Deep sea mineral exploration

Maersk Supply Service & DeepGreen deliverables

- AUV site surveys
- Box coring
- Bulk sampling
- Biological studies
- Metocean & environmental studies
- Mineral recovery testing

Maersk Supply Service is working with DeepGreen and its subsidiary, NORI, to bring marine knowledge to the development of a method for harvesting small metallic rocks, or 'polymetallic nodules', in a sustainable way.

The aim of the offshore work is to better understand the quality and quantity of nodules present and how to extract them in the most environmentally sound way. Throughout five marine campaigns over the course of 2018 and 2020, Maersk Supply Service is supporting the project with two vessels, project management and engineering services. The first four campaigns are centred around environmental studies and documentation of the seabed, and the fifth campaign is focused on mineral recovery testing.

Sustainable harvesting
Recovery method with both environmental and societal benefits

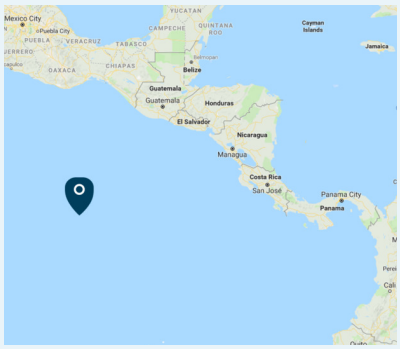
As opposed to terrestrial mining, deep sea mineral harvesting eliminates the risk of social displacement and deforestation. DeepGreen's patented zero-waste processing technology will allow it to produce high quality nickel, copper, cobalt and manganese products. Silica, iron and nitrate liquid products can be used by the cement and fertiliser industries.

Enabling renewables
Essential metals for clean technology and batteries

Metals extracted from the polymetallic nodules in the Clarion Clipperton Zone are essential to building sustainable technologies and infrastructure necessary to raise the living standard of the growing global population. The metals are needed to produce electric car batteries, wind turbines, solar power and smart phones.

Full-scope solution
Project management and engineering

In addition to the vessel services, Maersk Supply Service is project managing the offshore campaigns, which includes both planning, the required procurement, interface management with sub-contractors, regulatory bodies and any other third parties. We also provide HSEQ coordination, cost control, document control, and offshore operational support.



Key facts

Client:

Nauru Ocean Resources Inc. (NORI), a subsidiary of DeepGreen Resources

Project:

Environmental studies and nodule recovery planning and evaluation

Location:

Clarion Clipperton Zone, Pacific Ocean

Water depth:

4000 - 4500 m

No. of vessels used:

2

Project timing:

2017 to 2020

Operations:

AUV site surveys - Box coring - Bulk sampling - Biological studies - Metocean & environmental studies - Mineral recovery testing

Safety performance:

Zero Lost Time Incidents

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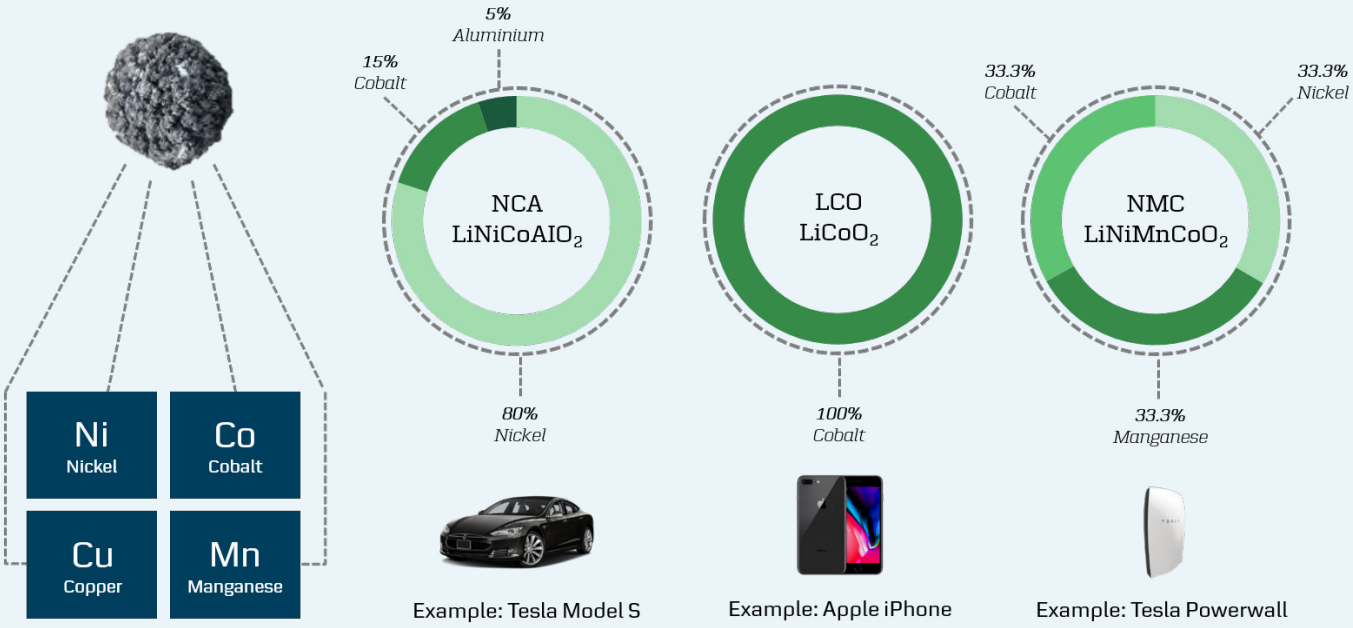
Polymetallic nodules contain metals for clean technologies and batteries



Example: Tesla Model S

Example: Apple iPhone

Example: Tesla Powerwall

Source: DeepGreen

End-to-end project management of:

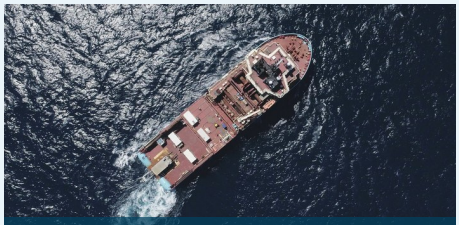
Campaign 1
- Duration: 63 days
- POB: 38
- Work scope: AUV survey and box core sampling
- Outcome: 2,314 km surveyed, 45 box cores recovered and approximately 500 kg of polymetallic nodules

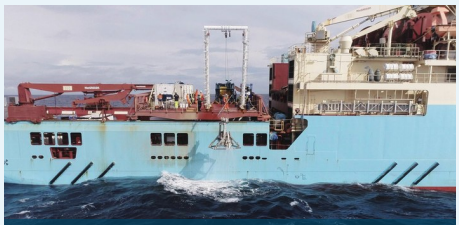
Campaign 2:
- Duration: 56 days
- Work scope: Oceanographic moorings, box coring and bulk sampling

Campaign 3:
- Duration: 101 days
- Work scope: Biological studies, oceanographic moorings and seasonal studies

Campaign 4:
- Duration: 31 days
- Work scope: Retrieve oceanographic data and environmental baseline

Campaign 5:
- Duration: 170 days
- Work scope: Biological studies, oceanographic moorings, prototype nodule harvester testing, site survey


Maersk Launcher during Campaign 1


Deploying box core sampling from Maersk Launcher


Geoscientist measuring nodules from box coring

Maersk Supply Service - Provider of vessels and full service solutions to the energy sector

Maersk Supply Services is a leading provider of global offshore marine services. We bring more than 50 years of hands-on marine experience from vessel operations on a global scale, serving a broad range of clients in the energy sector.

Our Integrated Solutions division delivers full service solutions, which include scoping, planning, subcontracting and execution of marine projects as well as access to in-house cost-competitive vessels with competent and experienced crew that meet the highest standards of quality and safety.

Safe hands. Sound business.

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