Toward the Future: Lessons from the Recent Past

FIJI ISLANDS VOYAGING SOCIETY

SAILING FOR SUSTAINABILITY

Pete Nuttall

Sustainable Sea Transport Talanoa:

28th – 30th November 2012:USP: Suva

It’s a wind generator Jim, just not as we know it!!!

- The uniqueness of Island Oceania means challenges and opportunities are not necessarily the same as for Continental Earth.
- New approaches/solutions needed for Oceania.
- Oceania has a successful historical record of continuous adaption and innovation excellence in sea-transport.

Ship Owners Send SOS

Local Shipping companies have called on the government to increase its subsidy. .... The increase in the price of fuel prices. ....

The government provides 42 percent subsidy aimed to encourage private shipping operators to service uneconomical routes.

Fiji Sun 9/7/11

Increase subsidies to pay for increased fuel cost?

Is it possible to decrease fuel costs by changing fuel .....

..... to wind?

If it were possible , Fiji could have the “greenest” shipping fleet in the world....

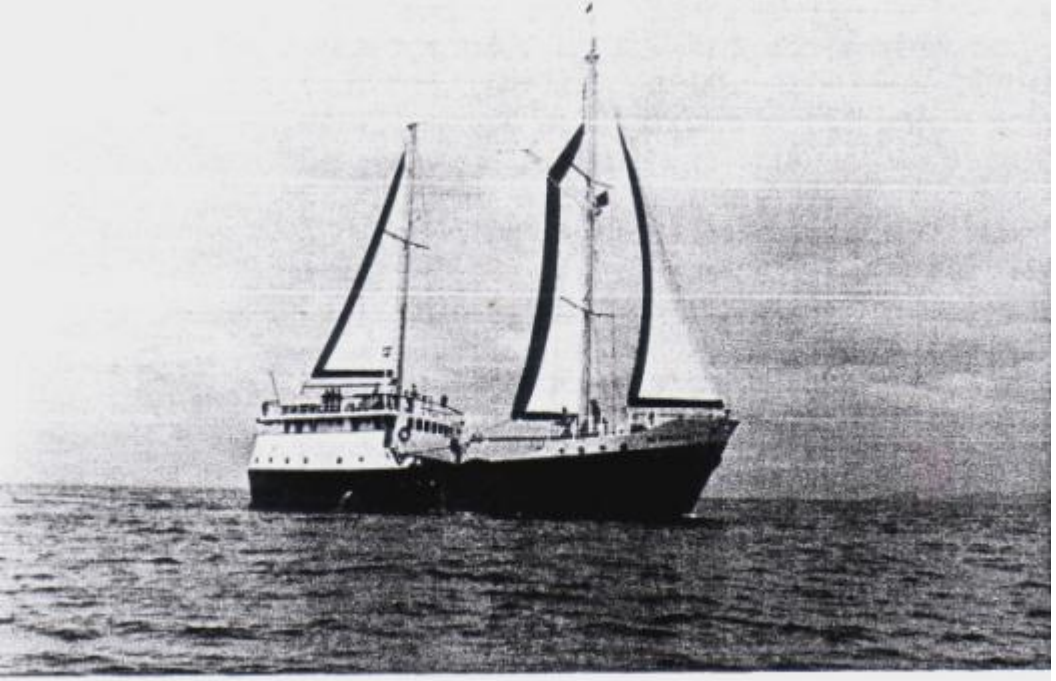
.....green enough to earn carbon credits to subsidise uneconomic routes?

Na Mataisau (1984)

6 yr old, 300 ton passenger/cargo ship used for island work in Fiji. Retrofitted with auxiliary sailing rig -ADB /Southampton University project.

Results were impressive:

- 23 % fuel saving
- Incr stability = incr passenger comfort & safety, reduced engine wear, reduced roll.
- 30% overall engine wear reduction
- Feathering prop would = additional 30% saving
- Capable of pure sail



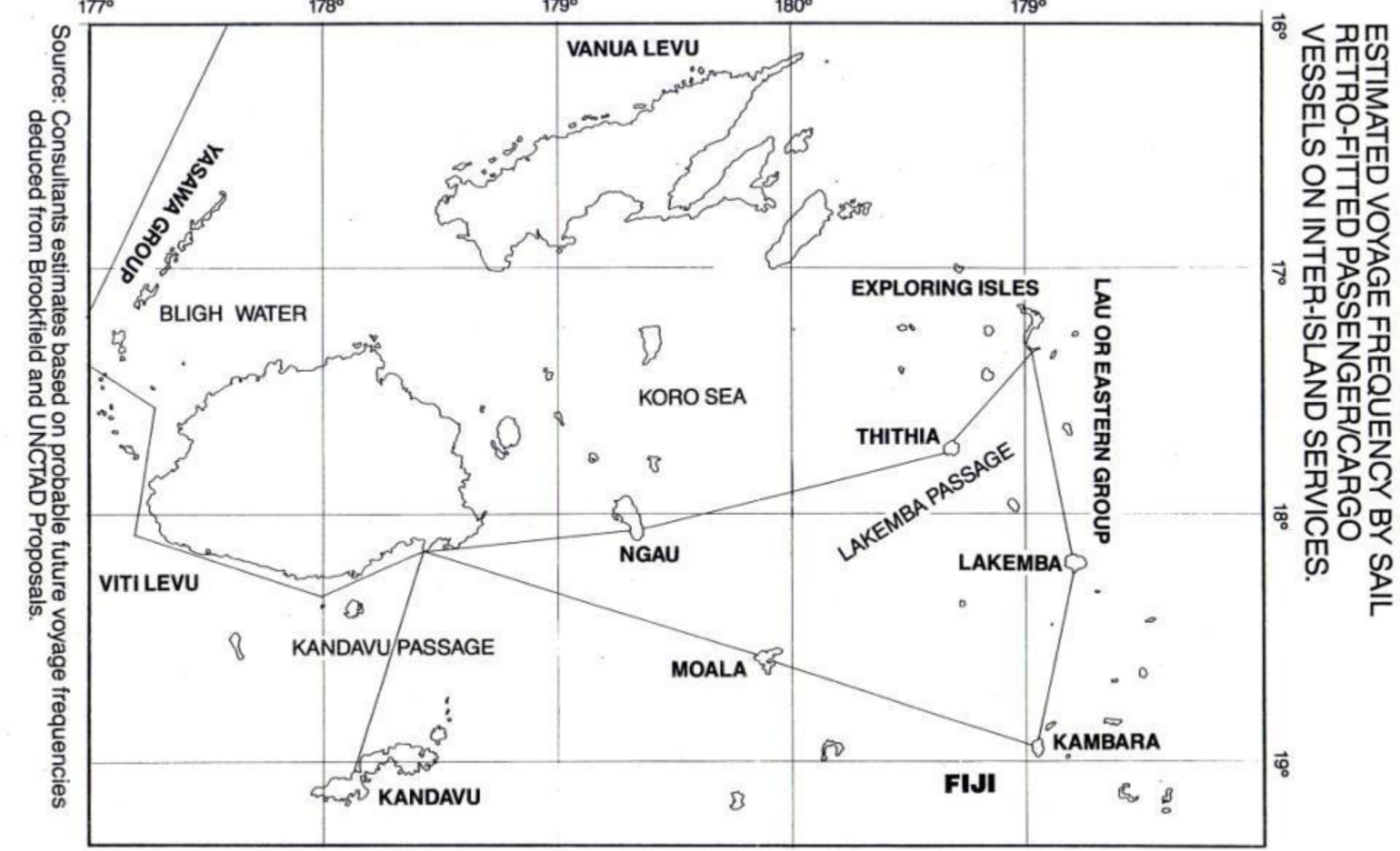
MAINSAIL REEFED TO 50%

17 Jan 1985 Na Mataisau was caught in a developing cyclone
Her engines failed.
Under sail alone she made the safety of Maloa Is.
Although she grounded and sank, 16 crew and party of passengers including Fiji PM made it ashore
2 crew were drowned.

The rig was salvaged and put on “Kapawai” but suffered technical problems.

“Cagidonu” was also fitted with sails and achieved up to 30% fuel savings.

SAILS FURLED SHOWING LOW WINDAGE.



The results from these experiments provide compelling arguments for sail use on most common Fiji shipping routes

FUEL SAVING ~ COURSE

FIJI AVERAGE WINDS

The research from Southampton University collected comprehensive wind and route data for all Fiji which is all still relevant today

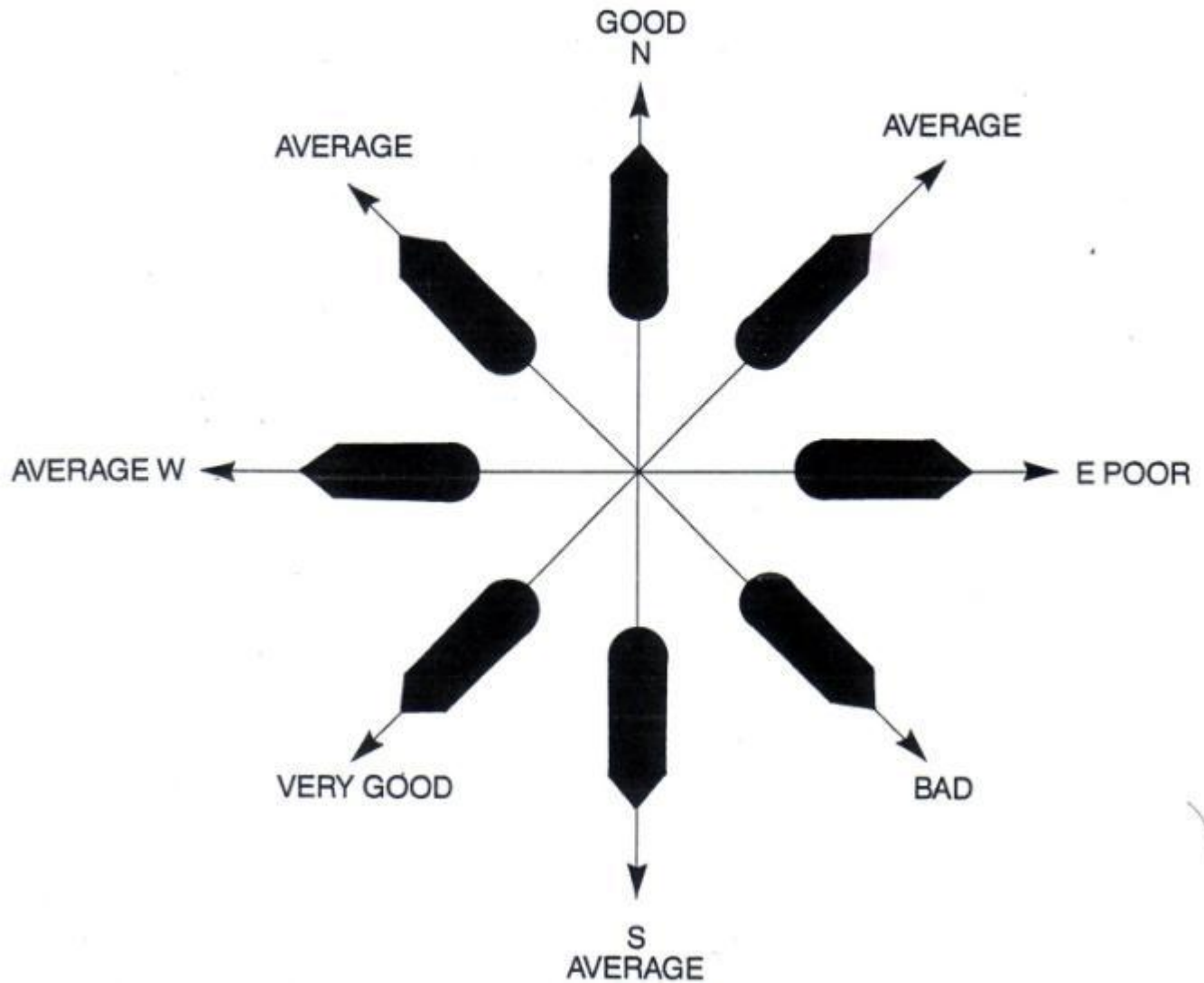
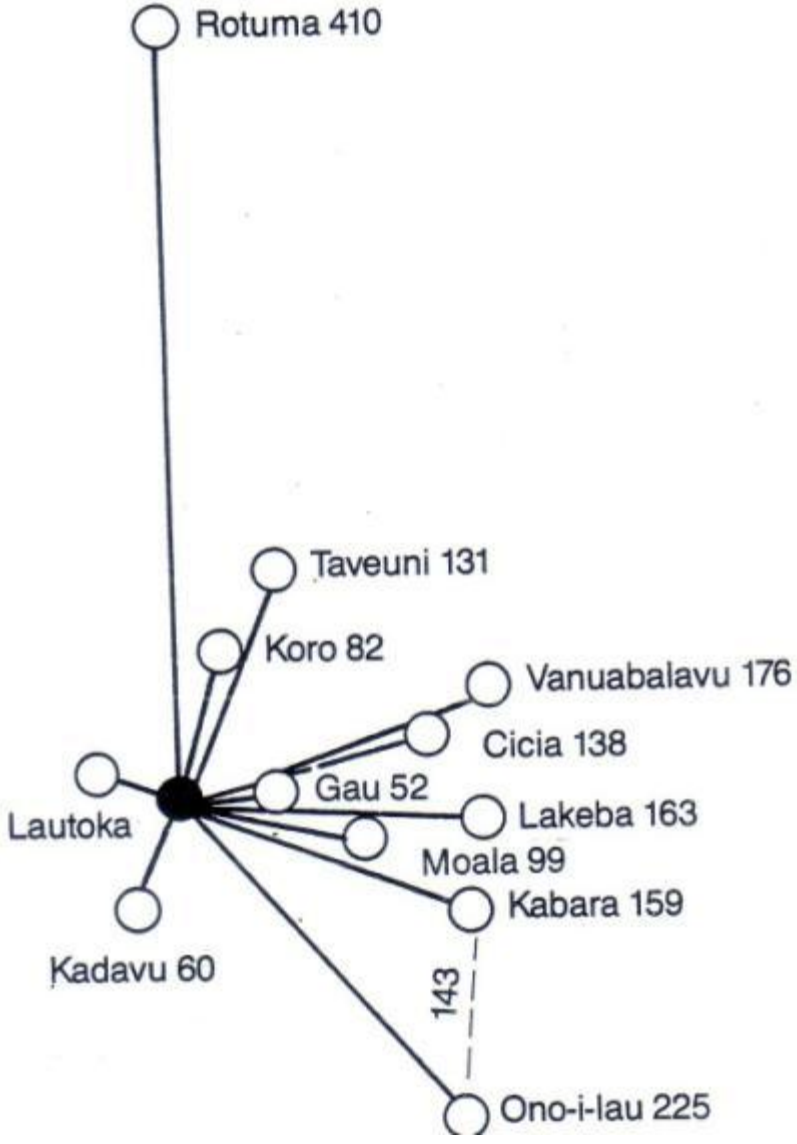
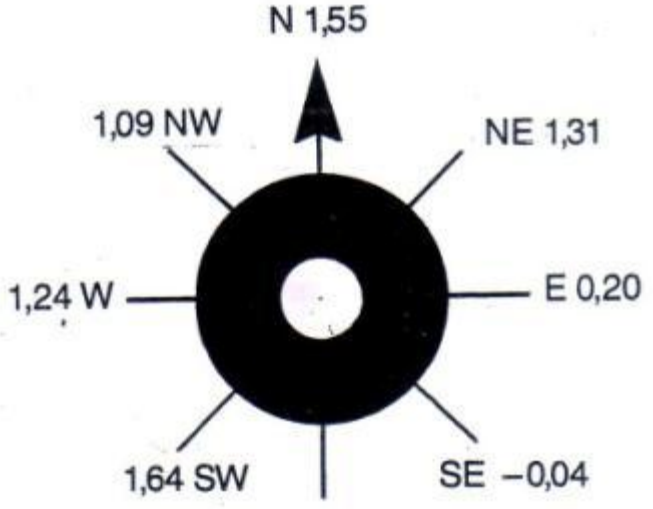


Fig. 2

ANGLES OF SAILING AND FACTORS FOR REDUCED FUEL CONSUMPTION WITH PREVAILING WINDS





Note. No sails would be set on a south east course

For explanation of Reduced Fuel Factor see Appendix 1, Figure 8, Page 22.

Distances in Nautical Miles

		Voyages year	Predominant course	Reduced fuel factor out	Reduced fuel factor home
To	Lautoka	100	W	1,24	0,20
	Rotuma	20	N	1,55	1,03
	Kadavu	100	E	0,20	1,24
	Gau	100	E	0,20	1,24
	Cicia	50	E	0,20	1,24
	Vanuabalavu	50	E	0,20	1,24
	Kabara	25	E	0,20	1,24
	Ono-i-lau	25	SE	—	1,09
	Moala	25	E	0,20	1,24
	Koro	50	NE	1,31	1,64
	Taveuni	50	NE	1,31	1,64
	Lakeba	50	E	0,20	1,24
		645			

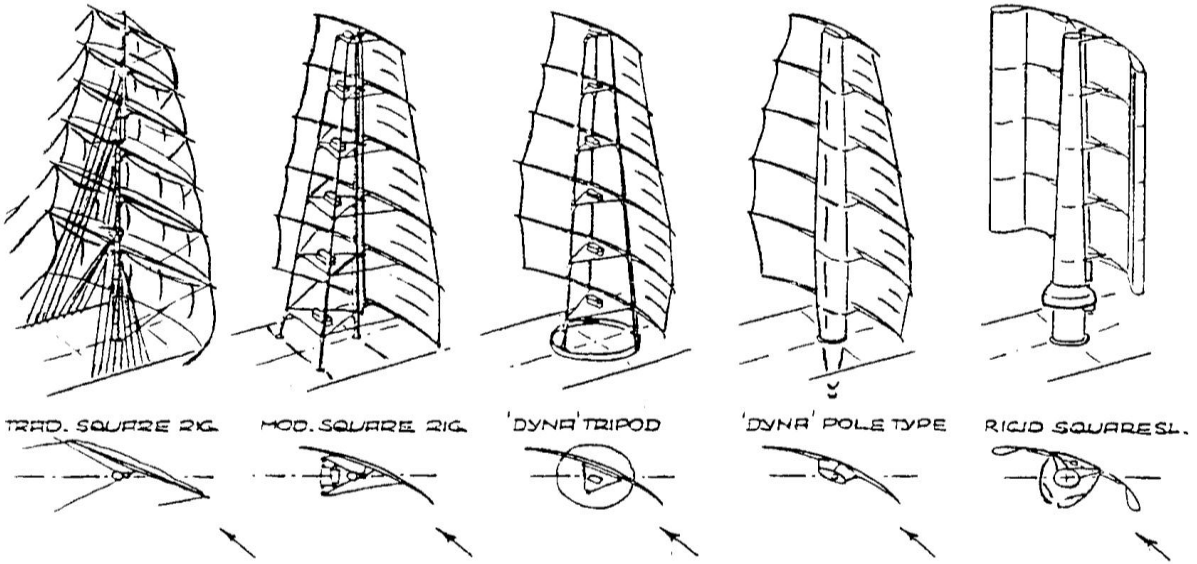
Shin Aitoku Maru

Also in the 1980s the Japanese fitted small oil tankers with fixed wing sails.

These were high tech, computer controlled rigs.

Again the results were impressive. But low fuel costs meant they were discontinued after 3 yrs.

The ships use an evolution of traditional square rigs



- Overall fuel savings of up to 30%
- The sails replaced the need for stabilisers – the roll and pitch of the boat was greatly reduced. Energy demand decreased by 50%
- Increased stability meant vessel could operate in stronger weather than conventional ships
- Engine wear dramatically reduced
- Vessel maximum cruising speed increased from 12-14kts
- Vessel could be sailed without motors in emergencies

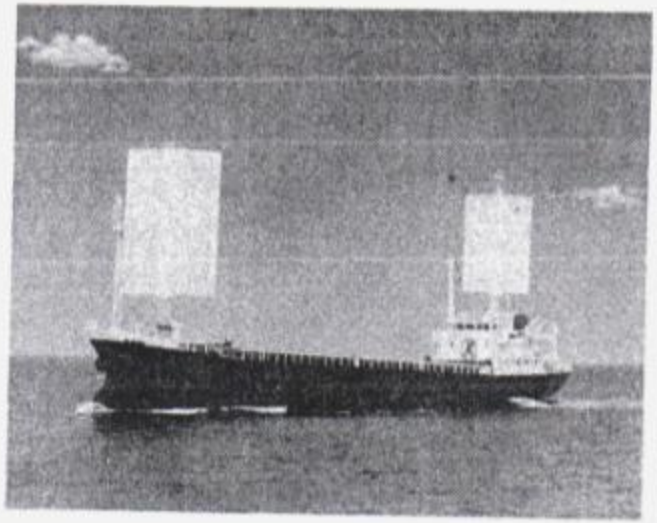


Fig. 41 Senyo Maru

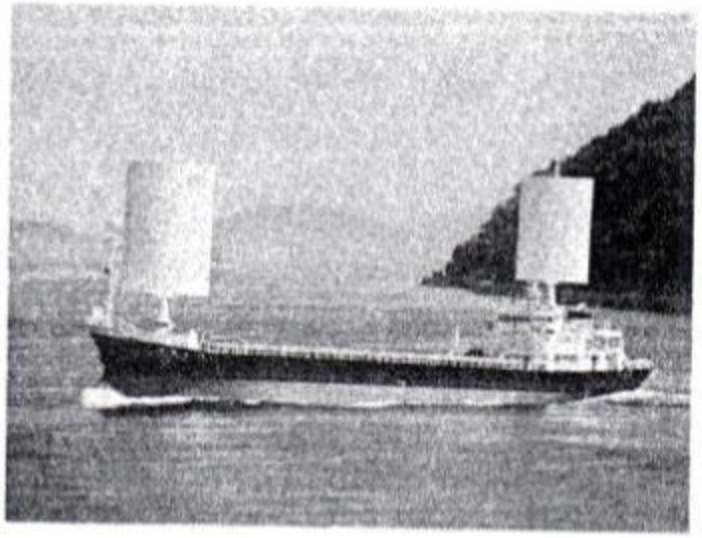
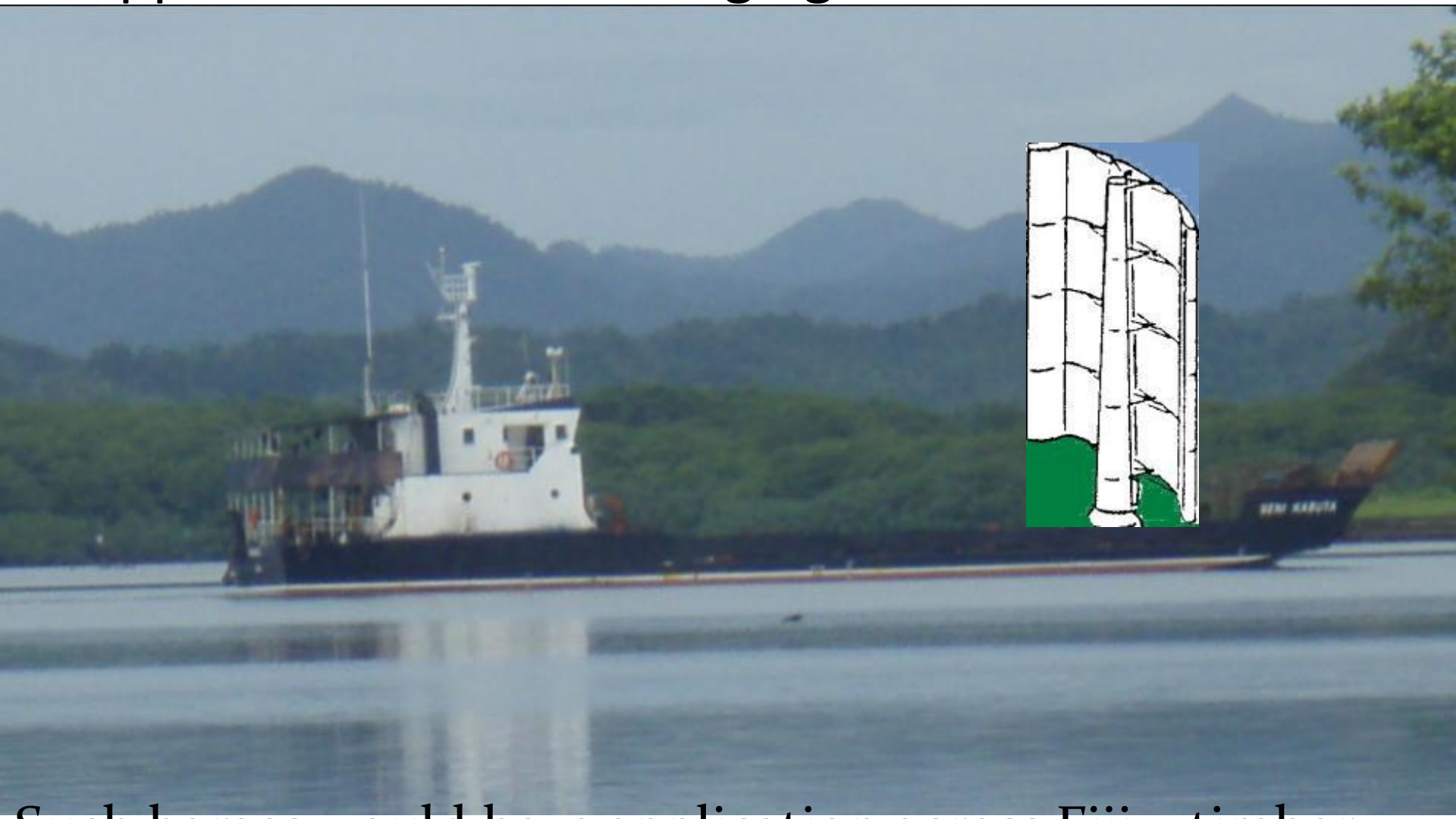
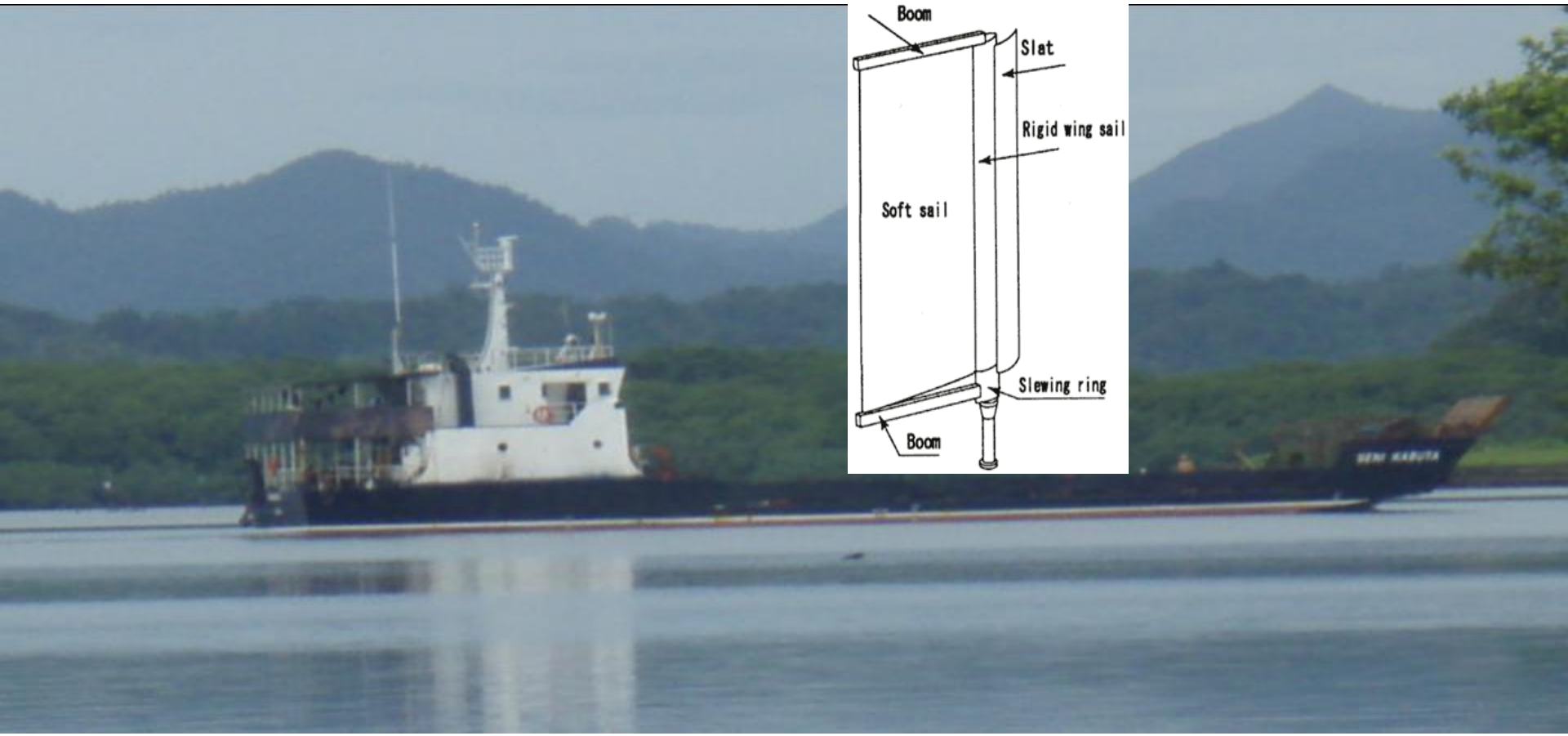


Fig. 42 Nissan Maru

What is the potential for using a low tech approach for coastal barging?



Such barges would have application across Fiji – timber transport for pine from Kadavu, copra from Koro, etc



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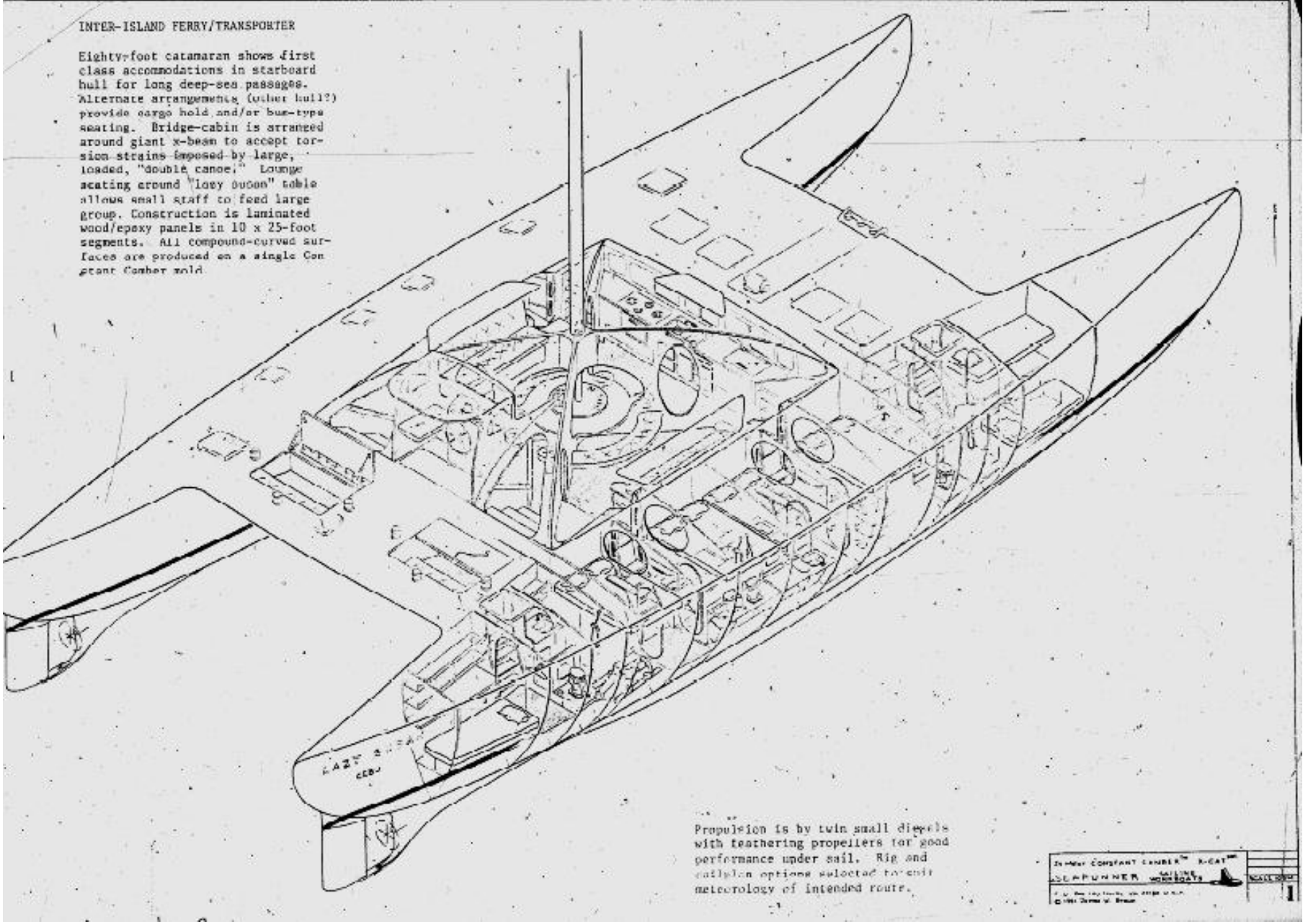
S.V. *Tai Kabara*

50 ton ketch, built 1984-87 on Kabara.

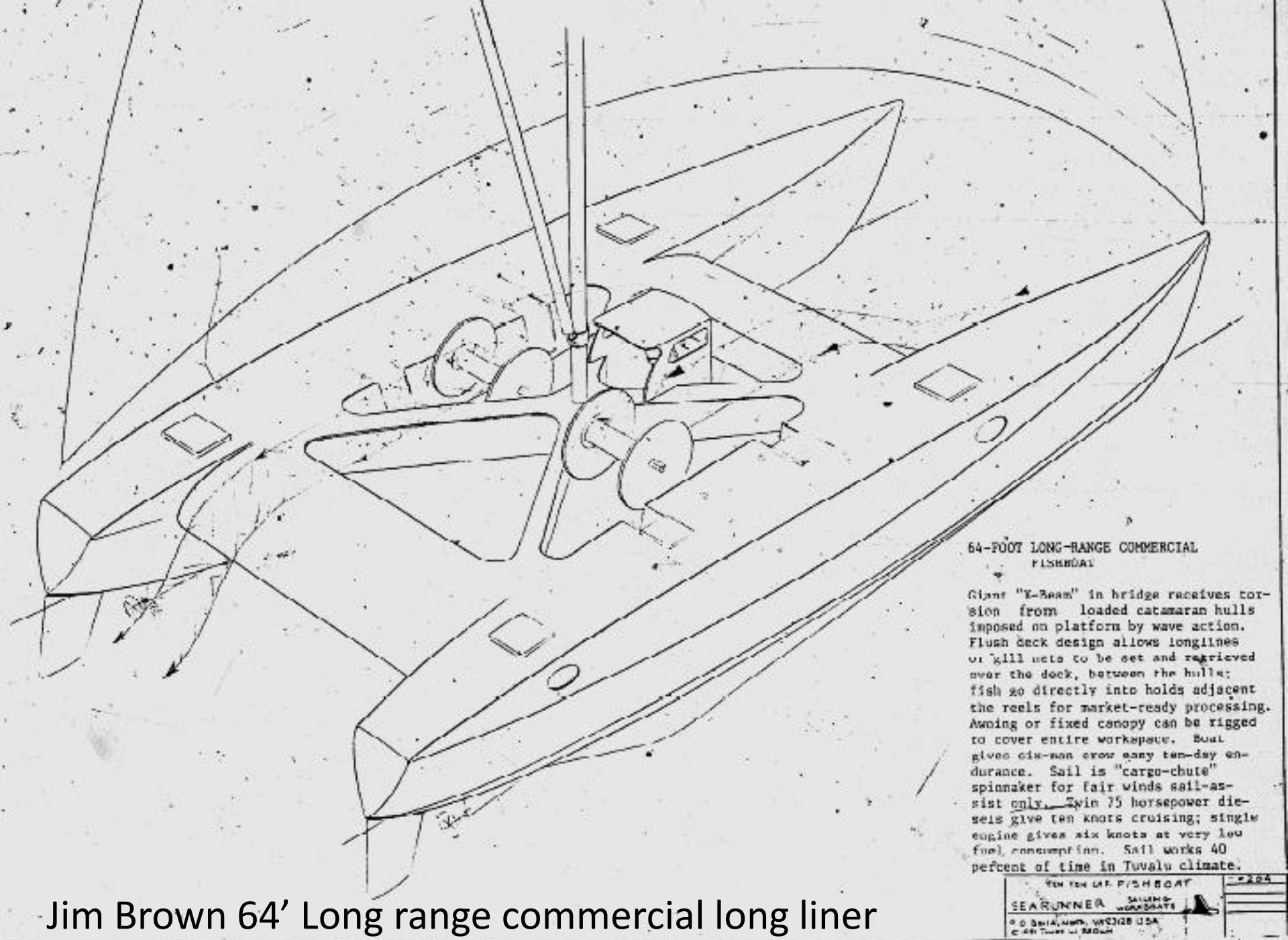
European Union funded project.

Designed in Fiji and built by mataisau. Vesi keel/frames, Dakua planked, copper fastened.

The mainstay of the Lau route for more than 20 years.



Jim Brown’s Sea Runner
80’ long range fast passenger catamaran



Jim Brown 64’ Long range commercial long liner

In the 1980's FAO investigated and trialled a range of artisanal fishing craft in a number of Pacific Island countries.

More than 350 vessels were built.

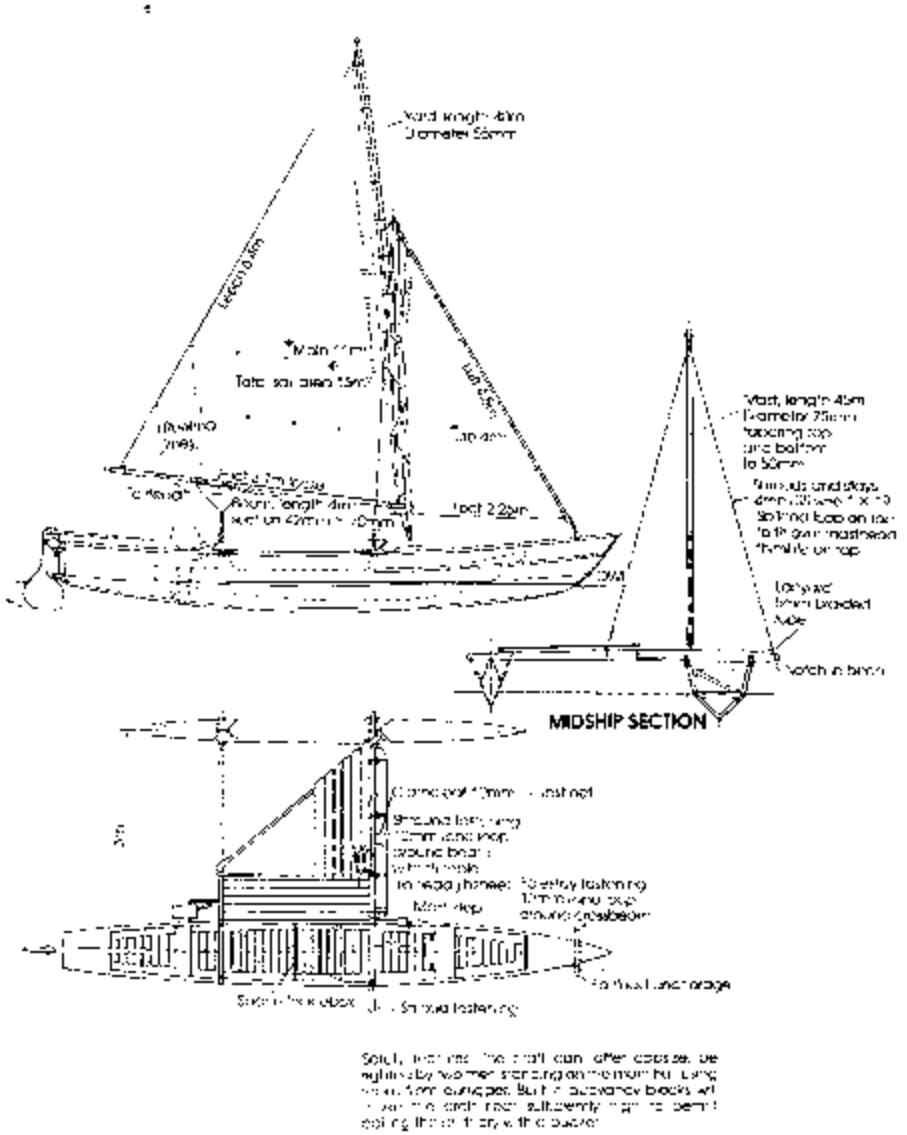
These included several sail or sail assisted vessels ranging from one person fishing catamarans to 11 m trimarans.

Although the uptake was low, the design work is still relevant today

One of the critical lessons learned was that cultures with a living sailing tradition were much more likely to use sail effectively.

A whole sailing culture has to be learnt and used .

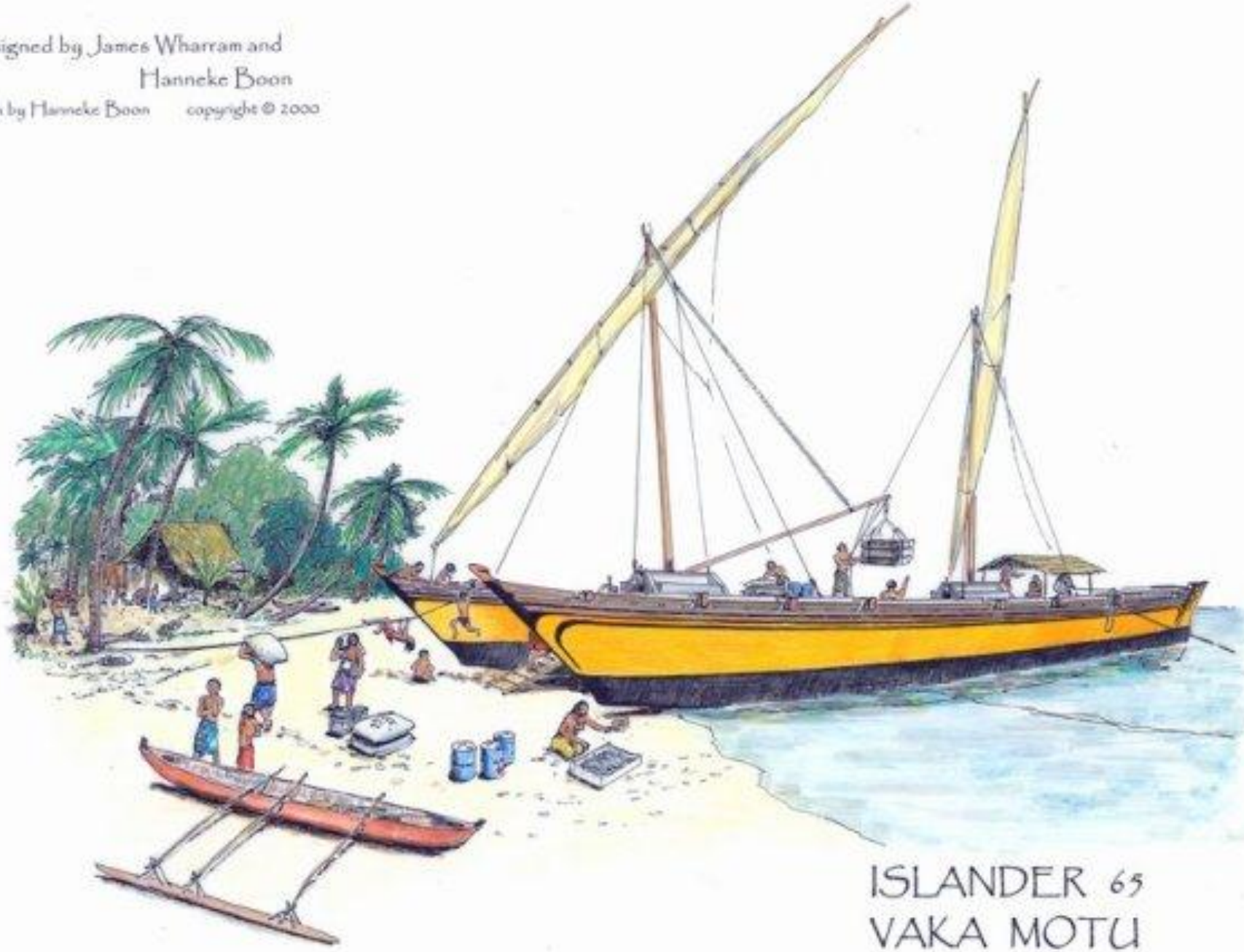
Sail options need to demonstrate economic viability for broad uptake



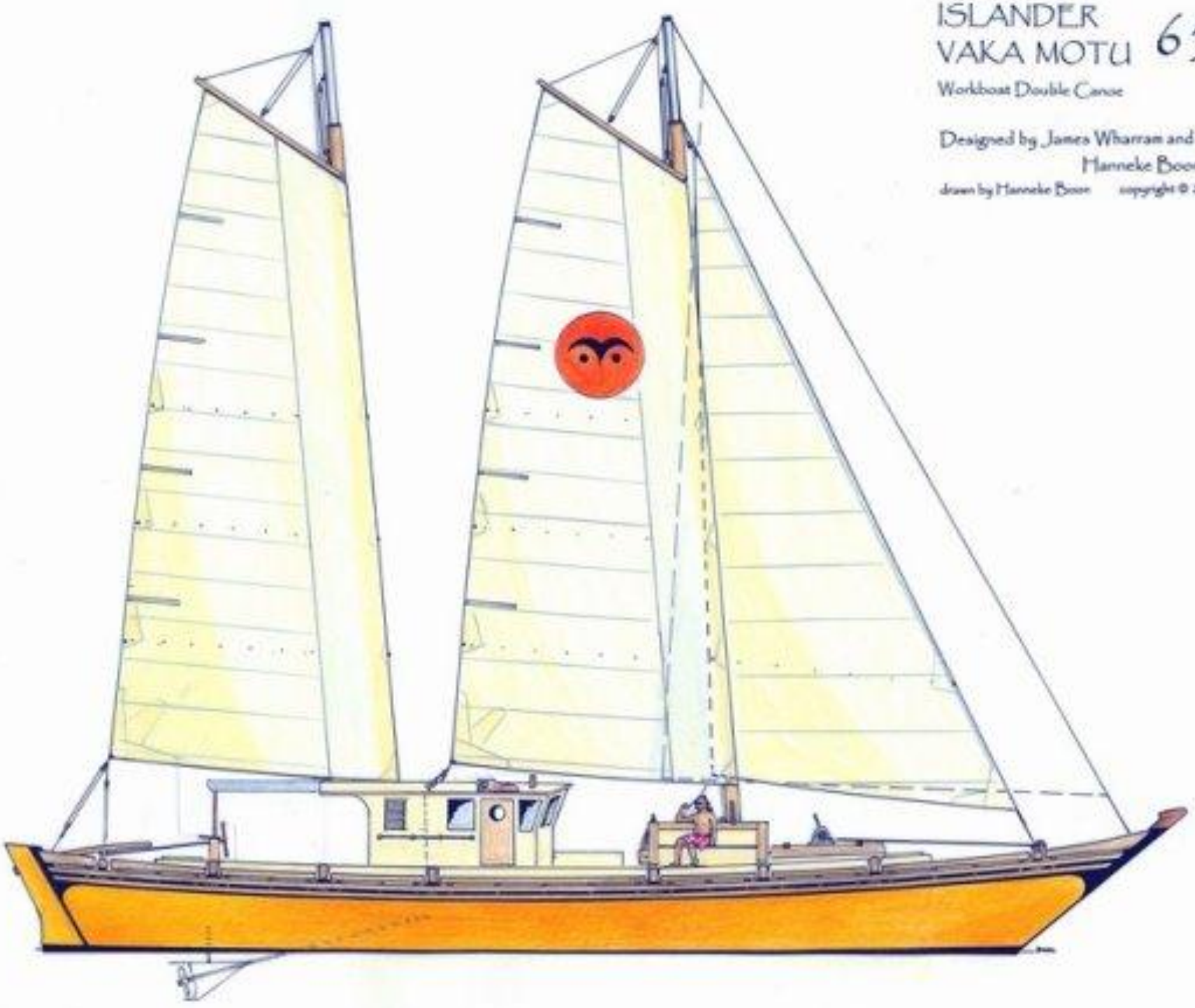
KIRIBATI – 7.1 Metre Canoe KIB-4

Designed by James Wharram and
Hanneke Boon

drawn by Hanneke Boon

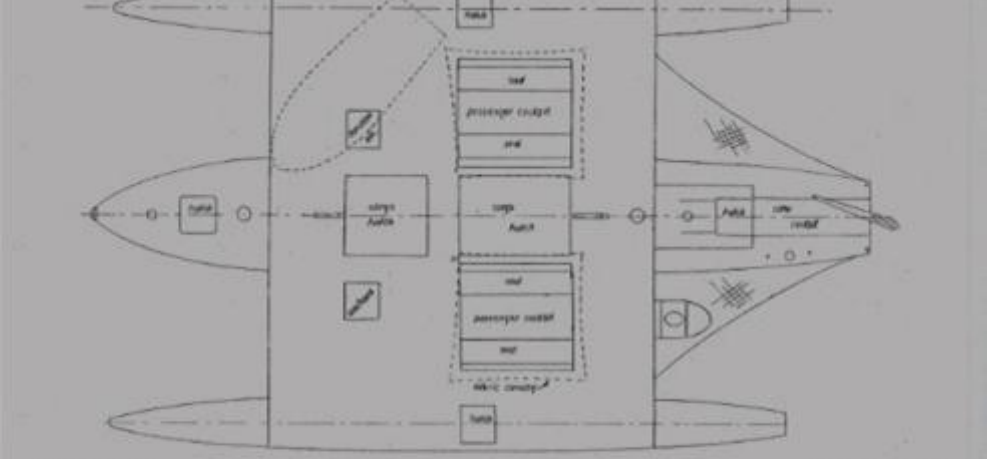


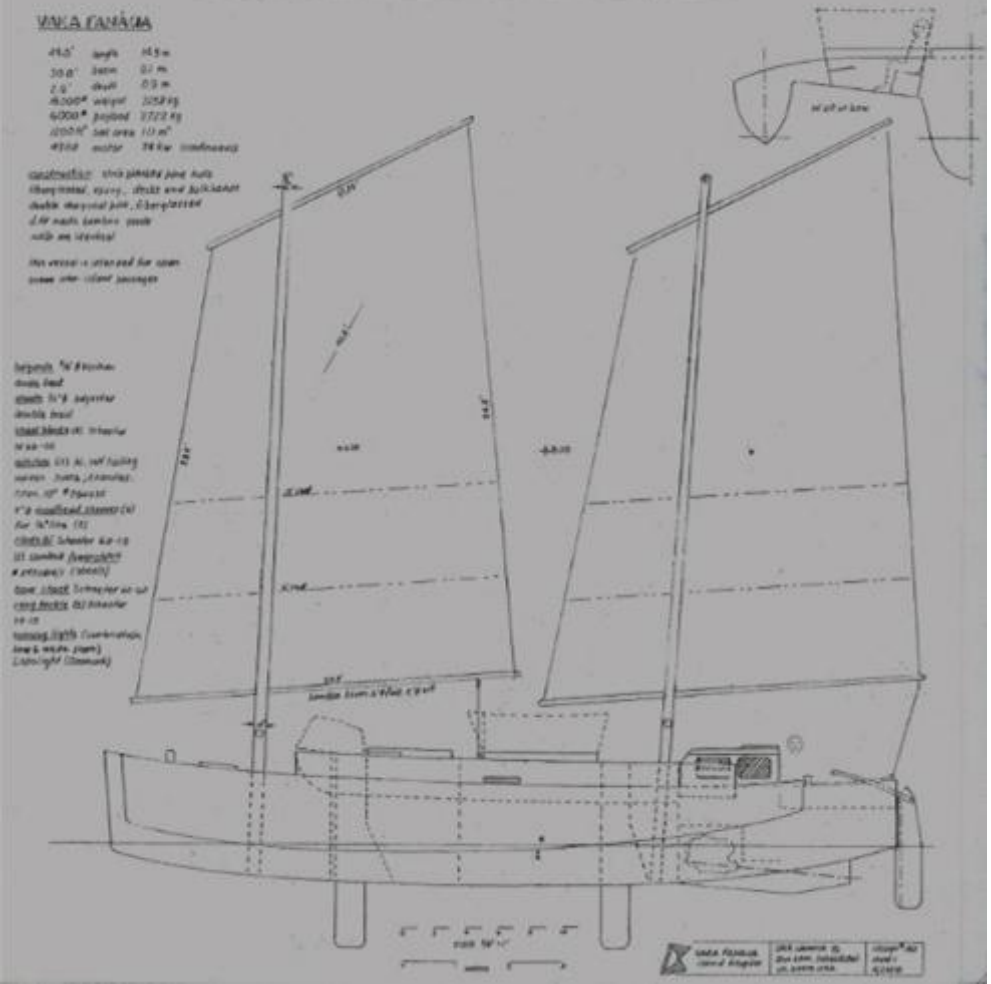
ISLANDER 65
VAKA MOTU


ISLANDER
VAKA MOTU 65
Workboat Double Canoe
Designed by James Wharram and
Hanneke Boon
drawn by Hanneke Boon
copyright © 2000

Wharram Vaka Motu - Islander 65

Vaka Fanāua





Project Vaka Fanāua

Designer Dick Newick

Projected cost: $448, 861 NZ2010 costings

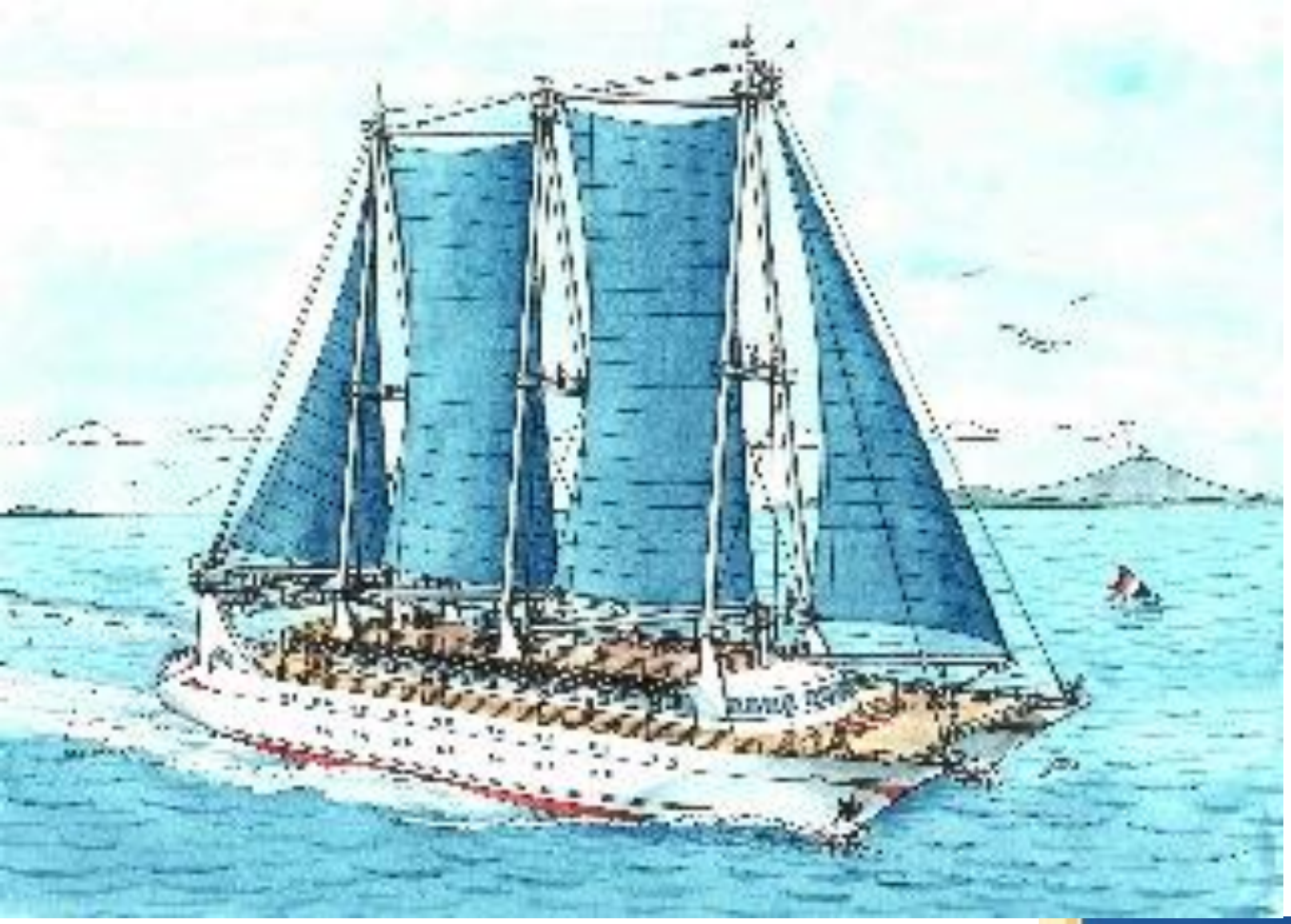
Capacity: 2.7 DWT

Type: Trimaran

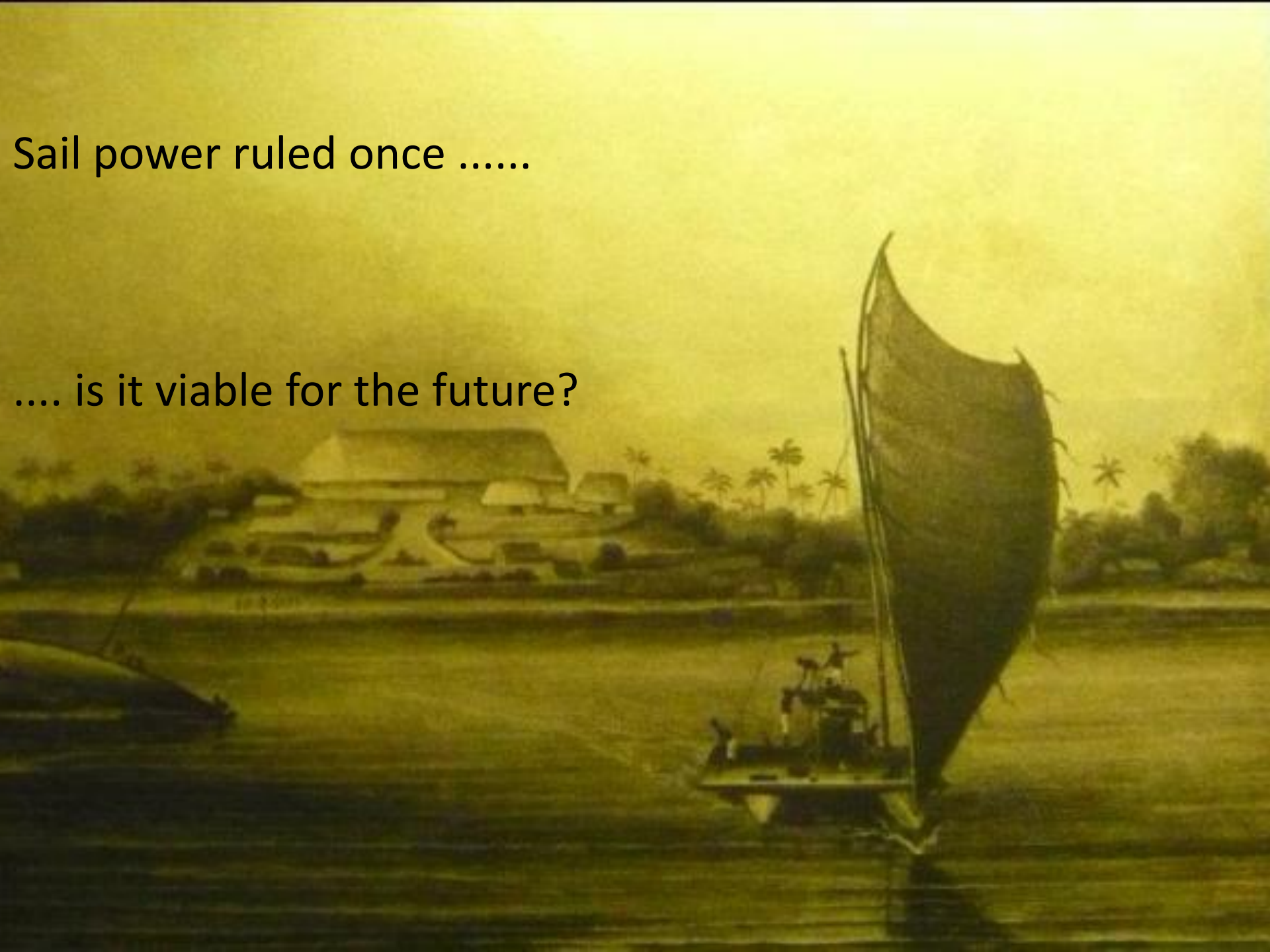
Length: 48’

- Average 10 knots in usual trade wind conditions. A small diesel engine will give 6 to 8 knots
- lug schooner rig
- Specifically designed for the northern Tongan islands of Niuatoputapu, Niuafouou and Tafahi. These islands, 480km (300 miles) north of Tongatapu, closer to Samoa than to Nuku‘alofa
- Wood construction, sheathed with epoxy and fiberglass,
- Preferred boat builder Aaron Beatty of Lifestyle Yachts, Pipiroa.


ENERCON




CATASTREAM


Sail power ruled once ……
…. is it viable for the future?