MTCC AFRICA
Maritime Technology Cooperation Centre

CAPACITY BUILDING FOR CLIMATE CHANGE MITIGATION IN THE MARITIME SHIPPING INDUSTRY

Pilot Projects on Emissions Reduction

Madagascar National Workshop | 16 – 17 May 2018 | Toamasina

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Pilot Project
Onshore-Power-Supply (OPS)
Cold Ironing / Shore Connection / Shore-to-Ship Power (SSP) / Alternative Maritime Power (AMP)

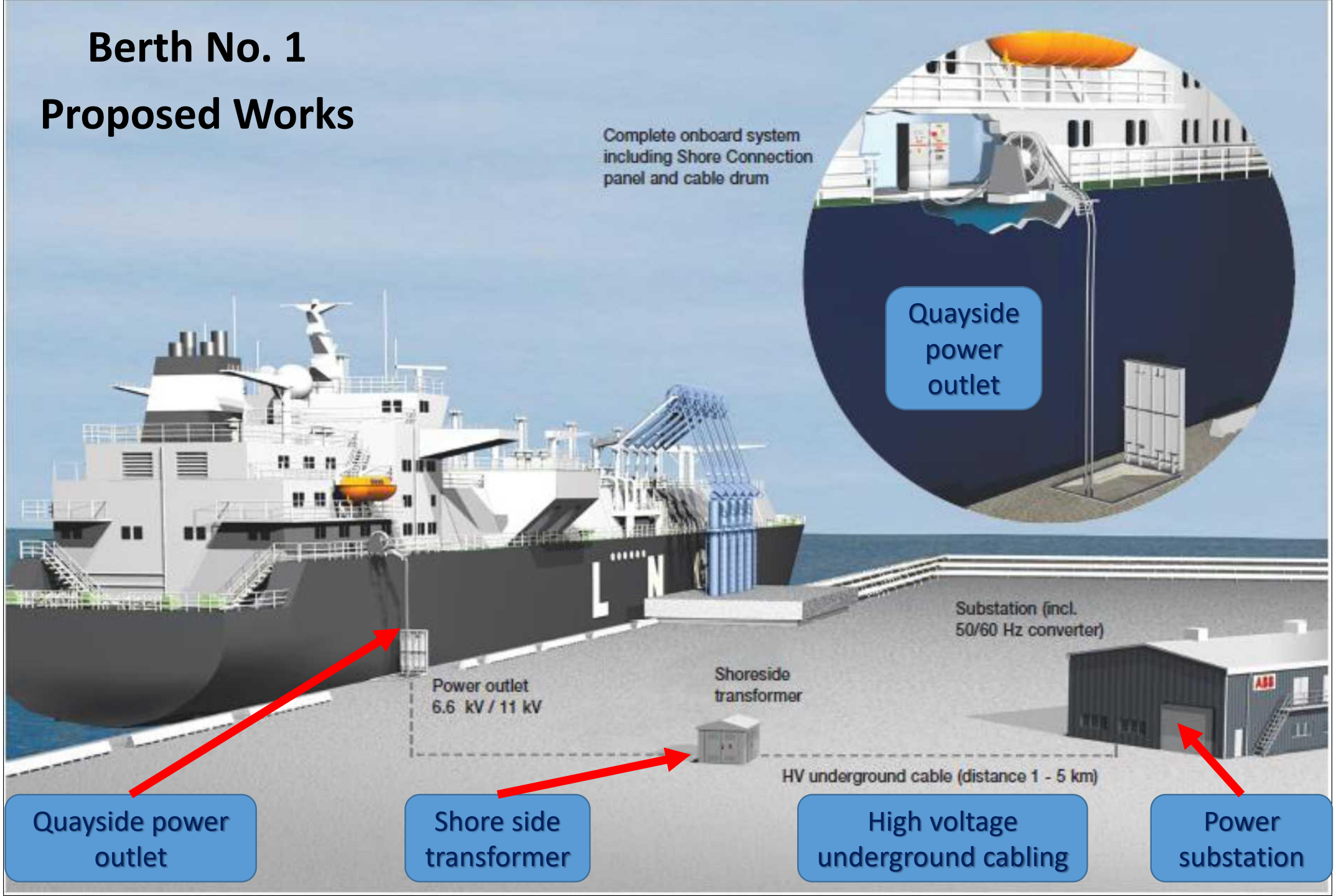
This project is financed by the European Union
and implemented by the International Maritime Organization

Pilot Project - Uptake of ship energy efficient technologies and operations

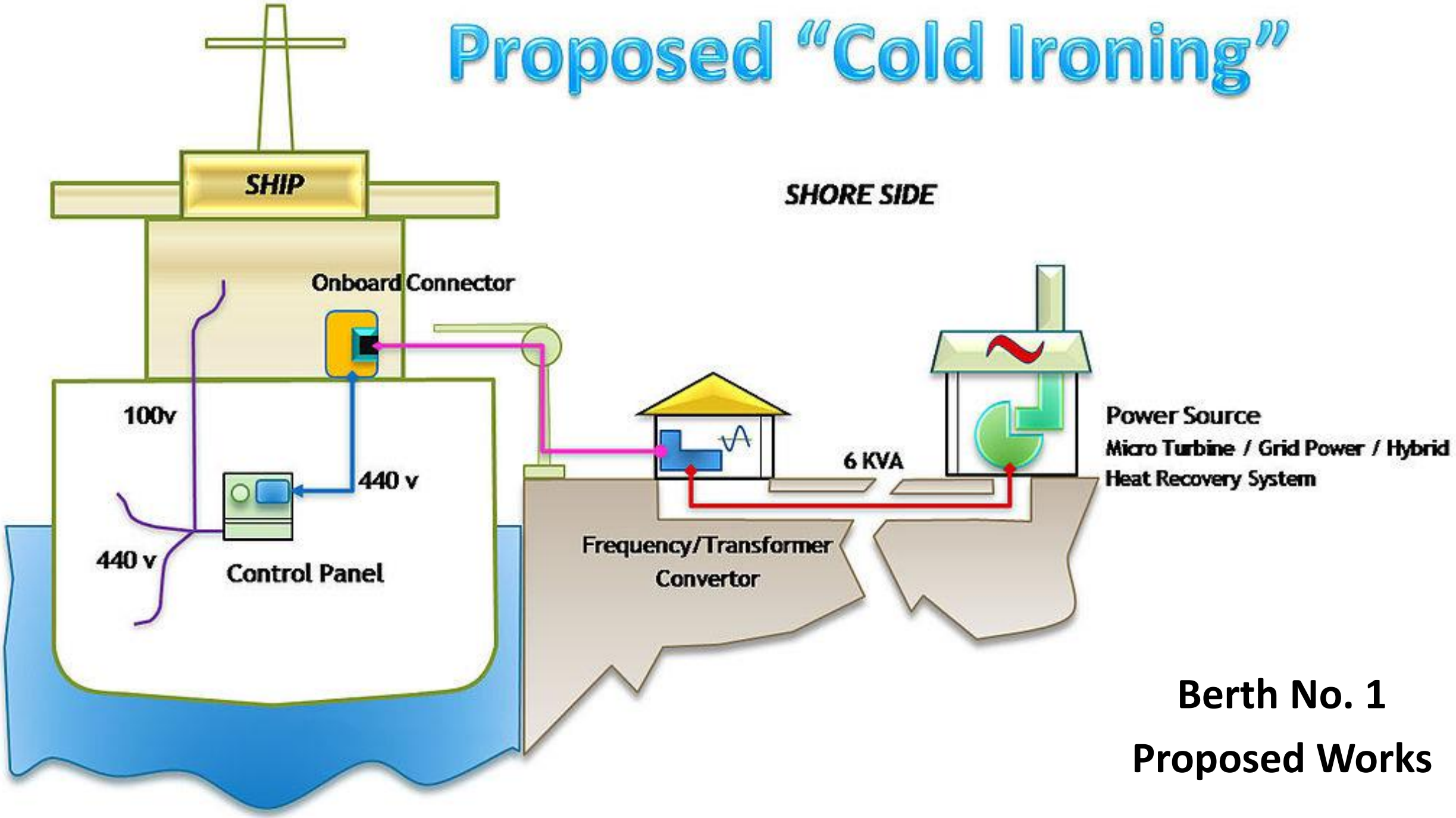
- A ship requires continuous supply of power for emergency equipment, refrigeration, cooling, heating, lighting, and other onboard equipment.
- Onshore-Power-Supply (OPS), Cold Ironing / Shore Connection / Shore-to-Ship Power (SSP) / Alternative Maritime Power (AMP) is a concept whereby Power required while a vessel is at berth is supplied by the shore utility provider rather than running the ship's auxiliary engines.
- OPS results in reduction of GHGs, noxious emissions, noise, vibrations, etc. which improves the Port's environmental conditions.
- It also provides a window of opportunity for inspection and maintenance work on the engines.

Berth No. 1

Proposed Works



Proposed "Cold Ironing"



Berth No. 1

Proposed Works

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Pilot Project
Fuel Consumption Data Collection

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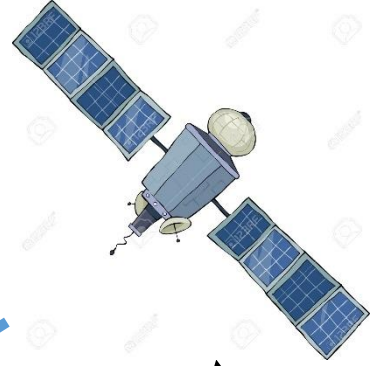
Pilot Project - Fuel Consumption Data Collection and Reporting

- (Carbon emissions = **Fuel consumption** × **emission factor**)
- Assessment of the impact of GHGs from the maritime shipping industry using Energy Efficiency Operation Index (EEOI) of the ships
- Fuel consumption data collection from volunteer ships both at sea and at port and calculation of EEOI and EEDI
- Monitoring of GHGs threshold of the port area
- Demonstrate the close relationship between GHG emissions and ship energy efficiency
- Send data collected anonymously to IMO, KMA and NEMA to facilitate policy formulation towards mitigating the effects of GHG emissions on climate change from the shipping industry.

Maritime Data Collection Methods

- A: Bunker Fuel Delivery Notes (BDNs) and periodic stocktakes of fuel tanks (When ship is moored at port)
- B: Bunker fuel tank monitoring on board (Continuous data collection - Manually or Automatically)
- C: Flow meters for applicable combustion processes
- D: Direct CO_2 emissions measurements

Pilot Project
Fuel Consumption Automated Data Collection and Reporting



Cape Verde

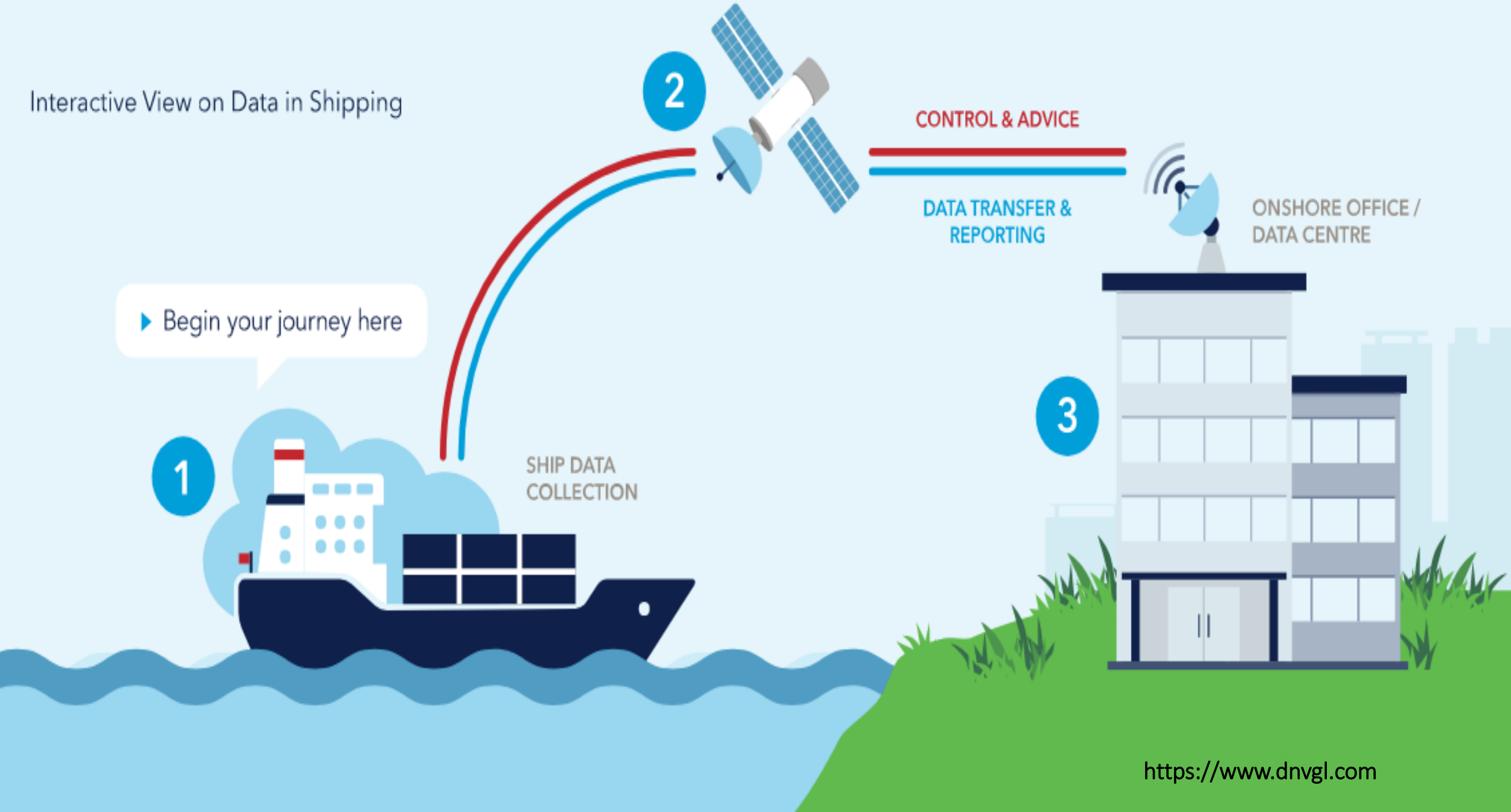
São Tomé and Príncipe

Seychelles

Comoros

Mauritius

Madagascar


Interactive View on Data in Shipping
2
CONTROL & ADVICE
DATA TRANSFER & REPORTING
ONSHORE OFFICE / DATA CENTRE
Begin your journey here
1
SHIP DATA COLLECTION
3
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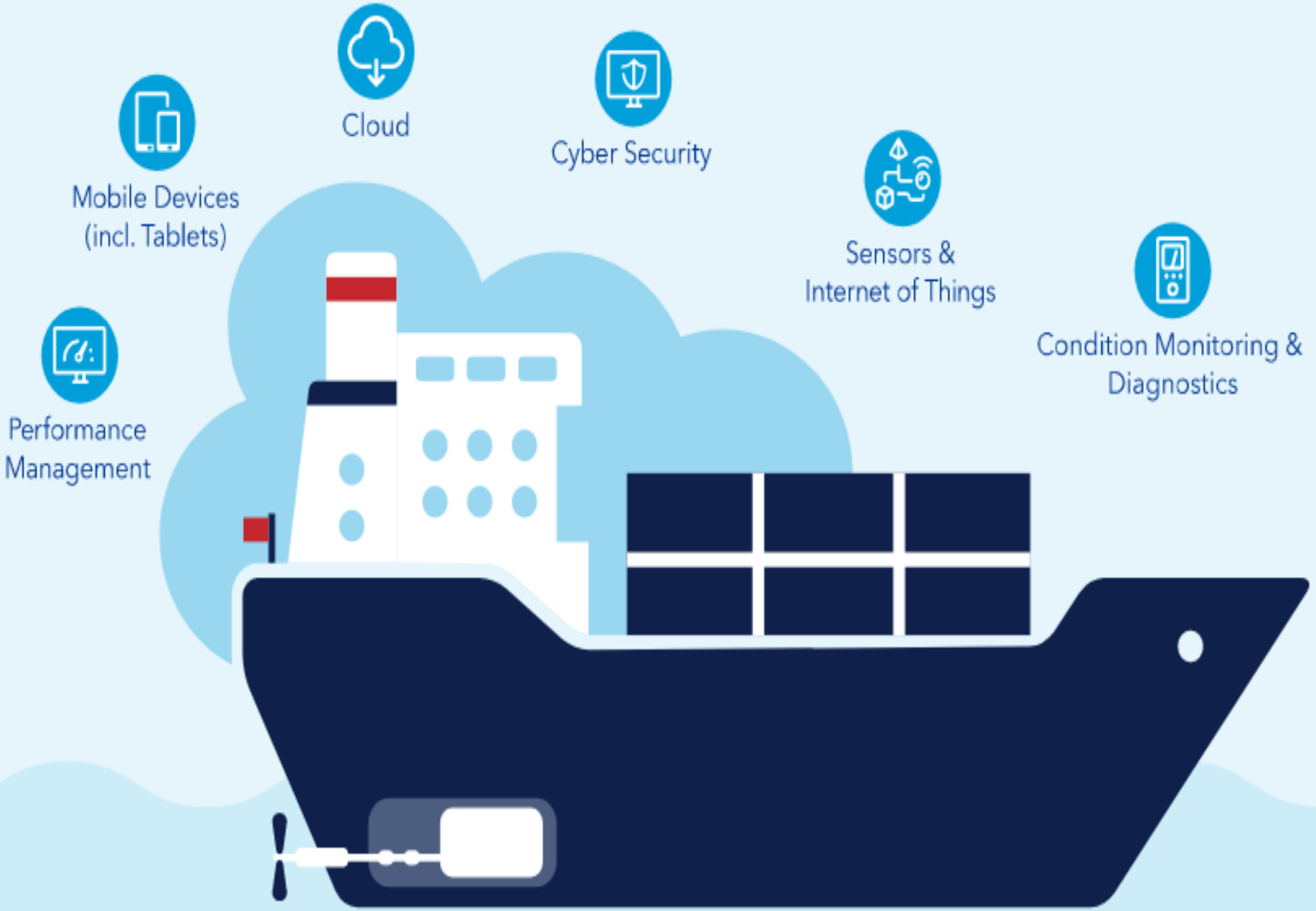
‹ Overview



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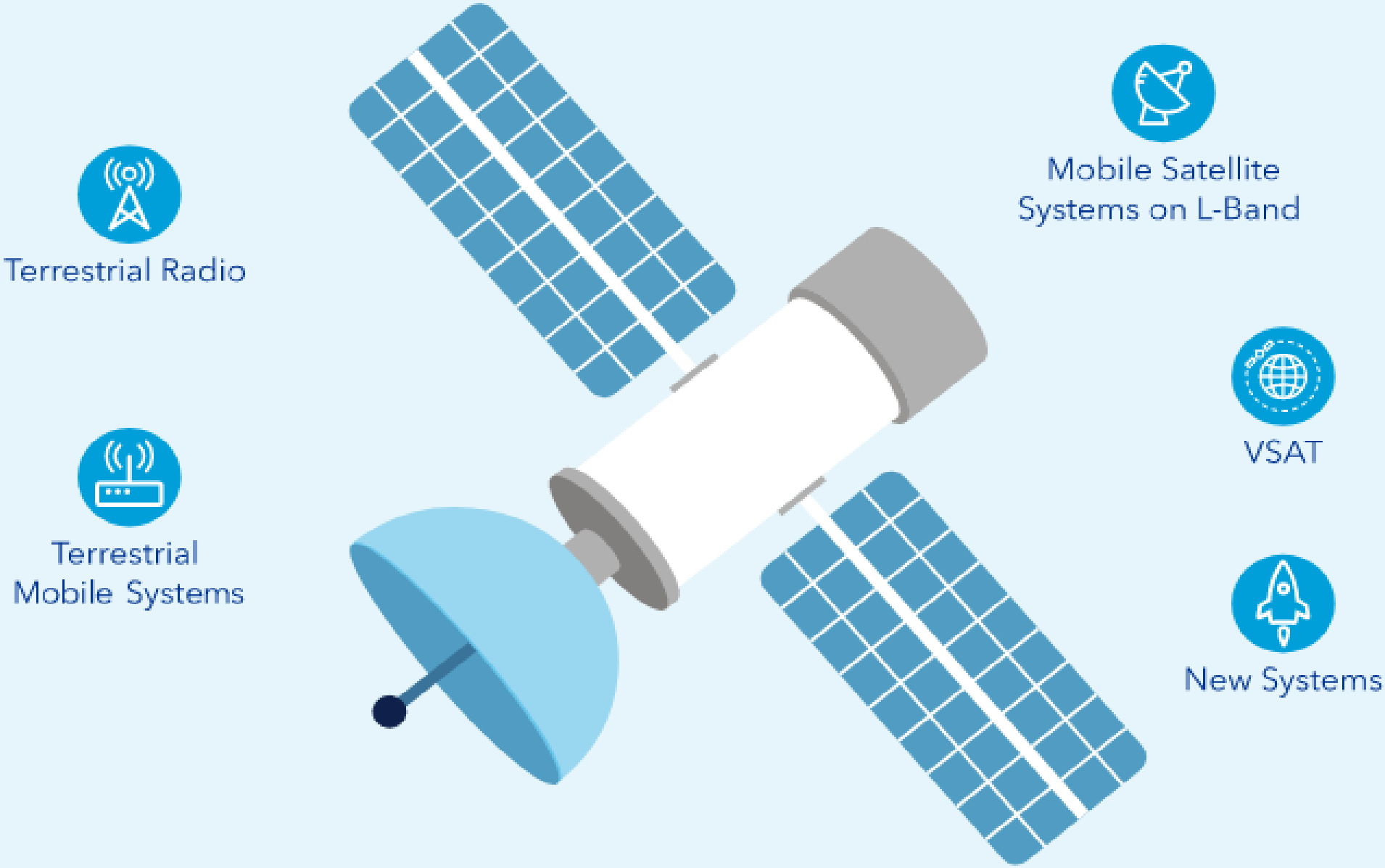

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Onshore Control Centre
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Pilot Project
Fuel Consumption
Automated Data Collection
and Reporting

Base Station

Processing of collected data

- Calculation of EEOI (real time and period average) as per MEPC.1/Circ.684 (17 August 2009).
  - The basic expression for EEOI for a voyage is defined as

$$\text{EEOI} = \frac{\sum_j FC_J \times C_{Fj}}{m_{cargo} \times D} \qquad \text{Eqn 1}$$

  - Where average of the indicator for a period or for a number of voyages is obtained, the Indicator is calculated as:

$$\text{Average EEOI} = \frac{\sum_i \sum_j (FC_{ij} \times C_{Fj})}{\sum_i (m_{cargo,i} \times D_i)} \qquad \text{Eqn 2}$$

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Air Quality Measurement

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Figure 4-5: Distribution of traffic from port to road network (Based on City Master Plan surveys 2015)

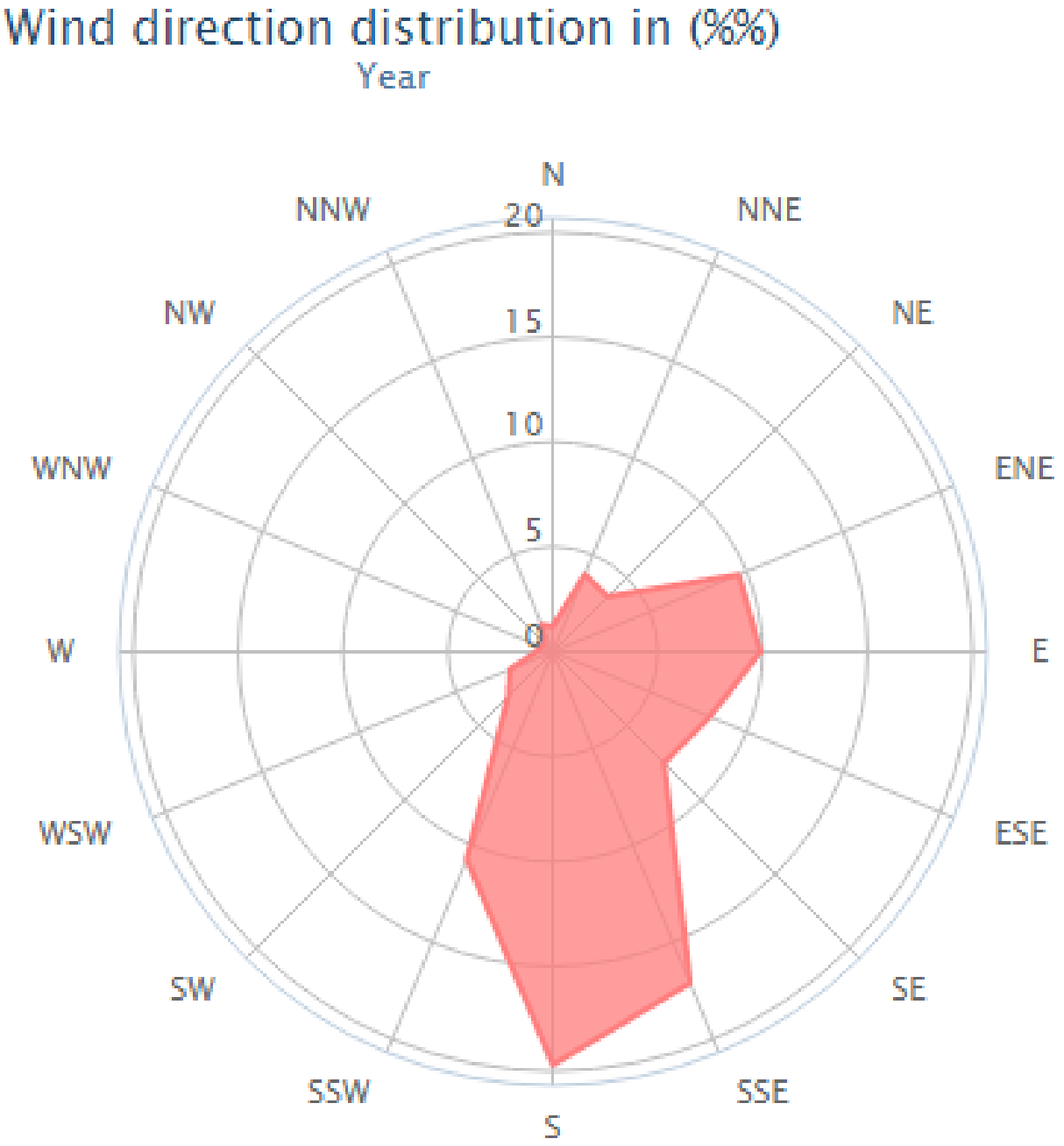
Mombasa Town Emissions from Maritime

Figure 5-2 Overview of planned infrastructure investments in Mombasa

Mombasa Town

Wind-Rose

Showing influence from the wind patterns



Capacity to Measure Air Quality

Measurement of Emissions

Parameters Monitored

- PM2.5, PM10
- Black carbon
- Ozone (O_3)
- Carbon monoxide (CO)
- Carbon dioxide (CO_2)
- Sulphur Dioxide (SO_2)
- Nitrogen Dioxide (NO_2)
- Nitric Oxide (NO)
- Hydrogen Sulphide (H_2S)
- Methane (CH_4)
- Ammonia (NH_3)

GMN | The Global MTCC Network

A global network for energy-efficient shipping

THANK YOU!

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