface craft industry". Alan Blunden became the only other editor of the journal for the subsequent years.

Once the finances of the business had become more secure, Juanita also published books and held international conferences and exhibitions, and so it was that "A History of Air Cushion Vehicles" by Leslie Hayward; "An Introduction to Hovercraft and Hoverports" by Professor O'Flaherty and Ian Cross; and "Hydrofoil Sailing" by James Grugono, Alan Alexander and Donald Nigg appeared in 1963, 1972 and 1975.

In 1969 and 1970 the International Air Cushion Vehicles and International Hydrofoil societies were formed with the support and encouragement of Juanita. Further details of the formation of the IHS can be found in the presentation given by the late Bob Johnston during the IHS 25th Anniversary Celebration and Conference: https://foils.org/wp-content/uploads/2017/09/ihs25his.pdf

Later in life, Juanita married Nat Rothman. Following Nat's death in 1998, and in her last decade, Juanita worked for free as a literary editor and agent for aspiring and established authors, helping them to publish in a wide variety of genres, from fiction and memoir to scientific and historical treatises.

Jenkins, George

On February 7, 2020, we lost George after a long struggle with declining health. He is survived by his wife, Pat, of 58 years.

George was a U.S. Naval Academy graduate, Class of 1958. As a Surface Warfare Officer, his sea tours included Destroyers, Destroyer staffs and Mobile Logistic Support Force (MLSF) (Command). His shore tours included the U.S. Naval Academy (instructor in Physics 1967-1969), U.S. Naval War College as a student in 1970, Defense Nuclear Agency (1972-1974), Office of the Chief of Naval Operations (OPNAV) serving as PHM Program coordinator from 1976 through 1979. He also served on the staff of the Commander in Chief, U.S. Naval Forces, Europe for the detailed planning for PHM support in the Mediterranean. He retired from the Navy in 1981. From November 1982 until October 1993 George provided technical and management support to the OPNAV PHM Platform Sponsor. After providing support to seven NAVAIR and NAVSEA Combat System acquisitions, he retired in 2000. George and his wife most recently resided in Williamsburg, Virginia.

George served as Treasurer of the IHS from 1996 to 2009 and later worked with Frank Horn, the subsequent Treasurer. He was recently awarded a Meritorious Life Membership in the IHS in recognition of his long and devoted service as IHS Treasurer. George was also on the Board of Directors for many years.

Daniel Savitsky

Dr. Daniel Savitsky of River Vale, NJ, 98, Professor Emeritus, Stevens Institute of Technology

After a career spanning over 70 years, Dr. Savitsky passed away peacefully on March 23, 2020.

Dr. Savitsky was born in New York City on September 26, 1921 on the Lower East Side. He attended Stuyvesant High School, and the City University of New York (CUNY) where he earned his undergraduate degree in Civil Engineering. He served in the Army from 1944-1947 as an aeronautical research scientist, and later earned his Master of Science degree in Fluid Mechanics/Naval Architecture from Stevens Institute of Technology. Dr. Savitsky earned his PhD from New York University in Oceanography.

His professional contributions to the fields of naval architecture and marine engineering are vast. Dr. Savitsky retired as Professor Emeritus from Stevens Institute of Technology where he taught graduate classes in marine engineering while also directing research on high-speed marine craft in the Davidson Laboratory. It was there that he devised a mathematical model that became the Savitsky Method still widely used across the world. A research vessel was christened in his honor and named R/V Savitsky. It is used for the study of hydrodynamics in the New York Harbor.

Dr. Savitsky truly enjoyed sharing his knowledge with students and colleagues, and accepted opportunities to further the study of marine engineering and naval architecture through his research, in the classroom, and to professional organizations. At 94, he traveled to Annapolis, Maryland to deliver a follow-up paper to his seminal work from 1964, and at 95 published his last professional paper.

He was proud of his Ukrainian heritage and enjoyed sharing stories of growing up on the Lower East Side. He enjoyed sailing at the Niantic Bay Yacht Club with his family, as well as reading, traveling, and watching Yankees baseball. For all of his professional achievements, the most important thing in his life was his family, and he couldn't do enough for them.

He is survived by his wife, Mary of 57 years, his sister Emily, his 3 children, granddaughter, and 2 sons-in-law. Arrangements by Robert Spearing Funeral Home, Inc., Park Ridge, NJ

Nat Kobitz

Of Baltimore, MD, passed away on April 5, 2020 at the age 92 years old. He had a long and distinguished career in the Department of Defense and with the U.S. Navy. He was survived by his loving children, Madeline Cheers (Robert Vetter), Linda Rose Kaiser (Alberto Conti), Celia (Robert) Kibler and Bennett Alan (Kathleen Mckinney) Kobitz; grandchildren, Lauren Nichole (Christopher) Henry, William Kyle (Jessica) Harris, Matthew Henry Kaiser (Lauren May) Emily Ann (Stephanie) Kaiser, Rhys Myles Kobitz, Galen Archer Kobitz, Ross Kibler, Paul Kibler and Ryan (Vicki) Kibler and five great-grandchildren. He was predeceased by his loving wife, Cynthia Kobitz (nee Lenes) and parents, Benjamin and Anna Kobitz.

Funeral services are private. Please omit flowers. Contributions in his memory may be sent to Jewish War Veterans of the United States of America, 1811 R Street NW, Washington, DC 20009 or ALS Association, 7507 Standish Place, Rockville, MD 20855.

Published in the Washington Post on Apr. 6, 2020.

CAPT Frank G. Horn (USN, Ret.)

by Mark R. Bebar, Vice-President, IHS

It is with great sadness that I report the passing of CAPT Frank G. Horn (USN, Ret.). Frank was an outstanding member of the International Hydrofoil Society and served as Treasurer for many years. He received a Certificate of Appreciation in 2016 for his dedicated service to IHS.

Following graduation from Charleroi High School in 1955, he attended West Virginia Wesleyan College receiving a Bachelor of Science in History (1960). On August 12, 1960, Frank graduated from Officer Candidate School (OCS) and was commissioned a US Navy ENSIGN. His magnificent career spanned 32 years (1960-1991).

Captain Horn commanded four afloat units: USS Calcaterra (DER-390), USS Richard E Byrd (DDG-23), and Patrol Hydrofoil Missile Squadron Two (COMPHMRON 2) as Commodore.

A major role for PHMRON 2 was its heavy involvement in the national counter drug program. The squadron was first fully constituted in 1983 and PHMs accounted for about 30 percent of all surface U.S. Navy-assisted drug seizures. In Fiscal Year 1992 they devoted over 84 percent of their underway time to this mission. Under CAPT Horn's outstanding leadership, the 6-ship squadron conducted 30% of the Navy's counter-drug operations. This was recognized by 22 Unit Awards from the USCG and the Senior Coast Guard Commander in the Miami area said that

"[PHMs] are the most effective surface asset [for certain types of counter drug operations]."

A major role for PHMRON 2 was its heavy involvement in the national counter drug program. The squadron was first fully constituted in 1983Under CAPT Horn's outstanding leadership, the 6-ship squadron accounted for 30% of all drug seizures. This was recognized by 22 Unit Awards from the USCG and the Senior Coast Guard Commander in the Miami area."

It is noteworthy that CAPT Horn was interviewed by CNN in 1983:
https://www.youtube.com/watch?v=zzZnK3XTc6s

Frank Horn will be greatly missed by all of us at IHS. A tribute wall and obituary for CAPT Horn can be found at this link:
https://www.moserfuneralhome.com/obituaries/Captain-Frank--Gordon-Horn?obId=20104664&fbclid=IwAR0UaEXYuWZEmlaujGkyBpMMw5t4aUs4CBI1j9sNQV5ZQ8zODuEqgQHOOlw#/celebrationWall

INTERNATIONAL HYDROFOIL SOCIETY PURPOSES AND OBJECTIVES

https://foils.org/ihs-purposes-and-objectives/

• Foster advancement of hydrofoil technology.

• Serve as a source of expert knowledge on hydrofoils and hydrofoil technology.

• Provide an international forum for interchange of information and ideas on hydrofoil technology, design, construction, and operation.

• Build and maintain a library of information and data on hydrofoils and hydrofoil technology and disseminate to interested persons and organizations.

• Foster and participate in conferences and exhibitions related to hydrofoil technology

• Promote commercial, military and recreational application of hydrofoils.

• Foster educational activities about hydrofoils and related technologies.

• Act as a spokesman for the world hydrofoil community.

NEWSLETTER

The newsletter can be viewed and downloaded for free from the IHS website, www.foils.org

Membership is free: Fill out this simple form with your email and you are in. Any questions or concerns, contact IHSpresident2016@gmail.com

P.O. Box 8911
Reston, VA 20195

Founded in 1970, IHS is a nonprofit tax-exempt organization.

GET IN PRINT

Do you or your company have a story to tell, a product to show to the hydrofoil community, etc.? Send a copy to IHSpresident2016@gmail.com and if it is appropriate, we will give you some publicity or otherwise help share your ideas. No cost to you.

DISCLAIMER

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

DUES ARE HISTORY

As a key part of this administration, annual dues have been eliminated. The new program is to rely on Sustaining Members and donations. Please inquire with IHSpresident2016@gmail.com to place an ad.

TAX DEDUCTIBLE DONATIONS INVITED

The International Hydrofoil Society does not charge a membership fee. Its financial operation is dependent on the generous contributions of our corporate sponsors and individual donors. The IHS is recognized by the Internal Revenue Service as a 501(c) (3) charity. As such, donations to the IHS are tax deductible. Recent changes to the tax laws have made itemized deductions generally less attractive, however, there are circumstances where itemizing rather than taking the standard deduction still make sense. The following article describes one of those circumstances that is advantageous for retirement age members: CLICK HERE

If you would like to make a tax-deductible donation to the IHS, the mailing address is:

International Hydrofoil Society
P.O. Box 8911
Reston, VA 20195

TOO MUCH EMAIL?

You may email IHSpresident2016@gmail.com and request to be removed from our 1,700-member list, however we have a staff of zero, so a big favor to us is for you to simply use your browser to ignore or block our incoming newsletter. Of course, we hope you choose to enjoy our free news report twice a year.