A sustainable sailing cargo Proa for Fiji and the Pacific

Oceania, 10 million people and 25,000 islands scattered across 3 million square miles of the Pacific, the world's largest ocean, is arguably the region most dependent on sea transport in the world. The region is also extremely dependent on imported fossil fuel, which represents a major drain on economies, a major barrier to development and a source of vulnerability (Jafar, 2000).

The transport sector (land, air and marine) is the largest user of fossil fuels, accounting for at least 70% of all PICs use (Mofor et al, 2013). For Small Island Developing States (SIDS), sea transport is a significant, and in some cases, the majority user of fossil fuels.

Further to its negative impact on the environment, the current maritime sector in the Pacific region is deeply inefficient, and many remote coastal communities do not have direct access to interisland transport services'' or they do, but at a very high cost. This, in turn, strongly affect the supply chain and thus, food security and livelihood improvement across the Pacific countries.

1. The "Sustainable Sea Transport Initiative" – a non-profit industrial association in Fiji

The "Sustainable Sea Transport Initiative" (SSTI) is the sustainable sea transport industry association for Fiji and Oceania, registered with the Fiji government under the "industrial association Act" of 1941. The objective of the association is to develop a new and efficient sector of sustainable sea transport in Fiji and beyond, in the Pacific States. It will expand the present offer for inter-island sea transport, adding a green and affordable option to the existing shipping sector, currently mostly based on the use of old, large diesel ferries, complemented on secondary routes by fiber-boats powered by two-strokes engines; both options having a high impact on the environment, as they are strongly reliant on fossil fuel and large physical infrastructure (ports and jetties) affecting coastal and mangrove areas.

SSTI aims at developing and promoting efficient supply-chain solutions and the use of low or zero carbon emission ships for the transport of goods and passengers in a socially and environmentally responsible way, especially to, from and between remote coastal communities. It focuses in particular on deploying sailing boats with auxiliary electric engines, with ship designs that use modern material and apply innovative shipbuilding methods while being inspired by traditional sailing concepts – an attractive dimension for the sector of sustainable tourism, a promising sector for SIDS.

2. Pilot project – a prototype sailing vessel shipping cargo and passengers to remote islands

SSTI has developed a pilot project and a first prototype sailing ship, inspired by traditional Pacific ship designs (a "Cargo Proa"), is currently being built (see Annex 1), in partnership with the University of Queensland. It will be tested for transportation of freight on a route between a large and a remote island of Fiji (see examples in Annex 2).

The ultimate choice of routes will include among other considerations: the level of community ownership, with a strengthened involvement of women in the decision-making process; the type of cargo which must ensure sustainable community development and livelihood improvement in the context of the COVID-19 economic recovery; the existing shipping market; sailing technical considerations; etc.

The ship, which is planned to be launched towards the last quarter of 2021, is 24 meters long and will carry up to 10 tons of cargo; it is affordable to build, maintain and operate; it is also versatile as it will not require jetties but will be able to beach in shallow areas; it will also be able to sail over the reefs and will be at least as fast as small ferries in most of Fiji's wind conditions. The data gathered during the pilot project implementation will be used to upscale and replicate the project.

3. Synergies between sustainable sea transport and sustainable tourism – a promising sector in Pacific SIDS

SSTI has a long-standing partnership with Leleuvia Island resort (https://www.leleuvia.com/), located midway between the chiefly island of Bau and Levuka, Fiji's only World Heritage Site; the resort has always been a champion for sustainable sea transport and has become a base for commercial sailing journeys that have a social

development perspective as well. Leleuvia is a leader in Eco Tourism initiatives in the region and is a founding member of the Duavata Sustainable Tourism (https://www.duavatasustainabletourism.org), formed in 2017 to advance sustainable tourism initiatives across Fiji. It was the first resort in Fiji to introduce a ban on single use plastics, and the first resort in the Pacific to ban chemical sunscreens. About 9 years ago, the resort replaced all 2-strokes outboard engines on its fleet of boats (transporting passengers and supplies) to 4-strokes engines, resulting in the removal of up to 95% of harmful emissions. The resort has recently developed a comprehensive, long-term project aimed at replacing all its fossil fuel engines with electric engines.

Besides transporting cargo supplying the islands, the prototype sailing vessel built by SSTI will have cabins onboard that will help to generate tourism finance to support its operations. In the framework of the partnership with eco-resorts, guests would come to the resort for briefing and training, before heading out to the remote Lau group or other islands (Kadavu / Gau) that are inadequately serviced by transport infrastructure. The vessel would service the dual purpose of making remoter parts of Fiji accessible to tourism (as there could be homestay operators under the Duavata Sustainable Tourism Collective supported to establish enterprises so that the vessel offers the opportunity to get off and stay to assist with some of the organic agricultural and conservation projects on those islands) and providing them with a vital link to be able to get their produce to market and access cargo goods from the mainland.

4. Sustainable Sea Transport in the Pacific – an all-encompassing development challenge

SSTI is addressing the development challenges of sustainable sea transport in Fiji and Oceania in a comprehensive manner, and is developing a diverse array of solutions aimed at fostering livelihoods in remote island communities, especially in the context of promoting a blue/green economic recovery post COVID-19 :

- **Supply chain and logistics**: SSTI is identifying and addressing the supply chain between various islands in a holistic manner; among other aspects, it is developing concepts and ideas promoting cost reduction of the overall supply chain, e.g. through development of container systems that are more adapted to cargo transportation in Pacific islands (boxes of 1 cubic meter made from recycled plastic in the Pacific); creation of aggregation hubs for freight; consolidation of the distribution network; as well as development of wharves and jetties systems with a lower environmental impact for shallow-draft vessels;

- **Boat design**: SSTI is engaging in partnerships, promoting studies and research for other designs that could be considered for inter-island shipping and passengers transportation. Besides the sailing cargo prototype, hybrid and full-electric designs are also considered, especially for ferry taxi boats, for instance for public transportation at large within the Suva-Nausori corridor or on the Rewa river (a major axis of traffic in the larger Suva area);

- **Power source / fuel**: SSTI is working on electric propulsion (as auxiliary and primary source) and will be testing an array of options and systems (different boats and contexts – cargo, passengers, fishing, etc.). Solutions for energy storage and charging (solar, hydro-generation, land-based charging stations) will be tested, which will include extensive data collection, in partnership with other entities working in the sector;

- **Boatbuilding materials and methods**: SSTI is promoting low-tech innovation that will facilitate the development of the sustainable boatbuilding sector in the Pacific islands. Modern materials such as resins and fiberglass, are expensive and difficult to source; worse, in a sustainability approach, they are also often damaging to the environment. New, greener material and building methods are currently developed around the world and SSTI intends to develop partnerships with other innovation hubs (esp. in Europe, currently leading on maritime innovation) to adapt the current innovations in the global maritime industry to the low-tech environment of the Pacific, using resources that are easily sourced locally or in the region;

- **Innovation and the use of ICT**: SSTI intends to develop software solutions that will allow to tackle two main challenges when operating sailing cargo vessels between Pacific Islands: 1) weather routing, that will allow to maximize timing of delivery and partially solve the issue of potential delays (esp. due to lack of wind), and 2) the end-user aspects of the logistics chain (booking of parcels, payment, tracking);

- **Skills development and capacity building:** SSTI will promote capacity strengthening of communities especially at the nexus between traditional sailing and boatbuilding skills and their modern counterpart. Hubs and centers will be developed at the local level including training and workshops facility, with training-by-doing coastal communities. SSTI is member of the Fiji Yachting Association, and as such has access to the national sailing center facilities, where a first pilot center could be developed.

- **Creation of a "Sustainable Sea Transport Innovation Lab"** for the Pacific: SSTI has access to the ideal location for solutions development and testing purposes, the Fiji National Sailing Center based in the capital, Suva: situated on the eastern ocean-front of the city, directly besides the University of the South Pacific campus, with ramps into the water, slips and technical facilities, the center is also protected by a sea wall and has direct access to a passage out of the Suva lagoon. Two members of the SSTI board (the president and the secretary general) are also members of the core group currently working on the development of the center's infrastructures, in collaboration with the Fiji Sport Council. SSTI already included reflections on building a new facility with workshops and training rooms, that could host the new lab.

5. SSTI – core group of the association and partnerships

The SSTI association board is composed of a diverse and highly-skilled mix of individuals: the president is a recognized leader of the traditional sailing world in Oceania, with a strong foothold in the sustainable tourism industry in Fiji; the treasurer, a leading entrepreneur from the green/sustainable energy sector in the Pacific; the vice-president, a former Olympic athlete with a broad experience from the shipping sector in Fiji and the Pacific; the scientific advisor is a globally acclaimed, high-level academic in the field of climate change and oceans, co-recipient of the 2007 Nobel Peace Prize for her contribution to the Intergovernmental Panel on Climate Change (IPCC); and the secretary general is an institutional expert and lawyer with a comprehensive experience of the international policy and development sector for multilateral organizations. The board works on the pilot project with an innovative shipbuilder with access to R&D and academic resources in Australia.

The group has a strong existing network and partnerships in Fiji and among national and regional organizations, especially with the Pacific traditional Voyaging Societies (esp. the Fiji based Uto ni Yalo Trust), the University of the South Pacific, the UN and CROP (Pacific regional) agencies in the Pacific, the Oceania National Olympic Committee and the Fiji Sport Council, the private sector; and is actively interacting with other organizations working on sustainable shipping in Fiji and in the region, such as the South Pacific Commission, the German development agency GIZ, the German Technical university of Emden/Leer and the World Bank / IFC.

6. Pilot project – finance needs

SSTI is looking to mobilize funding for the pilot project, especially in order to support 1) a feasibility study, 2) development of a robust business plan; 3) development of the concepts for all sub-components described in section 4 of this note; and 4) the operation of the pilot cargo project over a period of 1 year. The overall finance needs for the pilot project are estimated at 400,000 USD.

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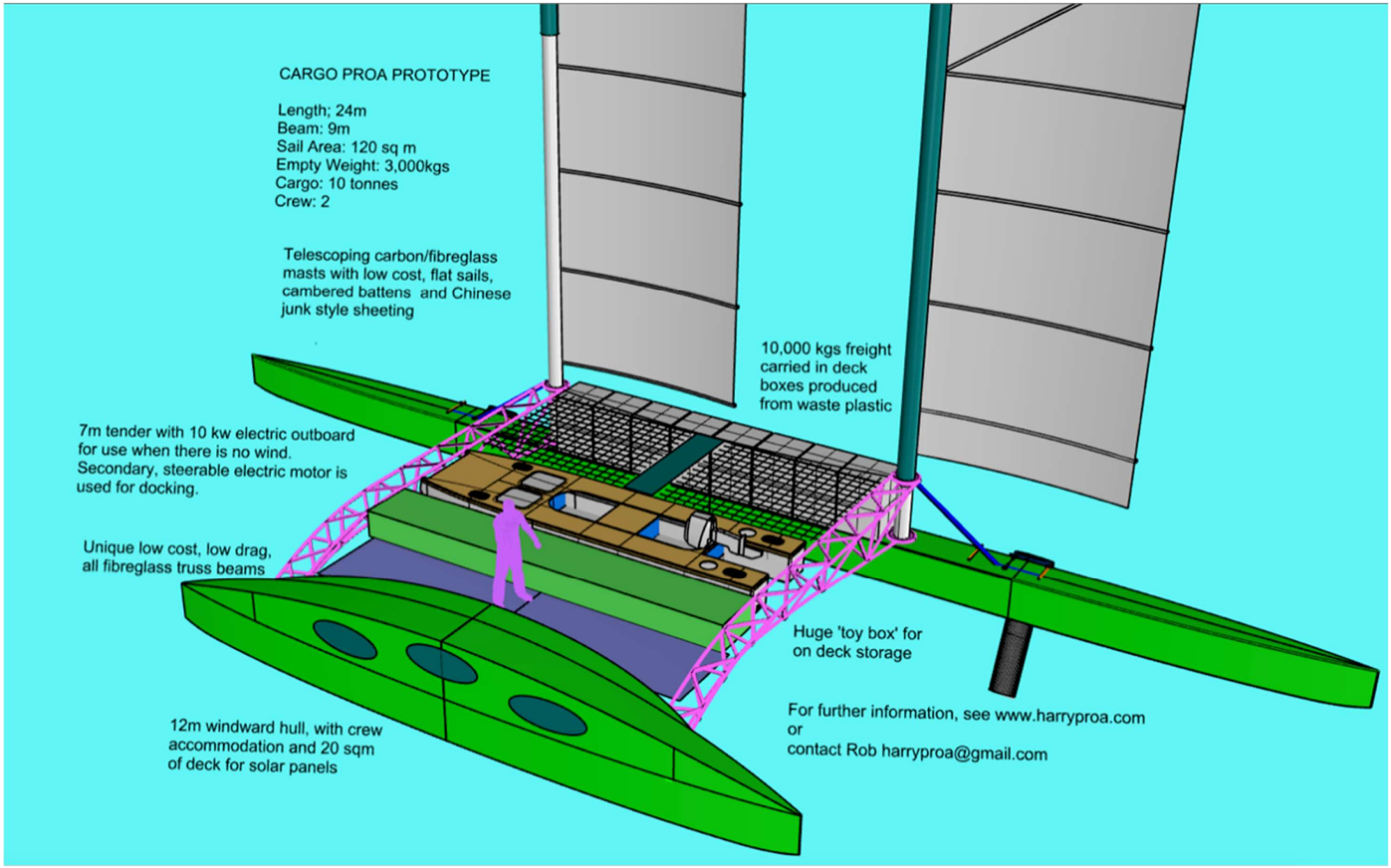
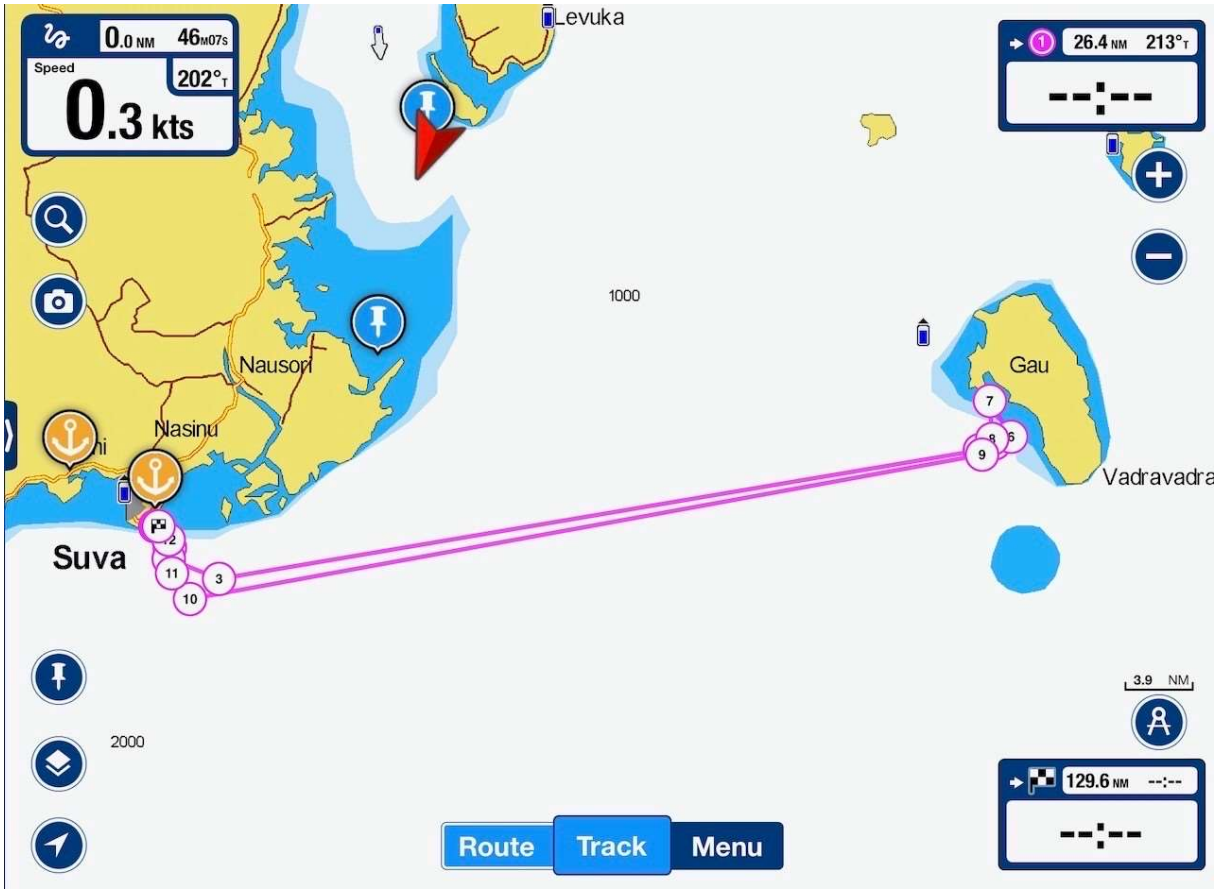
ANNEX 1: Drawing of the Prototype Cargo Proa. Conception: HarryProa; building HarryProa & University of Queensland. Forecasted launch November 2021.



Annex 2 – Example of routes for the Pilot project

Suva (National sailing center) to Gau Island



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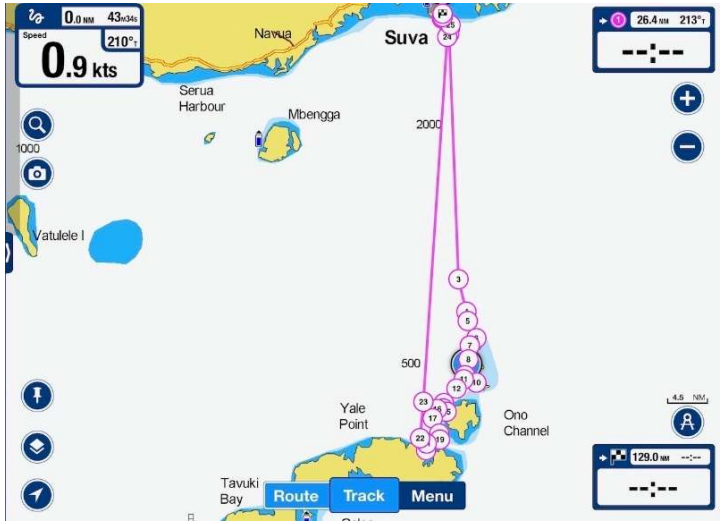
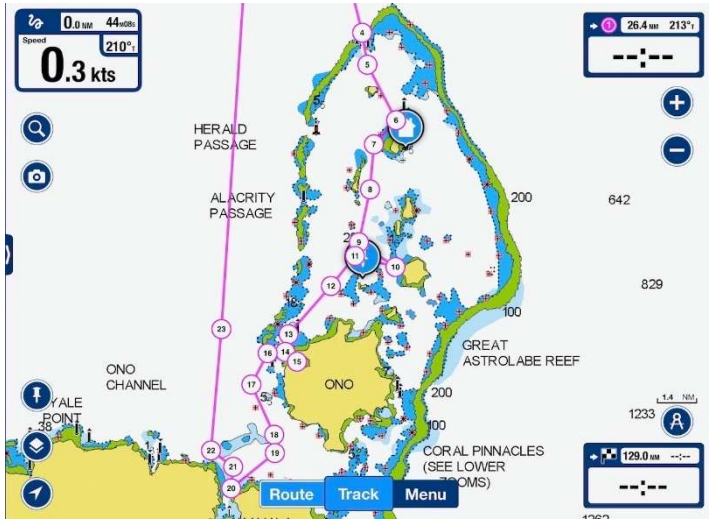
Semi-circular route Suva to Ono and Kadavu group





Circular route Suva (National Sailing Center)-Kadavu-Moala-Gau