The Okeanos Project

By Dieter Paulmann, Okeanos – Foundation for the Sea

Where do we come from? An odd story of decline

The seemingly peaceful tropical landscapes of South Pacific Islands camouflage a brutal history of colonialism that decimated sustainable lifestyles evolved from thousands of years of collaboration with the sea.

The last two hundred years of history were shaped by an unparalleled expansion of Western-capitalist culture. Nations of Western Europe and North America took control of many countries and regions as “colonies.” Western countries saw these “colonies” mainly as storehouses of raw material for the production of their wealth. During the post-colonial era, the Western world extended its dominance using economic politics which alienated local economies from their traditional cultural rules and from the sustainable use of natural resources. Many traditions of farming and fishing were destroyed and rapidly disappeared, land and sea rights were contracted to multinational corporations including the World Bank, all at the expense of small farmers, traditional fishing communities and fish populations. This resulted in poverty, dependency, a lack of identity and above all environmental degradation.

Today, it is clear that an economy based on growth-at-any-cost destroys the resource base necessary for its own existence. A return to a sustainable and just economy in balance with nature can only be achieved by locals who apply their own traditional regulations over use of natural resources.

It is therefore imperative to create and enforce conditions for an autonomous economy that restores local identity and integrity, thereby giving the people a chance to live and tell their own history.

> *"For indigenous people, in the time that defines one's life, the relationship one has to earth is the constant and true gauge that determines the integrity of one's culture, the meaning of one's existence and the peacefulness of one's heart… Every single particle, thought, and being, even our dreaming, is the environment, and what we do to one another is reflected on earth just as surely as what we do to the earth is reflected in our diseases and discontents." – Paul Hawken,* Blessed Unrest

Pacific peoples know that the ocean does not divide the islands but rather connects islands making sea transportation the circulation system of this invisible continent. Today, the limited boats islanders have are outdated, expensive, and dependent on high consumption of fossil fuel. Economic independent must include restoration of an efficient sea transportation system based on traditional technologies that evolved specific to the Islanders needs and environment. The origins of our Okeanos Project begins with a holistic expansion from the success of our fleet of traditionally designed sailing vessels call Vaka Moana.

How did we start? Te Mana O Te Moana

For the first time in more than 100 years, south Pacific people embraced their indigenous knowledge by building traditionally designed sailing catamarans called Vaka Moana (Boats of the Ocean) equipped with state-of-the-art solar technology connecting the best of the past with the best of the future.

Our inspired voyage "Te Mana o Te Moana" (The Spirit of the Ocean) was intended to connect Pacific islanders with their traditions, the ocean and themselves. Our fleet of seven Vaka Moana was entirely fossil-fuel free.

Many island nations including Fiji, the Cook Islands, Samoa, French Polynesia and Aotearoa were each represented by a single vaka. Two additional vaka had crews composed of sailors from several island nations stretching from Papua New Guinea to Easter Island.

Pacific Voyagers fleet leaves the Hanalei Bay of Kaua'i Island in Hawai'i for San Francisco in July 2011 © Rui Camilo

Our fleet sailed from Aotearoa in April 2011 to Hawaii then continued to the US West Coast with a historic arrival at San Francisco Golden Gate Bridge, August 2011. After sailing down the California coast, we spent some weeks winter rising in San Diego. Our journey home began January 2012 during which we visited Cocos Islands, Galapagos, Tahiti, Cook Islands, Samoa, Fiji and Vanuatu concluding at the Festival of Pacific Arts in the Solomon Islands, August 2012.

The spirit of tradition and ancient wisdom spoke to our hearts and created a longing for solidarity, cooperation, and kinship while allowing us to freely abandon feelings of competition, greed and jealousy.

Excuse me here while I introduce myself. For more than 40 years, I was a private underwater photographer who came to love the Pacific after my first encounter with a great white whale. Inspired by Pacific Island culture, spirituality and ancient stories of voyaging, I felt honored to partner with the Pacific peoples to sponsor this fleet of vaka moanas intended to sail across the Pacific to raise awareness of the increasing threats to these beautiful waters.

Our voyage demonstrated the power and the art of traditional sailing guided by the stars. Throughout our voyage, the sailors, both men and women, shined with pride and confidence in their traditional knowledge and great achievement. They expressed a deep understanding of who they are and who they can be.

Collectively we sailed 210,000 nautical miles of open ocean and showed the world the great power and potential of the vaka.

The Okeanos Project is Born

The “Okeanos Project” is born from a Pacific folktale describing Earth drifting through the universe like a blue canoe. In July 2011 Pacific Voyagers of “Te Mana o Te Moana” joined with internationally famous scientists at the Kava Bowl Ocean Summit in Honolulu. This was a historic moment, a conference gathering in traditional Pacific fashion: sitting in small groups, sharing kava root together in symbolization of friendship, honor and collaboration.

The scientists shared their latest findings on the state of the ocean, and the social, economic and environmental impacts of climate change. From this meeting, we imagined the **Okeanos Project** (previously called ‘The Blue Canoe Project’) - a unique, holistic vision that collectively addresses the social and environmental challenges small island nations are facing.

We as sailors, especially celestial navigators, immediately knew that we cannot drift with the ocean or through the universe without a sailing plan and final destination. So the “Okeanos Project” became our sailing plan guided by the single question: *What should an island on our Blue Canoe look like in ten, twenty, thirty years and how will we contribute to its future?*

Together, we developed four major goals for this project:

- **Inter-Island Transportation**
- **Fossil Free Energy Production**
- **Food Sovereignty**
- **Ownership of Fishing Rights**

To achieve these goals every island community is tasked with creating a sailing plan composed of both short and long-term goals - the guiding stars and the waypoints. Short-term goals include reestablishing traditional sailing, fishing, farming and boat building practices. The overall long-term goal is economic independence achieved through increase in locally produced food, fossil free energy use and control of marine waters.

Inter-Island Transportation: the Vaka Project

Over the last 7 years, we developed three types of Vaka, providing solar powered alternative ocean transportation for almost every Pacific need.

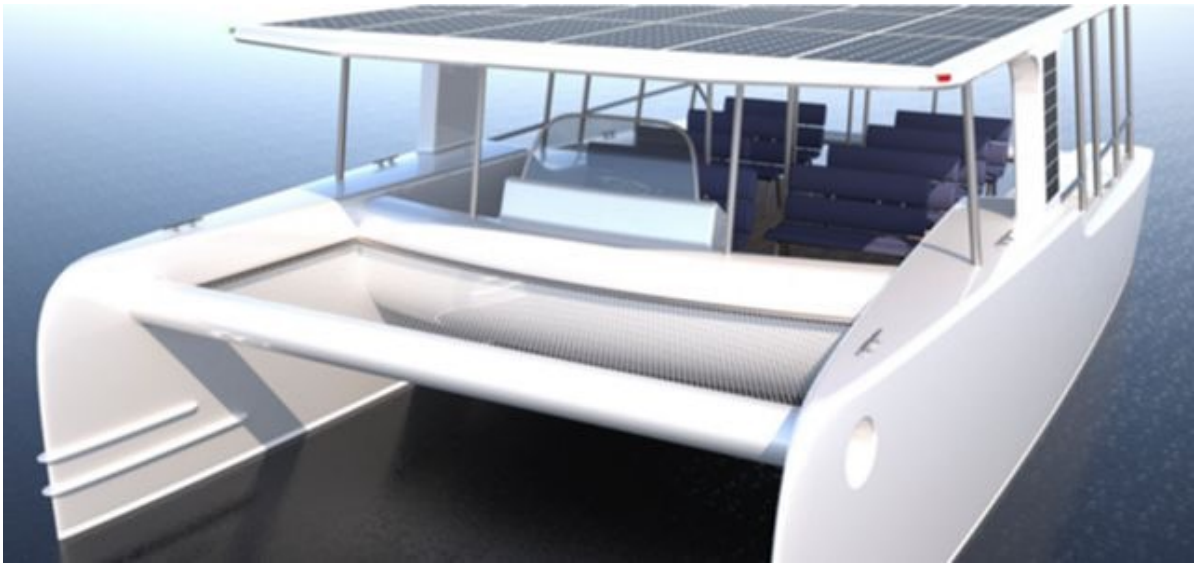
The VAKA MOANA (Boat of the Ocean) is our largest traditional canoe built according to drawings made by James Cook around 1770. She has two masts, a maximum weight of 14 tons, accommodates 16 people and is able to carry four tons of load. She is made for open sea transportation over long distances with the larger goal of reviving traditional Pacific culture for the next generation.

Vaka Moana “Hine Moana“ © Rui Camilo

The VAKA MOTU (Boat for the Island) is a smaller version of the vaka moana. She has only one mast, a maximum weight of nine tons, can accommodate 12 people and three tons of cargo. She is primarily designed for commercial operation between the islands.

Vaka Motu “Okeanos” © Oceanic Nature Film Production (ONFP)

The VAKA HAPUA (Boat for the Lagoon) a completely new construction covered by solar panels and no mast, is the first vaka model intended for transportation within lagoons. She will be able to ferry 16 passengers with luggage and little cargo. She is currently under construction scheduled to begin operating in September 2016.



Vaka Hapua © Naval DC

All three vaka models share the same technologies including solar panels, battery type, electric engines, controllers and switchboards and differ only with regard to battery size or engine performance. This helps to ensure a high degree of operating efficiency and security.

See addendum for technical details about vaka construction and operation.

Fossil Free Energy Production

Small Island nations are posed to be the world's front runner in the global paradigm shift away from corporate oil and gas dependency toward democratized clean energy production, distribution and consumption. With abundant natural resources and a wealth of traditional knowledge about stewardship of native resources, these island communities are ready to quickly establish an economic infrastructure based upon renewable energy.

Due to their remote location, Pacific islands currently suffer from their dependence on expensive oil and electricity. And while they have contributed the least to greenhouse gas emissions, they are now the most threatened by global warming with rising sea levels, salinizing their crops and endangering their very existence. They have the culture, resources and knowledge necessary to make change and feel an urgency to take control of their future by implementing sun, wind and geothermal technologies to fuel all homes, cars, and everyday needs.

We should all follow the example of the tiny island of Tokelau, the world's first territory to run on 100% renewable energy in 2012. We are at a critical moment where Pacific people are ready to free themselves from an imposed western economy and in turn become leaders in applying traditional knowledge to establish sustainable infrastructures and become first fossil free continent on Earth.

Food Sovereignty

Cook Islands Prime Minister Henry Puna has stated (in 2012): *"Somewhere in our makeup we are environmentally conscious people, because we have learned to live off the land and off the sea, that is our heritage, that is our tradition and we are just tapping into that again."*

Food security is critical for the Islands' economic, environmental and cultural health. Prior to Western colonization, generations of islanders relied solely on local inter-island trade or independent food production. Today, Island nations have become dependent upon imported foods that are expensive and often unhealthy.

Hawaii, for example, is 90% dependent on imported foods. With many of the native streams and habitats still desiccated, residents are calling for native habitat restoration, including the old taro[1] fields and fishing ponds.

In Fiji, a government initiative has launched to turn all available arable, idle land into thriving, vibrant fields, and targeting specific crops as "import substitutions".

There are also important indigenous food communication initiatives such as a 14-parts TV series titled "Real Pasifika" which was produced by Zoomslide Film Productions in Auckland, New Zealand, together with Okeanos – Foundation for the Sea. These films demonstrate the use of traditional recipes and food stuff in the entire Pacific region from Tahiti to Vanuatu in three-star restaurants, which are mostly visited by tourists. They are being presented around the Pacific in hotels and restaurants creating greater interest in local cuisine.

[1] Taro has been a traditional and at one-time abundant nutritional food staple in the Hawaiian Islands.

Ownership of Fishing Rights

Imagine wanting your island to become an elite destination for tourists. What does it take? Advertising and elegant hotels are not enough. As in Costa Rica, tourists are attracted to, and interested in supporting, beautiful healthy ecosystems. Marine protection therefore becomes a pathway to both wealth and environmental sustainability. Elite patrons expect high quality local fare. Currently, tourists are mainly served frozen fish caught in the host island EEZ by foreign Asian fleets reimported to the island restaurants. Customers will pay three times more for locally caught fresh fish especially if they understand these stocks are sustainable.

The current decline in fish populations endangers the marine ecosystems Islanders depend upon. For instance, dramatic decline of shark populations has degraded coral reefs around the world. Pacific island nations are small in population and land but own vast ocean resources and can exert control over a large portion of the high seas sequestered within the boundaries of their united national waters. So decisions island nations collectively make may well determine the course of not only their own future, but inspire similar action by others.

In 2011, when we started “The Okeanos Project”, the average remuneration was about seven percent of the value of the fish and this did not include the estimated 30% of illegally caught fish above the allowed quota.

This reminds us of the global situation in the 1960s with oil-producing nations. Then, Middle Eastern countries received a minuscule ten cents per barrel of oil. However, as they could not use the oil themselves this token amount still improved their lives. Once they realized the degree to which they were being robbed, the decided to join together and take control over their own natural resources. In 1967, these countries founded OPEC (Organization of Oil Exporting Countries) and collectively were able to increase the price of oil immediately to 10 dollars per barrel, a 10,000% price increase. The world was shocked by these prices but OPEC has received up to 120 US$ per barrel in the last years making the oil-exporting countries incredibly rich.

With our collective efforts, the same could happen with the price of the fish. Pacific island nations now receive about 10% of the true value of their fish but should ask for at least 35%. This income could free the islands of foreign loans while allowing them to invest in sustainable technologies. In the near future, fish is likely to be more important and more valuable than fossil fuel. Therefore we demand the building of a new but powerful body: OFEC – Organization of Fish Exporting Countries.

How to achieve these goals?

All Pacific nations are burdened by international loans and continually dependent on financial aid. They will never be financially free if they do not substantial restructure their economic system. One possibility could be a model based upon the success of the Marshall Plan that helped Germany and Japan recover after World War II.

At that time, Germany received a 10 billion dollars interest free credit with which the German government financed thousands of short-term loans for small and medium sized companies. The unique success of this economic model was the ability of the German government to use this money over thirty years and continually reinvest in new development thereby igniting and fueling self containing economic growth that was never seen before. After thirty years, Germany was able to fully repay the initial Marshall Plan funds with ease.

This exceptional success can be replicated in the Pacific by a union of Pacific island nations that launch a “Pacific Marshall Plan”. The loans from such a plan would be used to achieve our four Okeanos Project goals. The immediate benefit would be that that less money leaves our islands for truly unnecessary foreign goods such as imported food and fossil fuel. At the same time, each dollar that stays within the islands will continually spawn economic growth and foster ongoing entrepreneurship and investment in infrastructure.

A new story of success to tell

“The Okeanos Project” combines practical action, supportive advice and financing strategies as well as renewable energy to achieve a goal that is gradually facilitating the Pacific Islands to a future of independence and sustainability.

This will be a story of success, about how well people can live together in mutual respect and support and also preserve the legacy that was left to them from their ancestors and the wealth of nature.

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Addendum - Vaka production details

The vaka moana is our largest traditional canoe, built based on drawings made by James Cook around 1770. On the basis of these measurements, lines and on the initiative of Sir Thomas Davis, the first vaka moana “Te Au O Tonga“ was built in 1985 in Rarotonga/Cook Islands. Essentially, our vaka are recreated on these lines. However, in contrast to traditional vakas with hulls that have been made of one big tree trunk, our hulls are made of e-glass and epoxy resin as it would be irresponsible to build boats these days with precious wood.

Vaka Moana “Hine Moana“ © Rui Camilo

The vaka moana has two masts, a length of 72 ft, a draft of 22 ft and a depth of two ft. It has a maximum weight of 14 tons, provides accommodation for 16 crew or passengers and is able to carry four tons of cargo. The deckhouse has a height of only 1.45 m. However, it offers room for a small galley, a navigation point and a pilot berth for the watch captain or for sick passengers. The vaka moana has two rigs, a traditional one (crab claw style) and a contemporary one. This is advantageous on high seas as it is better equipped to reef the sails that have a total sail area of 850 square feet (79 square meter). The average sailing speed within the last two years (crossing the Pacific twice) was 7 knots per hour, or approximately 160 nm per day.

The vaka moana sails 65° to the apparent wind. It is steered in a traditional way by a wood steering paddle (hoi). All beams are connected with the hulls through traditional lashings.

It is mainly operated by celestial navigation and does not have a compass, GPS or similar navigational installations. However, to ensure safety it is equipped with VHF and AIS as well as safety equipment such as life rafts, life vests, flares etc. following international safety regulations.

The solar installation consists of eight solar panels with 230 W each, having a total capacity of 1.9 kW. With this capacity the vaka can be driven at sunlight with a speed of four to five knots. It has, in addition, a LiPo 48V battery system with a capacity of 2x 15 kWh which guarantees an operational range of about 20 nm when there is no wind or in the night. It is propelled by using two electrical pods of 10 kW power each, fixed under the deck planking, which can be lowered to the water for propelling or for recharging of the batteries during sailing.

Each vaka has two independent systems so that there is a redundancy, if one system fails. While in constant use over the past four years, we did not experience one situation where the battery capacity was not sufficient to reach our port of calls.

The Vaka Motu

The vaka motu has one mast and sails with a contemporary rig. It has a sail area of 615 square feet (58 square meter), a length of 50 feet, a 20-foot beam, a two and a half foot draft (80 cm) and is operated by four crew for normal operation. Its maximum weight is nine tons, and it is mainly destined for commercial use and can carry twelve passengers, three tons of cargo under deck plus one ton of cargo on deck.

It is steered by a traditional wood steering paddle (hoi). All beams are connected with the hulls through traditional lashings. It is mainly operated with GPS navigation, is equipped with a compass and VHF as well as with international safety equipment such as life rafts, life vests, flares etc following international safety regulations. The average sailing speed is about 7 to 8 knots. It sails nicely high to the apparent wind between 55° and 60°.

As is the case with the vaka moana, the hulls of the vaka motu are made of e-glass and epoxy resin as it would be environmentally irresponsible to build boats with wood nowadays.

Vaka Motu “Okeanos” © Okeanos – Foundation for the Sea

The solar installation consists of eight solar panels with 230 W each, offering a total capacity of 1.9 kW. With normal sunlight the boat can be driven with a speed of four knots. Independent of the sun it can run 20 nm, equivalent to four hours with five knots by using a LiPo 48V battery system with a capacity of 2x 15 kWh. It thus has a sufficient cruising range to reach ports or other safe places even when there is no wind or during the night. It uses two electrical pods of 10 kW power each. The pods are fixed under the deck and can be lowered to the water and thus be used for propelling and for recharging batteries during sailing. There are two independent systems so that there is a redundancy if one system fails.

We are also operating one vaka motu with 2x 15 kWh electrical inboard engines that may reduce the maintenance work, allow a higher speed and greater range. And now in 2016 we are starting test runs with 20 HP Volvo diesel engines operated with coconut oil. This would enable the islands to use the abundance of coconuts, however, of course, without using unsustainable plantation products.

The typical distance for inter-island traffic would be 50 to100 nm, but is also designed for long open ocean crossings. It is mainly used as a ferry boat to bring goods from remote outer islands to the central markets, for coastal fishing operations, noise-free whale watching, sightseeing tours for tourists and can even operate as a floating school-bus.

It contains a very spacious deckhouse, which is only 1.45m high, but offers enough space to give eight passengers shelter against sun, rain and wind. At the same time it provides space for a navigational area and two pilot berths. For the wellbeing of crew and passengers it is equipped with a special galley area in the port side and also with a functional toilet with a black water tank on the starboard side.

The two vaka motus that currently operate in the Pacific were built in New Zealand for practical, technical, design, surveillance, safety-at-sea testing and construction reasons. However, in order to gain experience it would be beneficial also if they were to be built locally on small islands. The materials that are used, mainly wood, lashings, sails, ropes etc can all be sourced locally.

The production, either with fibreglass or jute which is just in a testing phase, is relatively simple and can be handed over easily to local people due to a mould that is easily transportable in small containers and helps to build the hulls out of fibreglass after adequate training.

The main impetus behind the vaka motu was to become the typical working boat for the Pacific, built and operated by the islanders themselves.

This would not only revive old skills, knowledge and tradition but would also provide a lot of opportunities for young people to stay on the islands and find a profession that provides a good balance of challenges and benefits.

The Vaka Hapua

The vaka hapua - a boat for transportation within lagoons - is a completely new construction including most modern technology and design. The first is built at Salthouse Boatyard in Auckland/ New Zealand and will be delivered 9/2016.

It combines the most current and innovative use of the fibreglass with epoxy resin construction process with a solid solar technology and electric power system.

Its range of use is robust – from daily inter-island transportation of passengers, shuttle services for tourists between the airport and their hotel, reef excursions, whale watching, sunset tours and dive operation trips to school bus shuttle services, express cargo operation or funeral services. The vaka hapua can ferry 16 passengers with luggage and little cargo.

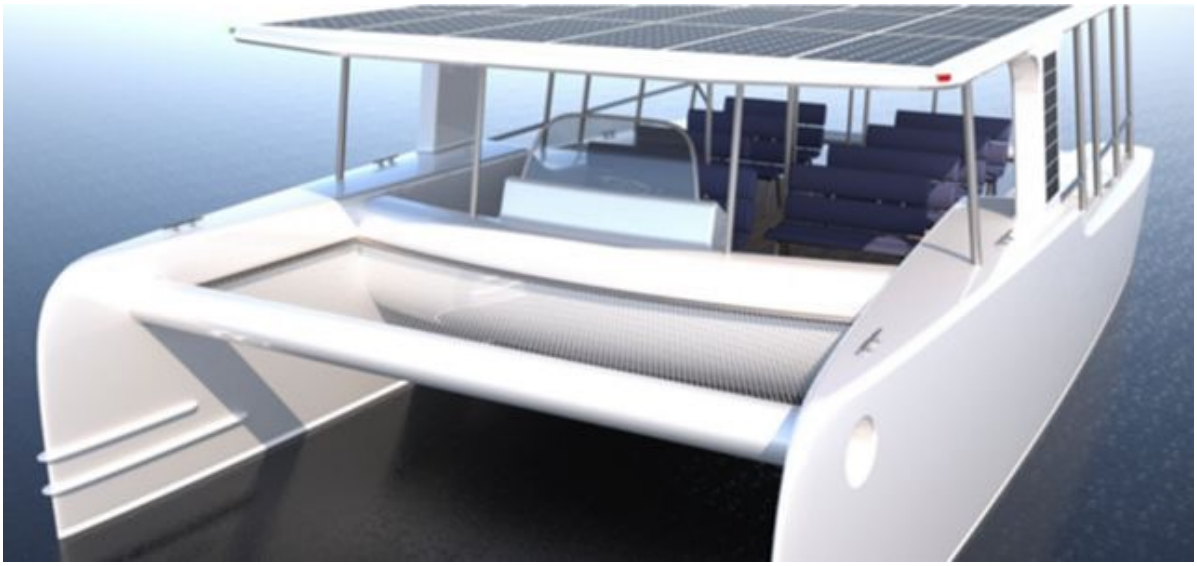
The vaka hapua provides all islands a unique chance to convert their energy production to alternative energy. This implies the creation of an additional significant business market as the conversion from boats powered by fossil fuel to electrically driven boats on a larger scale requires an additional energy supply during the night. The boats are mainly used during the day and the batteries can be fully recharged within 10 to 12 hours during the night. The required energy can easily be created, stored and then charged by renewable energy sources. According to first assessments and experiences the operating costs of the vaka hapua are significantly below those of conventional out boarders or in boarders at a fraction of the cost of conventional power – about 20 percent.

This means, compared to 100 dollars expenses for fuel, oil and maintenance for conventional motors, the total costs for electricity and maintenance for the vaka hapua are only about 20 dollars. Thus, the electric drive provides serious economic advantages as well as the massive ecological reasons for reducing dependency on fossil fuel imports.

It has a length of 32 ft (11.8 m), 16 ft beam (5.8 m), 2 ft (0.6 m) draft and a maximum weight of six tons. The roof incorporates 36 solar panels that provide roughly 10 kW solar energy during sunshine.

The vaka hapua is propelled by 2x 25 kW electrical inboard engines powered by a LiPo 144V battery system with a capacity of 2x 60kW, enabling the boat to operate in all weather conditions (no sunshine, heavy rain, at night) at eight knots for a maximum of six hours, which means that even under worse conditions it has an operational range of 50 nm. The maximum speed can be up to 12 knots, however, this reduces the range accordingly. The vaka hapua is driven only by the sun and operates with six knots.

It runs very smoothly and almost soundlessly. The electrical engines are much valued as they require very little maintenance and are robust in operation.



Vaka Hapua © Naval DC

After an initial test phase, the vaka hapua can also be constructed by boat builders on the islands as the hulls and decks are made of fibreglass and epoxy resin. Installation of the solar panels and electric propulsions requires training of local experts; however, our four-year experience in working with this propulsion system with the same technical arrangement has demonstrated that they are very robust and can easily and rapidly be maintained and supervised by local skilled workers.