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The Hovercraft Society
Formed in 1971

News Notes

NO 3 MAY 2022

An Air Rider AR45 on a frozen lake going out for a spot of ice fishing, using the specially installed fishing holes in the hull structure and weather protective 'hut'

Photo courtesy Air Rider

INTRODUCTION

After a period offline during April and most of May our Internet Site is back online. It now has controlled access to a member's part of the site as well as the open area for visitors with access to material that is publicly available such as regulations. A guide to the site is given on page 6 below. These News Notes are now located in the members area and so registration/log-on is necessary to read them online.

We have a selection of news and information this issue – a mix of design, operations, and some new sales and contracts.

In Norway at the end of April the initial selection phase for contractors in the zero-emission fast ferry competition was made. ESNA and SES-X have both been selected for the second phase that includes model testing. An overview of the total of four concepts, that also include a hydrofoil and a hydrofoil assisted catamaran is given starting on page 7.

During the month Air Rider in Canada have decided to stop production of their craft as a consequence of supplier problems. They already have a significant client base that is special to

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rural Ontario. We present a retrospective overview of the Air Rider craft starting on page 13.

Once again, your editor has found new materials on the internet. This month the focus is on the smaller craft and on Hovertravel videos.

NEWS ITEMS

BHC RECENT NEWS

Tidal-Pro to Ontario

Until March this year this BHC Tidal Pro was used as a demonstrator. Then a client from Ontario purchased it, refitted with a driver's 'cuddy' as you can see below. These open back drivers' cabins seem to be the mode now!

The craft was delivered in a container to its new owner. Two similar craft were delivered to BHC distributor in Shanghai, China in February. Those craft were all in red as we showed in the March News Note and also had driver's cuddies.

New Distributors

BHC have completed deals with distributors in Australia, and in Latvia for the Baltic area during March.

Vortex Mistral to Norway

A BHC client in Norway was delivered a Vortex Mistral Hovercraft for access to his holiday home (hytte in Norwegian) by a lake in eastern Norway in February to help with construction logistics.

When the lake ice is partially frozen there is no other way to gain access other than by hovercraft. This also includes access for any contractors needed. As the client had carpenters on stand-by, they eagerly awaited the craft's arrival so they could get themselves & their equipment on site! The craft was delivered from Immingham Docks to the port at Brevik just west of Sandefjord.

NEOTERIC AT FIRE SERVICE EXPOSITION

Chris Fitzgerald and Neoteric once again attended the Fire Department Instructors Exhibition at Indianapolis, Indiana, in the last week of April, having an exhibition booth and giving demonstrations of their craft. Neoteric have a significant client base with Fire and Rescue services in the US and internationally.

This year the FDIC show was very busy with 30,406 registered fire industry professionals for training, conference, workshops, business meetings, and exploring the exhibit hall.

The event is probably the largest of its kind in the world and attracts international as well as national visitors.

Neoteric gave regular demonstration flights in an open area close to his outside booth for interested attendees.

A taste for their rescue craft and FDIC participation is in their blog at the following link: Neoteric at FDIC 2022

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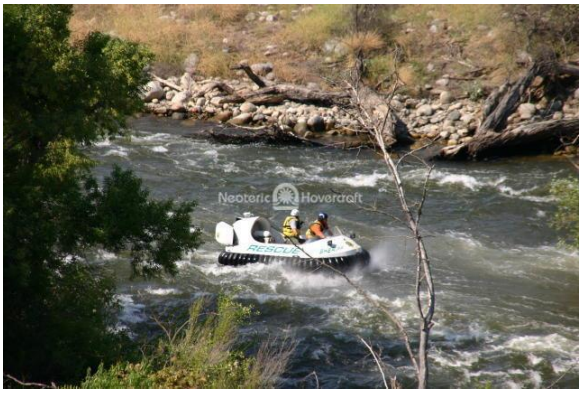
The Neoteric model design has been refined over the last decade to fit with the requirements of these specialist clients, as well as the company being involved in ongoing operational support.

Neoteric are moving to use the Briggs&Stratton 40 hp V Twin in their Hovertrek II. Further info on this can be found here:

Briggs&Stratton engine for Hovertrek II



Kern County Sherriff Department's craft on a rescue mission. Courtesy Neoteric Hovercraft Inc

NORTHERN VIKING JOINT EXERCISE, ICELAND

The picture above shows U.S. Navy Sailors assigned to the Kearsarge Amphibious Readiness Group and U.S. Marines with 22nd Marine Expeditionary Unit conduct ship-to-shore movements aboard a U.S. Navy LCAC attached to Assault Craft Unit 4, in support of exercise Northern Viking 2022 in Miðsandur, Iceland, April 10, 2022. Northern Viking 22 was targeted at strengthening interoperability and force readiness between the U.S., Iceland and Allied nations, enabling multi-domain command and control of joint and coalition forces in the defence of Iceland and Sea Lines of Communication in the Greenland, Iceland, United Kingdom (GIUK) gap. *(U.S. Marine Corps photos above and below by Cpl. Yvonna Guyette courtesy US DVIDS)*

Below, another view of action on April 11th from PO 1st class Tyler Thompson, courtesy US DVIDS

MORE EXERCISES IN NORTHERN NORWAY

US troops that arrived in Northern Norway after Easter were part of quick reaction forces from the US Marine Corps. Exercises took place on land, at sea and in the air. The LSD *USS Kearsarge* sailed into Tromsø, with Norwegian Broadcasting (NRK) noting that it was the first time such a large US vessel has visited the city. Its arrival came just a week after another US nuclear submarine surfaced in Tromsø, too.

Norwegian newspaper '*Klassekampen'* reported at this time that there is increased rivalry among the superpowers in the Arctic, with the US, Russia and China all boosting their presence in the area that has long been Norway's strategic backyard.

The US now views the Arctic as far more than just its territory in and around Alaska: "The

superpower rivalry (in the entire Arctic region) is now becoming more and more clear," Andreas Østhagen, a senior researcher at the Fridtjof Nansen Institute in Norway, told *Klassekampen*.

Three LCAC from USS Kearsage come ashore in Northern Norway, courtesy US Navy

At issue, he says, is "military positioning", an increased interest in Arctic resources such as oil, gas, minerals and food, and control over the Barents Sea. Russia needs access through the Barents for its vessels based around Kola: "If its fleet, especially its nuclear submarines, can't get out (towards the North Atlantic), Russia won't succeed with its nuclear deterrent in crisis times," Østhagen said.

Svalbard and Bjørnøya, which Norway controls, are strategically important for both sides. "It means a lot to Norway that the US is now looking north", Østhagen said. Meanwhile Norway has controversially been allowing more and more US presence on its own bases. Andøya, for example, will now become a permanent base for arriving allied forces.

Karsten Friis of the foreign policy institute NUPI in Oslo said it was "logical" for the US and Norway to be training together now, as long as the two allies "don't operate in a manner that's would unnecessarily provoke Russia". The new training session comes just weeks after NATO's Cold Response exercises in Norway this winter.

HiNorth news Tromso exercises

Thanks to Norway News in English for the lead to this story from Highnorthnews, and US DVIDS for additional information and images.

Air Lubrication Webinar

Rivierra have published a recording of a webinar discussing the Fuel and Energy savings potential of air lubrication system for shipping that was held on 12th April. You can find the webinar here:

Air Lubrication: fuel and emissions savings

The introduction to the seminar is as follows:

"How does riding on a bed of microbubbles improve efficiency, and does it make sense for your ship? Our panel will assess the extent to which such systems reduce friction, power requirements, fuel consumption and ultimately vessel emissions."

You will need to register with Rivierra in order to view the webinar, but there are no fees to pay. The webinar gives a useful insight into current status with this technology which is gathering pace now in assisting improved fuel efficiency and reduced emissions.

Rivierra are a useful site for maritime news, including offshore vessels and the increasing programmes aimed at energy transition, the main link is here:

https://www.rivieramm.com/

New Castoldi Water Jet announced

Castoldi have introduced a new large size waterjet unit for fast marine craft, the HTC600 is the top of its range extending power ratings to 1986 KW or 2700 shp.

The Turbodrive 600 H.C.T. is an innovative high efficiency propulsion system with ground-breaking performance destined to revolutionize the market of the large waterjets according to Castoldi.

Castoldi has transferred all the exclusive technical characteristics of the H.C.T. range into it, creating, after 4 years of intense studies with

the most advanced CAD and CFD software, a complete and easy-to-install propulsion system that allows compact applications, with considerable savings in dimensions, weight and costs.

For the first time a waterjet of this size is equipped with an integrated gearbox (heavy duty certified) with many gear ratios available, matched to a multi-disc hydraulic clutch. There is an innovative Clear-Duct unclogging system (synchronizing operations of the impeller rotation reversing and the intake grid opening) and integration with the reversing interceptors.

The steering and reversing actuators have been designed to manage the high forces involved, with two hydraulic cylinders controlling the movement of the bucket. This allows rapid and efficient crash-stops, with one cylinder dedicated to the steering nozzle for greater dynamic efficiency.

The high quality of the materials used (such as the Duplex micro-cast stainless steel impeller and the titanium liner) and the production processes (anti-corrosion hard anodizing treatment protecting all the aluminium alloy components and three layers of special paint) make it unique in its construction quality.

The Turbodrive 600 HCT is controlled by an ACES electronic system that can be supplied with several extra features such as position keeping, smart anchor, unmanned interface, autopilot integration and hybrid power.

Castoldi Site and HTC600 Brochure:

https://www.castoldijet.it/waterjet/model/turbodrive-600-h-c-t/

Video of drive: https://youtu.be/rC4qc8n8vLs

Castoldi waterjet range now consists of nine models starting with the 224DD weighing just 62 kg suitable for 147KW (200shp) engines up to the HTC600 that weighs in at 1580 kg including its inbuilt gearbox with 13 possible drive ratios available for selection.

AP1-88 Craft at Batam Island

The three AP1-88 craft delivered to Singapore in February and barge loaded for Indonesia were delivered to Batam Island just 15km south of Singapore across the strait. They are renamed Air Bison 1, 2, and 3. The ex-Freedom 90 will have some additional refit before the three craft are put into service.

It will be interesting to see what routes the craft are used on, possibly new ones opening up new tourist destinations in an area with quite a range of attractions serviced by ferries and fast ferries. The ACVs might allow access more directly to some locations.

Hovercraft Museum News

The museum now continues its regular Saturday openings from 10am to 4pm. During June there are some special events organised, as part of the Hovercraft Museum Patriotic Weekend as follows:

Saturday 25th June – Evening Concert starting at 19:30 including music with Organ, Saxophone, and Voice. Refreshments will be available

Sunday 26th June – during the day there will be a display of Classic Minis, and a Model Railways show.

Ticket prices for adults/children are £12/7 for the concert, £12/9 for the Sunday show and £28/15 for combined tickets. Tickets can be bought on the day, or by phone (02392 552090) from Marine Parade West, Lee on Solent.

THS members may have noticed that the THM Internet Site now has a notice saying that they are rebuilding their site and it should be more active soon. In the meantime, some information and images are loaded on their Facebook page.

HCGB Meetings plan for 2022

Current planned race meetings by the HCGB this year are as below. The biggest event is at Whittlebury over the Bank Holiday in UK for the Jubilee celebration of the 70th year of Queen Elizabeth II's reign.

2nd/3rd/4th/5th June

Jubilee Bank Holiday Celebration

Whittlebury Hall (returning venue, new circuit)

Day 1 National Racing

Day 2 Jubilee Celebration – Fun Day – fun Races

Programme/format for Thursday and Friday is subject to confirmation but there would still be a full day of racing over Day1 and Day 2

Day 3 National and EHF Racing (subject to approval from EHF

Day 4 Continuation from Day 3.

9th/10th July

Rother Valley Country Park, Mansfield Road, Sheffield, S26 5PQ

23/24th July

Gang Warily Recreation Centre, Newlands Road, Southampton, SO45 1GA

31st August – 4th September

WHF World Championships – Sweden

24th/25th September

Catchpole Park Fishing, Kingsbury, Tamworth, B76 0BD, Between junction 9 and 10 of M42

8th/9th October

Whittlebury Hall (returning venue, new circuit)

Cruising events also continue to be planned this year. In the next month or so we have the following announced:

22nd/24th July

Liverpool Sailing Club Cruise, Liverpool Sailing Club, Speke, Liverpool

For full details of these events, it is recommended to visit the HCGB site, and take contact with the event organisers directly via email or telephone:

https://www.hovercraft.org.uk/contact/

It may be noted also that as well as the Northwest oriented HCGB cruise events, British Hovercraft also organise several cruising events in the Southeast of England.

THS Meetings

The following THS committee meetings are currently planned. Details of other meetings will be publicised in the events blog once finalised:

2022	Subject
June 14th 13:00 UKt	Evening Lecture
June 16th 19:30 UKt	Committee Meeting
July 14th, 19:30 UKt	Committee Meeting
August 18th 19:30 UKt	Committee Meeting

Society News

June Lecture Meeting

Trygve Espeland of ESNA will give a presentation entitled '**SES opportunities in the energy transition**'. It will be held on Zoom at 14:00 CET (13:00 UK Time) on Tuesday 14th June. Emails will be sent with Zoom Meeting invitations for this event. This should be an exciting event so do join us!

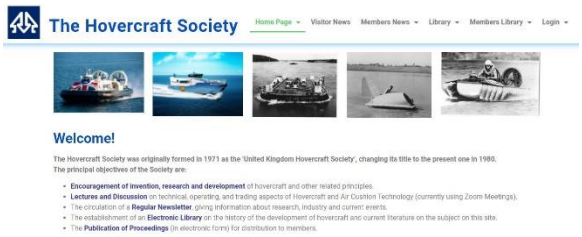
Internet Site rebuild

Members have been sent an email announcing the reopening of THS Internet site. It was relaunched on May 24th. There are some changes compared with the earlier site including registration and access.

When you first go to the site you will be taken to a homepage with a header that looks like below.

The homepage menu at the top has subitems for membership explanation, more about THS, frequently asked questions (FAQ), and a get in touch page giving our key email addresses, and an application form for membership, with instructions.

The other menu items are a visitor news blog, a library, and the log-in or register menu. The News Blog is an open summary of information a visitor might wish to read. The library has sub items for articles, regulations, resources, and videos. This will contain materials that are accessible outside THS. The material will grow with time.



In order to get at the THS materials such as the News Notes you will need first to register on the site. As a paid member of THS your access will then be upgraded. You will receive an email confirmation of this and can then log on and see

the home page header with two additional Menu Items, Member News and Member Library.

The Member News has subitems for the News Notes, and for Events.

The Member Library currently has an Admin page with access to Committee MOM, AGM materials and other information. It also has items for 2019 Bulletins, and Technical Transactions from 1980 presently.

This will grow as more material is added. The library will also include links to recordings of THS presentations. This should be achieved during June once we transfer the recordings from Zoom to a THS YouTube channel.

The Technical Secretary will be pleased to hear any thoughts members have on the work so far and ideas for improvement. The committee's new email addresses are on the get in touch page of the site which is available even without logging in!

Future programme

We are presently working on lectures for the rest of the year, aiming at a mix of operational and technical presentations. We have prospective presenters but need to set timing and complete technical preparation.

This Newsnote is the third in our bimonthly series. The next issue should be end July. Hopefully by this time it will be possible to have a schedule for the presentations through second half of the year.

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Articles

Norway Fast Ferry Programme

On 19th April it was announced that four contenders had been selected for the next round of the competition for the 'Fast Ferry of the Future'

The four are ESNA, LMG Marin, SES-X and Transport Development. The suppliers are focusing on battery electric fast boats with different hull designs: single hull, catamaran, and trimaran.

Both foiled technology and SES (air cushion) are represented - all with the same goal to reduce energy consumption for fast ferries.

"We are very pleased to see the good results that are delivered through the project. The county municipalities cooperate well and make it possible for the Norwegian maritime industry to take a world-leading role in green fast ferry design and construction, says county councillor in Nordland, Tomas Norvoll (Ap), county council leader in Troms and Finnmark, Bjørn Inge Mo (Ap), County Mayor of Trøndelag, Tore O. Sandvik (Ap) and County Mayor in Vestland, Jon Askeland (Sp).

Extra support of NOK 9.7m

This award is a top-up financing of the future fast ferry competition that comes in addition to the 55.9 million kroner awarded the project in 2020. This is to ensure that four out of six suppliers who are in the energy efficient design competition move on to the next project phase. The original budget had only room to take three suppliers further in the project.

Extra funding ensures greater variety

The goal of the competition for energy-efficient design is to develop fast ferries that spend 30 percent less energy than today's fast ferries.

"The current funds allocation ensures that there is a greater variation in concepts that will have the opportunity to develop as the future zero-emission fast ferry" says county councillor for transport in Troms and Finnmark county municipality, Agnete Masternes Hanssen (Ap).

Model testing

Since the fall of last year, six different suppliers have been working on their proposals for solutions for the future fast ferry. On March 25, they submitted their reports in connection with the end of the competition's first phase. The four who will go further have been selected after a thorough evaluation. In the next phase of the competition, suppliers will confirm their designs through, among other things, analysis, and model

tank testing. The completion date for this stage in the project has a deadline for submission at the end of November.

In May 2023, the design part of the fast ferry project ends. The goal is then to have developed electric zero-emission ferries with a minimum of 30 percent lower energy consumption compared to today's vessels.

Must have support from state

The ambition is to use the innovative design and technology solutions as a template in future fast ferry acquisitions where up to three ‘prototype’ or first in class vessels will be built and tested.

“We see that there is a big technological leap before we have the future fast ferry in place in the county municipal transport along our coast, and it will require further support from the state to build the boats. At the same time, this project is a like a "Kinder Egg", where you hope to get business development, climate benefits and better transport all together”, say Norvoll, Mo, Sandvik and Askeland.

About the future fast ferry project

The fast ferry is important to many. It links island communities with each other and with the mainland and creates the basis for a balanced and continuous housing and labour market. It is expected that a large part of future business development will take place along the coast of Norway and the expected activity will result in increased travel needs at sea.

However, traditional fast ferries consume large amounts of fossil fuels. This is both expensive and polluting. Through the project Future Fast Ferry Part II, the four county municipalities want to make fast ferries one of the greenest modes of transport. At the same time, the project's public grants contribute to reducing risk in Norwegian maritime industry, so that they can take greater development steps into a green future.

The project is supported by climate rates, a grant scheme subject to the Environment Directorate for reduction of greenhouse gas emissions.

Phase 1 reports

Each of the competitors in Phase 1 had to prepare a public summary report in addition to the main technical reports issued for evaluation by the County Team Management. All four reports are available on the THS site for easy access. The links are given in the blog post for this News Note, on the THS internet site.

As can be seen from the image above there is a trimaran hydrofoil, a foil supported catamaran, the SES-X air cavity electric ferry, and the ESNA electric SES. All concepts use battery electric propulsion, and lift in the case of SES-X and ESNA. A summary of the concepts proposed by ESNA, and SES-X are given below.

ESNA Zero Emission SES ferry

This design is based on ESNA hull concept already designed for hybrid powering, now transformed for fully electric and battery power.

The vessel design can easily be adapted to specific route requirements such as weather exposed areas, varying range and larger or smaller passenger numbers. Below is an example for main data.

Length	23.6 m
Width	12 m
Draft on air cushion	0.5 m
Draft floating off air cushion	1.9 m
Passengers (universal design)	180
Maximum speed	50 knots
Service speed	40 knots
Range	43 nm*
Propulsion system	4 x Waterjet
Electric Motors, norm.	4 x 580 kW
max	4 x 800 kW
Battery bank	2 x 1.0 MWh

Range extension 1 diesel generator set.

Design Basis: IMO HSC Code

Class notation: DNV ✠ 1a HSLC Passenger Craft Battery Power E0 Shore Power R3 (NOR)

Flag: NOR, Speed area 3 (4)

Construction: Carbon Fibre or Aluminium

Note that powering and number of machines are selected according to route requirements

Charging standard: MCS, 2 x 2.0 MW

* Range is related to the battery bank carried, that can be varied to lengthen range between charging. The 43nm was set by the competition project as a typical Norwegian coastal route. It is assumed that suitable charging infrastructure would be installed at ferry terminals to allow charging in between services.

Two artists impressions of the passenger cabin and the wheelhouse are shown below.

The optimisation of the electric powering system, charging system and infrastructure is a significant aspect of this project. Much has already been learned from the RoRo electric ferries that are currently in service, but the requirements for a fast ferry service are a new aspect.

ESNA has optimized the ship design for maximum energy efficiency at 40 knots. The result is a relatively short and wide boat with aerodynamic design that provides little air resistance. Reduced length provides less contact surface to the sea. This reduces friction resistance, which together with air resistance is most important at high speed for an SES.

Furthermore, the ferry has four water jets each driven by an electric motor. Four smaller water jets, in relation to two larger, give lower weight and provide higher efficiency.

The electrical architecture is based on modern power electronics and is optimized for the vessel with minimized weight and high efficiency. Design propulsion and electrical solutions are made in close collaboration with reputable suppliers to the shipbuilding industry. All equipment is available with normal supplier

guarantees for shipyards. ESNA are working together with operator team Torghatten Midt. Torghatten Midt consists of former FosenNamsos Sea and Torghatten Traffic Company. They run maritime public transport and currently operate 13 ferry connections and 10 fast ferry routes including two new plug-in hybrid ferries. The sister company Torghatten Nord recently entered into a contract for hydrogen RoRo ferries between Bodø and Lofoten that will begin services in 2025.

SES-X Zero Emission ferry design

SES-X Marine Technologies has a unique technology for partial airborne hulls, which greatly reduces resistance at higher speeds. Conceptually, there is little that sets SES-X apart from a conventional vessel:

The hulls are reminiscent of a combination between V-hull in the bow (with the bow design that provides significant planing surfaces at high speeds), and a shallow catamaran from the stern. In the bow is a lifting fan that presses a recessed air pocket under the hull and maintains an overpressure of air, which lifts the boat out of the water. This contributes to low resistance and seamless transition to planing.

"SES-X EL27 Pax" has a fast and modern profile. The vessel is partly airborne, with its lifting fan and air cavity. The vessel has a total length of 28.4m, including propulsion, with a water line length slightly below 27m. Key data for the vessel is given below:

Length LOA	28.4 m
Length LWL	26.6 m
Breadth B	8.5 m
Draft T	1.2 m
Passengers	164
Service speed	40 kt
Range, service	40 nm
Range, maximum	85 nm
Construction material:	Carbon fibre sandwich
Power system	Battery electric
Battery chemistry	Lithium-ion NMC
Motors	Permanent magnet
Propulsion	Water Jet x 2

The vessel is designed for coastal service in Norwegian waters, with a service speed of 40kt. The hull is based on SES-X own technology for partial airborne vessels, which combines the best from fast displacement and planing vessels. It is designed in carbon fibre according to class rules, to ensure low weight and resistance.

The lounge is designed with good visibility and lighting, for a comfortable passenger experience. There is room for 164 passengers, with access via the walkway on the aft deck. Internal outfit is to a high-quality standard as expected for modern passenger craft. The vessel is designed with personnel escape systems on both sides for evacuation via slides from the entry area to the lounge to inflated life rafts.

Under the main deck, two engine compartments have been arranged for propulsion and a generator room for range extension. At amidships are arranged four fire protected rooms for installation of the vessel's battery pack.

The vessel is equipped with a propulsion system based on encapsulated NMC batteries. This is designed according to class requirements for battery fracture in ships.

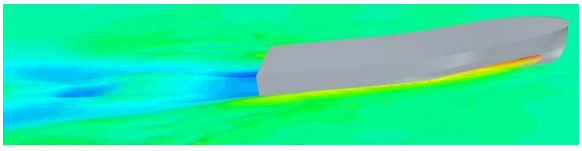
The vessel is based on the latest technology in batteries and system integration and combines high performance with security and well tested technology to meet the project's lifetime requirements.

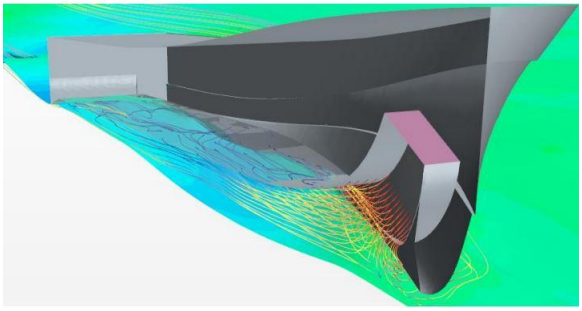
SES-X has self-developed digital management systems for the entire lifting system, which can be optimized for energy efficiency or comfort. The management systems are integrated into the

consoles of the wheelhouse, and can be used locally on the vessel, or be monitored from land through an online web portal. On this way SES-X facilitates advantage for forward-looking ship operators.

Propulsion is supplied by two water jets, installed in the two demi side bodies of the vessel. The water jets deliver high efficiency at high speeds and cause minimised loss of energy in the drive line.

Throughout the drive line, SES-X has had a high focus on minimising losses, and efficiency is ensured for all elements, in collaboration with manufacturers and subcontractors. The electric drive line has significantly lower losses than conventional diesel mechanical solutions. In return, the energy density is in batteries generally lower than in fossil energy sources. Because of this, the power system (machinery, transmission, and 'fuel') of electric vessels will usually weigh more than vessels based on fossil fuels. The battery pack is the largest contributor to this. Since weight is very defining for the efficiency of high-speed vessels the need for especially effective hull technologies become even clearer as the green shift progresses.





Ship design is complicated, and it is further complicated when new elements are introduced. SES-X Hull technology is based on features such as air chambers, lifting fans and associated control systems. SES-X technology is also based on planing forces, and thus high demands are placed on numeric tools for good assessments of the vessel concept. The first phase of the design project laid the foundations of highly detailed calculations of both resistance and vessel motions. Using in-house competence for direct dynamic simulations using CFD, SES-X has the ability to optimize for speeds and motions with low technical uncertainty.

CFD calculations of the vessel's resistance have been carried out, where the effect of air chamber and planing surfaces are included as shown below. In the future phases of the project, these tools and other numeric methods are used to document that the vessel satisfies requirements for both strength and acceleration levels.

The hull is designed according to DNV requirements for sandwich structures in carbon fibre. It is designed for accelerations and forces from the rough sea along the Norwegian coast.

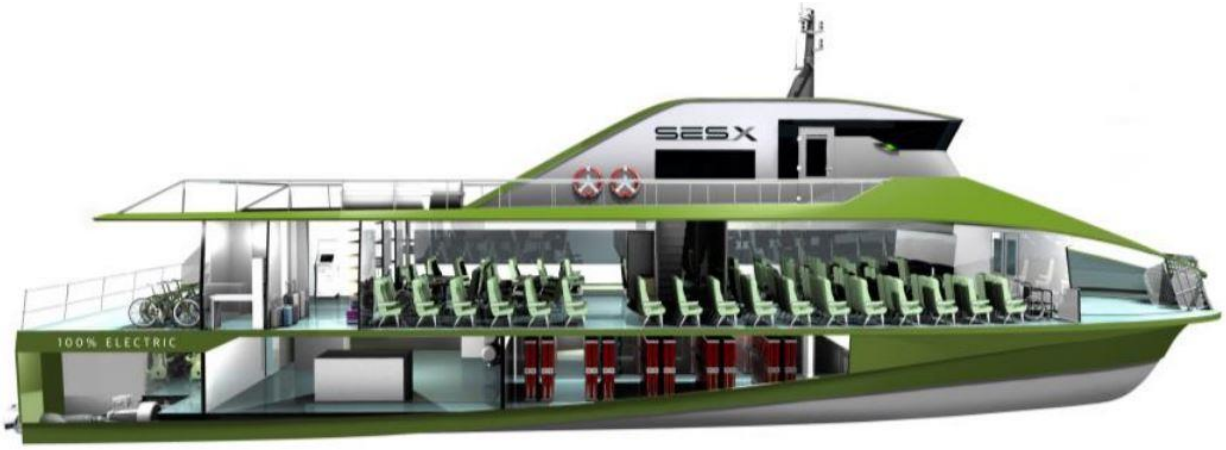
Fast ferries have for decades demonstrated that weight can be pressed to the extreme by smart material selection, and carbon fibre structures are among the lightest on the market.

The stability of the vessel is assessed according to the IMO HSC2000 code, where both the intact and damage stability is assessed for all relevant operational conditions. Extra consideration has been devoted to the effects of the air chamber. In this way, SES-X ensures a design that has comfortable motion characteristics, and high security in emergencies.

The machinery is designed according to class rules, and only type approved, and certified components are used. In addition, it is equipped with range extension for emergency cases.

There are high requirements for fire safety in battery electric vessels, and SES-X designed for the fulfilment of modern rules from the class companies. Here, stringent requirements are set for fire insulation and battery electric safety philosophy, to ensure a safe vessel.

The vessel weight is calculated according to the well-established SFI system, where weight components are broken down to their constituents and summed up for the entire vessel. SES-X has sought good, lightweight suppliers of all the subsystems for the vessel and have chased "small thieves" and other contributions to lightweight weight that can be removed. In this way, SES-X has secured a light hull, so that we get a gain for on the resistance figures.



Above: Here is a cutaway view of the SES-X 'Fremtidens hurtigbåt' showing the centrally mounted battery power packs low down in the side hulls and the main deck and passenger saloon. Aft there is storage on the outside deck for cycles. The craft's L/B is higher than that of the ESNA vessel partly due to the Vee shaped bow to enclose the front of the air cavity.

Below: A view of the4 ESNA contender showing the lift fan enclosure at the bow, and a central forward viewing window from the passenger saloon. There is a small aft extension to the wheelhouse. The bow area has an angular styling.

***Note!** Readers should be aware that the concepts shown here are likely to develop significantly as their design evolves. They provide an insight to 'work in progress'.*

AIR RIDER – A RETROSPECTIVE

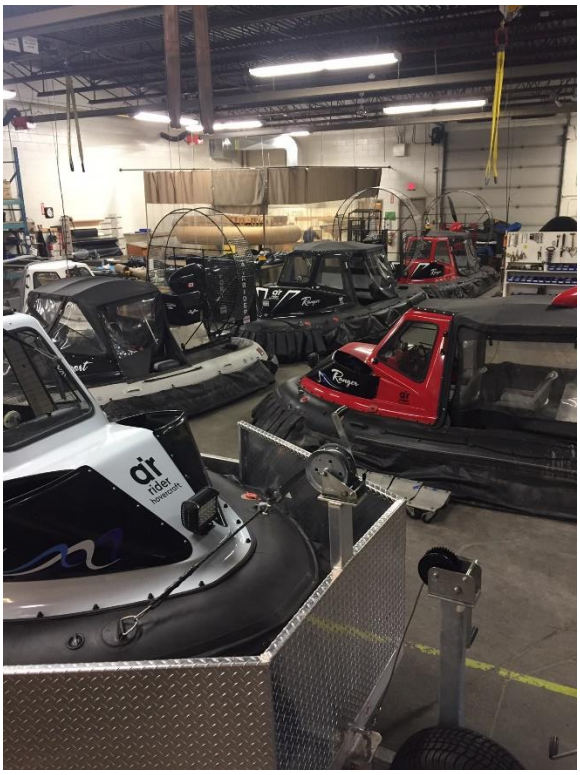
Air Rider Hovercraft is a hovercraft manufacturer based in Parry Sound, Ontario on the eastern coast of Lake Huron, north of Toronto. It has been in business since October 2013 developing and marketing a recreation and utility hovercraft with attributes specially adapted for rugged terrain.

During the spring of 2022 its supplier chain experienced problems and so series production has ceased, and the focus has turned to support for existing owners.

Founded by business partners Greg Swanson and Bruce Hatherley, Air Rider brought the world's most innovative hovercraft to customers potentially all around the globe. Air Rider was committed to creating cutting-edge craft and educating North Americans about the benefits of hovercraft use for access and safety over its rugged landscape.

During the years since the company was formed in 2013 the partners have developed a rather special design suited particularly to the great expanses of lakes and rivers in both eastern and western Canada. Here, winter is real, with lakes freezing, and summers are warm and inviting treks out for camping or visiting remote cottages owned by many. Access can be an issue to the more remote regions as there is a lot of marshy land also, few roads or drivable tracks; and in later autumn freeze or spring melting the ice can be treacherous.

Hunting and fishing are areas where the versatility of Air Rider again becomes evident, enabling hunters to hunt in areas they couldn't previously reach. From small creeks to partly frozen lakes, over beaver dams and grassy bogs, Air Rider opens the door to endless possibilities for hunting and outback activity. During hunting season, cold weather creates many opportunities for the Air Rider to transport hunters and game safely and quickly. Many hunting lodges and camps can be more easily accessed by travelling up and down shallow rivers and streams.



A view of the Air Rider works at Parry Sound

Outbackers are often in remote areas where they are cut off from suppliers during freeze up and thaw periods. The Air Rider 45 provides continued transportation and access at these times.

In aiming at the more adventurous, Air Rider have also gained clients from rescue teams at local fire services, to serve as rescue craft where people have got in to trouble on thin ice. This is a market that has been serviced by companies such as Neoteric in the USA, and Ivanoff Hovercraft in Sweden with significant success also. It is a natural for hovercraft!

Greg and Bruce feel that there is no other hovercraft in the world that matches the Air Rider for having the quietest operation and a specialized hull, alongside being the only small hovercraft offering a variable pitch propeller for forward/reverse drive to give a safe, very controllable, smooth ride. The hull is very special, being a combination of an internal fibreglass structure, with a surrounding inflated buoyancy hull in an equivalent manner to a hybrid hulled rescue boat. The skirt is also a unique hybrid design with a bow area populated by deep segments and the sides and stern being an inflated bag skirt with spray deflector. Power is provided for lift by a bow mounted engine and fan, and propulsion is a separate engine driving the VP Propeller. More details of the specification can be found below.

AR-45 Hoverhut, the ultimate fishing machine

For the ice fisherman who wants to fish earlier, later and safer, the Air Rider Hoverhut will take you out and bring you back warm and safe no matter how thin the ice is. The Hoverhut (see page 1 for photo) has removable access hatches in the floor which allows the ice fisherman to fish right from inside the craft. There is no better, safer way to ice fish than in an Air Rider Hoverhut.

AR-45 summary description

As the versatile design of the Air Rider skirt/finger concept is understood, it is easy to see how Air Rider 45 can access areas where no other vehicle would even consider going. With the segments at the front, the hovercraft is able to reliably travel over larger obstacles with the fingers providing a better seal for more efficient hovering. The bag skirt is very durable with a special urethane coating on the underside to provide many years of reliable service.

Kohler 4-stroke petrol engines give reliable and economical power for both the lift and thrust engines. Even starting at -30° C is no problem. Their reliability and durability are backed by Kohler's 3-year engine warranty.

The Air Rider Hovercraft comes equipped and ready to go, with comfortable seating for passengers and operator, efficient diesel fired Heater, HD Wiper, and LED Lighting, as well as many other features.

Unlike the majority of other small hovercraft, the Air Rider Hovercraft is quiet in operation. The two contributing factors to low noise are the low revving 4-stroke engines fitted with a specially designed super quiet exhaust mufflers and the slow rotating variable pitch propeller.

Specifications

Craft Length Overall	5.4m
Craft Width Overall	3.04m
Cushion clearance	0.45m
Dry Weight	350 kg
Payload capacity	5 persons or 454kg
Design Speed	50 kph approx.

Lift: Kohler ECV749 4-stroke, 749cc, 26.5bhp, air cooled electric start petrol engine direct drive to multiblade axial lift fan mounted in enclosure forward of cabin

Propulsion: Kohler ECH980 4-stroke, 980cc, 38bhp, air cooled electric start petrol engine driving 1.5m diameter 3 blade VP propeller via toothed belt reduction.

KievProp Propeller

With this prop installed the performance of the AR-45 is greatly improved compared with the prototype craft. There is a considerable improvement in the thrust generated making the craft faster and able to handle the windy days with ease. The stopping distance has also been greatly reduced using either the spin around method or by using the reverse pitch capabilities of the craft. Steering is also very responsive now making it a dream to drive.

The **KievProp VP Propeller** blades are designed using computer technologies, then tested in a wind tunnel, in flight, and have to pass special destructive tests. The propeller is made from a carbon fibre + fiberglass composite and is finished with a very durable epoxy gelcoat, which resists scratching.

The blades have an integrated strong leading-edge protection made of ultrahigh-density polyurethane. With these features combined, the prop is ideally protected against water spray, tall

grass, dirt, and grit. The hub is made from an aluminium alloy and is CNC machined then anodized. There is also a manufacturer's warranty against defects of 500 hours or 2 years and have a life expectancy of 1000+ hours.

Skirt System

The hovercraft skirt is one of the most important components of the hovercraft and allows the hovercraft to clear obstacles. There are several types of skirts available but the most common for light hovercraft are the inflated bag skirt and the segmented skirt. The Air Rider Hovercraft uses a combination of these skirt systems.

The Air Rider Hovercraft hybrid skirt features the stability of the bag skirt and the frontal non buffeting smooth ride of the segment skirt. Also, this type of skirt system is not prone to snagging in shallow stony rivers or undulating terrain that segmented skirts around the complete periphery have a tendency for.

Urethane film is laminated to the lower section of the bag which prevents abrasion and offers long life to the skirt loop section. Also, the lower loop sides are fitted with anti-spray extension flaps which eliminate enveloping spray across the passenger area at speed.

The tall front V-design segments, offer the Air Rider Hovercraft very good ride flexibility in turbulent water. The design also offers low spray characteristics for clear frontal visibility.

Skirt Systems Comparison

To explain their selection, Air Rider provide the following comparison of the two alternative designs of light hovercraft skirts.

Inflated Loop Skirt

The inflated loop skirt (sometimes referred to as a bag skirt) encircles the total perimeter of the craft and operates at a small overpressure compared to the main cushion, providing high roll stability.

Air is fed from the lift fan to the loop and to the underside of the hull normally at the bow. The air fed to the loop is pressured and forms the loop skirt shape to contain the air that is fed to the underside of the hull.

Segmented Skirt

The segmented skirt (sometimes referred to as a finger skirt) consists of several separate fabric sections that, when inflated from the lift fan, press together to form a continuous curtain around the hull. These segments are fed individually by air from the lift fan through ducts inside the hull, or collectively fed by air from the pressured air cushion under the hull.

The loop and segment skirt systems both have their good and not so good elements.

An evaluation was put together using the experience of Nigel Golding, who had 40 years light hovercraft design & use, as shown in the table below.

The loop skirt offers very good hovercraft stability; however, when operating on water, the frontal area will cause buffeting in choppy water, waves and turbulent river rapids.

The segmented skirt offers a much smoother ride into choppy water, waves and turbulent river rapids; however, craft stability is much lower. Also, at the rear of the hovercraft the segments are prone to catch, snag and detach from the hull in shallow stony rivers or undulating terrain.

The Air Rider Hovercraft Hybrid Skirt offers non buffeting into choppy water with excellent stability and, is not prone to snagging.

Performance	Loop	Segment	Air Rider Hybrid
Stability	very good	poor	excellent
Durability	good	poor	very good
Low Spray	poor	fair	good
Hump Performance	moderate	good	good
Speed	good	moderate	moderate to good
Drag: smooth water	same	same	same
Drag: rough water	high	low	moderate
Drag: mud	high	low	moderate
Drag: snow	high	moderate	moderate
Plow-in	same	same	same
Stony braided rivers	very good	moderate	excellent
River rapids	moderate	moderate	good

The Big Red Ranger

In 2019 the guys at Big Red Works Inc, a commercial and industrial equipment supplier took a major decision and purchased an AR-45 to help deliver their Winter Patrol Service in the area around their base in Honey Harbour, on the Southeast coast of Lake Huron, Ontario north of Toronto.

You can see their service offering at the hovercraft page on their site, here:

https://www.bigredworks.com/hoovercraft

Services include:

- Driving sub-trades to the cottage for assessment, measurements, etc needed to make sure your spring projects start on time
- Taxi service to allow you to enjoy a weekend out of the city, away from it all, in your favourite place. Georgian Bay has never been so quiet and peaceful!
- Make a day of it and experience a hovercraft ride around the islands

Air Rider Contact Details

Air Rider Hovercraft

32 James Bay Junction Road

Seguin, Ontario, Canada P2A 0B2

Toll Free: 1-855-648-5723

Phone: 1-705-746-9193
Email: info@airriderhovercraft.com

Videos of Air Rider Craft

There are a number of most interesting videos available showing the Air Rider in action over the ice and open water, as well as an amazing programme segment from Rick Mercer where the show host drives an Air Rider through the centre of town to go for coffee and has some trouble stopping at a traffic light. It has to be seen to be believed. A testament to the craft's controllability.

https://youtu.be/cils95YBLWU

Rick Mercer Report. Rick is shown around the works, description of the craft and gets to drive a hovercraft in Parry Sound. A real good video. in ice and snow and water, and a little road trip. 6:05. You have to see this!

https://www.youtube.com/watch?v=u4twK3C7tUc

Air Rider introductory video. Gordon Bay Marine Hovercraft in operation, 2:33

https://youtu.be/VH7UAChHJNc?list=PLrQSe7IW4WXXSf-OZzKWc6RoIBMinDUXx

Georgian Bay hovercraft run, actually a really practical demonstration of lake ice operation and how to approach it. Another must see video. 10:41

https://youtu.be/fXdnTnRidIc

Sports Classic video 2020, 1:50

https://youtu.be/BuHJB16MP1U

Vancouver Air Rider hovercraft, 0:36

https://youtu.be/9auyVAb157A

Video drone footage of red Air Rider craft, 2:07

https://youtu.be/MAjWc9eqXKE

Parry Sound craft, 0:35

https://youtu.be/GlX-gwsJyx4

Three enthusiasts visit Parry Sound craft, 6:00

https://youtu.be/TYq8rkS1qJc

Rogers TV, Georgian Life, The world's first Hoverhut program segment, 5:00

From the Internet

This month we have found a selection of YouTube videos related to the Hovertravel Solent Service. In addition we were alerted to a real time camera that shows the Ryde terminal from the top of the Esplanade hotel opposite. Once you know the timetable from Hovertravel, you can tune in to see arrivals and departures!

Here is the selection:

https://www.youtube.com/watch?v=NYhcwz7OiV8

11:55 From A2B via sea, upright image on phone, duration 11:55, September 2021, ads to start and inside video. Deceptive, but OK and is Southsea to Ryde journey complete.

https://www.youtube.com/watch?v=MQTLGEC1790

Planit Park, Southsea to Ryde June 2021, 13:58, ads in video

https://www.youtube.com/watch?v=jIesmg-4Obc

Cine-video Andy Hardy, 10:00, normal screen from 2017 with AP1-88's

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

In cockpit with pilot, 2:18, Colin Walker from 2012, in AP1-88

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

Kittikoko, July 2019, Southsea to Ryde, 8:21, New craft with ears now removed ads inside the video

https://www.youtube.com/watch?v=87thE21qQHU

Bloody Mary Travel, arrival in Ryde and eventual departure, no ads, not the journey, 9:34

Railcam – Ryde

Watch in real time – can see the BHT craft parked https://www.youtube.com/watch?v=UkmhN7P8U-4

Lastly an article that is in Chris Fitzgerald's blog, from October 2020. This is an amazing journey taken by a new owner of one of his Hovertrek machines to get it back to his place on an estuary in Alaska. That was clearly some journey!

http://neoterichovercraft.blogspot.com/2020/10/neoteric-hovercraft-adventure-on.html

OBSERVATIONS

This issue has taken some assembly. There has been a lot going on the last couple of months, and I hope that it has been enjoyable reading.

Once again, I have ended giving a significant number of internet links for you to follow for more detailed information and videos. Here in the News Note I continue to use the text version of links rather than to insert images. This is the most efficient for the document. In later months this year I will begin to assemble these links into pages on the internet site, and there I will use still images to provide a more visual lead into such material.

The site itself has been a journey, and one that is just started really, since there is a lot of material to gradually include. I am hoping that the format presented is acceptable to members. If you have comments, criticism, or/and ideas (or even material for us!) do please come forward.

In the meantime, please do register so you can see the whole site and the material that will only be accessible when you log on. To start with, a stroll down memory lane with the papers from the 1980 lecture season could be enjoyable!

(ab)

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Hovertravel has agreed to allow THS members to book flights between Southsea and Ryde at a 20% discounted rate when booked online.

To obtain the discount members must use the current **THS promotion code**, which is available either from THS Treasurer, or from the THS Technical Secretary.

At time of boarding, they should show their **membership card**. The offer is available for up to two people travelling at the same time. Once booked the tickets are not refundable or transferrable.

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