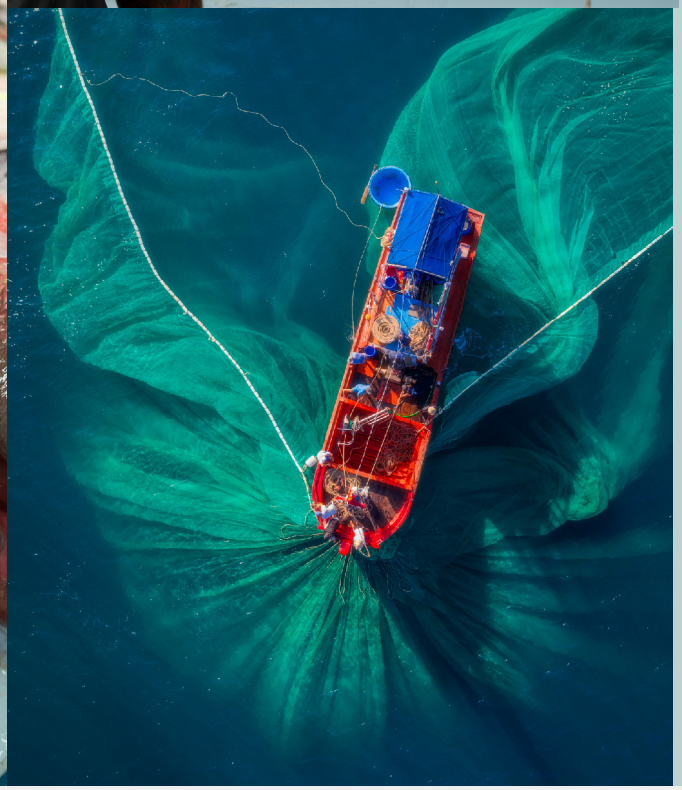

A Sustainable Blueprint for the Connected Fishing Vessel

Cost-effective voice and data services that can be bundled and scaled

January 2024

A SUSTAINABLE BLUEPRINT FOR THE CONNECTED FISHING VESSEL

Cost-effective voice and data services that can be bundled and scaled

"Digital sustainability can be implemented at national level and scaled globally. Operating costs can start at less than USD$10 per month"

Vessel owners and workers can benefit from affordable voice and data services. These solutions, which can be bundled and scaled according to need, are based on an independent assessment of available communication services in markets where commercial fishing is a major contributor to local economies.

Geeks without Frontiers (GWF), a not-for-profit, technology-neutral organization, has collaborated with maritime stakeholders since 2019 to develop an implementation framework for cost-effective digital solutions on fishing vessels that a) encompasses the public-policy needs of government, b) delivers returns on investment (ROI) for the private sector, c) makes grievance mechanisms accessible, while also improving the well-being of workers and their families, and d) promotes environmentally sustainable fishing practices.

GWF's work, completed in 2022, defined economical and resilient internet connectivity options to be used in the fight against illegal, unreported, and unregulated (IUU) fishing and for the improvement of human welfare for fishing vessel workers. Fueled by the strategic pillars outlined in USAID's Oceans And Fisheries Partnership [1], the project laid the groundwork to bring information and communication technology (ICT) and internet connectivity to fishing vessels, to address human rights concerns and provide enduring commercial benefits for vessel owners.

SHIP TO SHORE CONNECTIVITY OFFERS SIGNIFICANT REWARDS FOR PRIMARY STAKEHOLDERS

- **Fishers** can stay in touch with their family and friends. Labor issues can be addressed through the digitisation of grievance procedures, contracts and payment records. Workers at sea can access on-line training and digital applications such as telemedicine.
- **Vessel owners** gain greater operational visibility and improved ROI, through the implementation of navigation system, vessel geo-positioning, as well as weather and fish monitoring technology. These solutions can help to reduce bycatch, enhance operational safety and accountability. Artificial Intelligence (AI) can facilitate the recording of catches and enable greater alignment with health and safety requirements by regulating working hours, helping compliant fleets to gain a competitive advantage in the marketplace. Connectivity streamlines operations and increases efficiency by enabling quicker decision-making and faster response times when problems arise.
- **Retailers and Consumers** benefit from enhanced traceability throughout the supply chain, which advances biodiversity, increases the assurance of food security and promotes ethical business practices.
- **Governments and local administrations** can use digital connectivity to address IUU, overfishing and seafood fraud, by supporting customs compliance through greater accountability and traceability. Furthermore, dark vessels can be identified by combining earth observation data and GPS to detect movement on the seas, even if a vessel has disabled its Automatic Identification System (AIS).

RECOMMENDATIONS

GWF's work in Thailand and Fiji indicates that the coverage of wireless operators supports the viability of near-shore connectivity, with satellite offering a feasible far-offshore solution. Harnessing private sector innovation through the N50 Project Global Alliance [2], GWF has developed a technology toolkit that can be matched to diverse operational budgets.

The following off-the-shelf solutions are available today:

1. **Low/no airtime options:** existing telecommunications infrastructure, can deliver near-shore voice and website access for crew and bridge staff. Local providers can expand into new markets, with pricing and communication plans tailored for the fishing vessel.

2. **Stand-alone or plug-in modules:** metered technologies can provide a Wi-Fi interface for crew and bridge staff to connect to Low Earth Orbit (LEO) satellite networks for storing and forwarding messaging services. While video and high-resolution image sharing would not be possible, this option provides a resilient and cost-effective solution to enable worker connectivity at sea.

3. As anticipated, LEO satellite connectivity - including SpaceX's Starlink and Eutelsat's OneWeb - has become increasingly accessible, enabling higher throughput, lower latency and greater responsiveness than today's geosynchronous satellites. It offers simple internet connectivity at a lower cost and dynamic bandwidth allocation.

Guidelines for designing the connectivity solution include:

- Accessibility for all crew members
- User interfaces for all of the main languages spoken on the vessel
- Avoidance of processes such as tickets or Wi-fi vouchers, which act as a debt burden for the worker
- Ease of installation and maintenance
- Scalability, so that additional services can be added as required

Note that an effective awareness campaign should accompany the launch of such a platform, to ensure proper usage and encourage adoption.

ATTRACTING INVESTMENT

GWF's extensive research has demonstrated that digital sustainability can be implemented at national level and scaled globally. Installation costs for the connectivity solutions remain affordable, and operating costs can start at less than USD$10 per month. Local governments and communities alike acknowledge the benefits that internet access can offer the fishing industry as a whole and show a willingness to engage to secure the future success of this economy.

GWF's digital sustainability blueprint includes consistent, off-the-shelf, and proven connectivity that can scale to address growing needs and new applications in the future. These solutions can be developed and packaged according to the requirements and budgets of vessel owners, giving stakeholders the opportunity to reap the rewards of improved operational efficiencies and greater ROI, while meeting the expectations of worker voice and grievance mechanisms.

NEXT STEPS

To demonstrate the viability of a responsible blueprint for the connected fishing vessel, field implementation of the above solutions is required for an extended period (at least 12 months) in multiple geographies.

Critical success factors include:

- Involve retailers as a key stakeholder
- Focus on a specific fish type (tuna, for example)
- Compare by vessel type: a) distant 50-meter-longliners and b) smaller vessels
- Engage with local labor associations, vessel owners, and social service organizations
- Define appropriate incentive mechanisms for worker participation
- Include, as relevant, national and regional bodies to standardize connectivity solutions

If your organization would like to be a forerunner in this ground-breaking initiative for a sustainable, connected fishing industry, contact Geeks without Frontiers travis@geekswf.org.

SUSTAINABLE BLUEPRINT FOR THE CONNECTED FISHING VESSEL SOLUTION OVERVIEW

	Nearshore "airtime"	"Connectivity Box"	Metered Technologies	LEO Satellite
Description	Extends coverage up to 30 km (GSM) and 100 km (LoRa)	Carry-on/off box equipped with WiFi and/or cellular data connection	Low latency connection for store/forward messaging	High-speed, low latency broadband from anywhere (subject to availability)
Use / Application Fit	Wi-Fi crew and bridge staff	Once the terrestrial connection has been lost.	Wi-Fi Interface to crew and bridge staff via smartphone.	Basic internet connectivity
HW / SW Needs	Stand-alone or plug-in modules	Native support for vessel-wide Wi-Fi. Houses "plug-in" modules for GSM, LoRa, Swarm-VHF, and L-Band SBD	Small low-cost, low-power embeddable satellite modem	Antenna and modem
Data Transmission	Mid (good voice quality and loading of websites	Video Calls possible	Secure text messages	Video Calls possible
Vessel Fit	Small (all) vessels operating within one hundred nautical miles of land	Small (all) vessels operating within one hundred nautical miles of land	Distant long liners fifty meters in length	Distant long liners fifty meters in length
Regulatory	Little or None: uses Public Spectrum	None	None for “high-seas” operation	Available, expanding monthly

[1] https://www.usaid.gov/sites/default/files/2022-05/FS_USAID_Oceans_May_2020.pdf
[2] https://www.n50project.org

ABOUT GEEKS WITHOUT FRONTIERS

Geeks Without Frontiers (GWF) is a platform for global impact. An award-winning 501(c)3 non-profit, Geeks' mission is to promote technology for a resilient world including bringing the benefits of broadband connectivity -health, education, poverty reduction, gender equality and the other UN Sustainable Development Goals (SDG's)- to the estimated 3 billion people who remain unconnected.

Geeks aspires to empower the unserved, including the forcibly displaced, creating Smart Communities and helping to catalyze positive global change. It does this by leveraging the benefits of exponential preparedness technologies as well as data, connectivity and other scalable solutions in a resilient, technologically neutral and sustainable manner; by the creation of innovative regulatory and business models designed to democratize and accelerate connectivity and through education and training, thought leadership, advocacy and public and private advisory support.

Geeks without frontiers
technology for a better World

www.GeeksWF.org

ABOUT THE N50 PROJECT

Digital Participation for the Next 50%

The **N50 Project** accelerates digital adoption and community enrichment through innovative applications, network design, and business models to enable the next 3 billion people to participate in the digital world. Broadband adoption will be accelerated and sustained, globally, through commercial, non-profit, government, and community partnerships.

Geeks Without Frontiers serves as the Project Management Office for the N50 Project.

N50

www.N50Project.org