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**Climate Change Adaptation for Seaports
in Support of the 2030 Agenda
for Sustainable Development**

27–28 October 2020

**Environmental Monitoring for Ports in
Caribbean States**

Presentation by

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Climate Change Adaptation for Seaports in Support of the 2030 Agenda for Sustainable Development

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Presented by

David Smith
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Environmental Monitoring in the Transport Sector

Abstract

- ❑ The transport sector is critical to the sustainable growth of all SIDS
- ❑ Conventional wisdom has focused on financial maximisation in the running and operation of ports
- ❑ Given the anticipated inexorable impacts from climate change, societal requirements for improving resilience, and ecological fragility, a new paradigm is suggested
- ❑ Monitoring of environmental parameters is recommended to allow port operators to better understand the natural environment in which they operate (including changing climate trends), and their impact on the surrounding land and sea

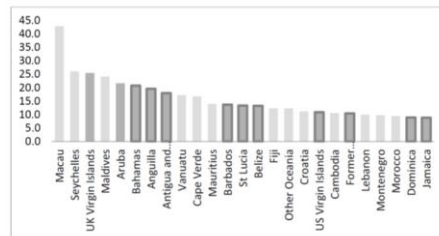


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Significance of Transport Sector - Airports

- ❑ Heavy dependence on air ports to bolster the tourism sector
- ❑ Using total value-added contribution + indirect/induced contributions, the Caribbean has 3x the world average
- ❑ 12 out of the top 25 contributing countries in the world are from the Caribbean

Figure 1. Contribution of Tourism and Value Added to GDP: Top 25 Countries



Source: World Travel and Tourism Council



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Significance of Transport Sector - Seaports

- ❑ Seaports play a critical role in the movement of bulk cargo and transshipment of goods
- ❑ Several purpose built cruise terminals have been developed in the Caribbean (support to the tourism sector)
- ❑ Cruise sector has grown, on average, 8.5% per year



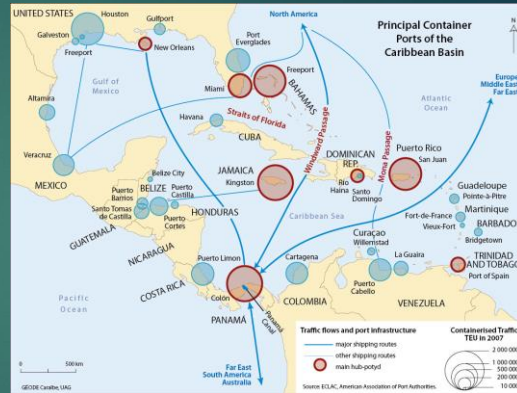
Transshipment Triangle



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Significance of Transport Sector - Seaports

- A search for Caribbean ports reveals there are 175 ports in the region
- These include public sector owned and private sector managed
- Public sector – container; transshipment; cruise; LNG; Oil, etc.



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Significance of Transport Sector - Seaports

- Private sector – bulk (cement, limestone, etc.); ore (bauxite)
- The sheer number of ports in the region underscores the importance of sea transport to the region, and in fact to most SIDS
- The table shows the distribution of ports in this archipelago

ISLAND	No. of PORTS
Dominican Republic	17
Belize	1
Haiti	11
Jamaica	22
Cuba	15
Netherland Antilles	16
Montserrat	1
Martinique	6
Puerto Rico	22
Cayman Islands	2
Guadeloupe	7
US Virgin Islands	7
British Virgin Islands	4
Antigua and Barbuda	2
St Kitts & Nevis	3
Trinidad & Tobago	11
St Vincent and the Grenadines	10
St Lucia	4
Barbados	5
Dominican Republic	3
Aruba	4
Anguilla	1
Grenada	1
TOTAL	175



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Expected Climate Change Related Impacts

- ❑ Seaports are vulnerable to direct and indirect climate change impacts
- ❑ These could include: sea level rise; higher wind speeds during operating conditions; more damaging storms; extreme rainfall; flash flooding, heat waves, storm surges, etc.
- ❑ These changes can affect operational viability for things like ship movement and mooring, loading and unloading, and dredging when required
- ❑ Supply chain infrastructure such as roads, rail and other intermodal hub connectors may also be seriously affected
- ❑ In short, resiliency in port operations directly benefits national resilience building after natural disasters



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Environmental Monitoring of Seaports

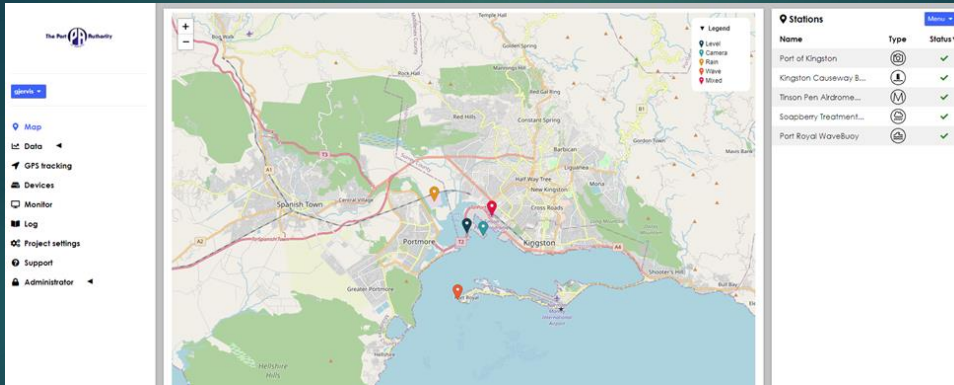
Some of the parameters that should/could be monitored include:

- ❑ *Operational Impacts* – Waves; Currents; Water levels; Winds; Rainfall intensity
- ❑ *Ecological Impacts* – Water quality; Terrestrial and aquatic impacts (habitat alteration and diversity); Air emissions; Hazardous materials disposal; Oil management; Underwater noise and vibration
- ❑ *Societal Impacts* – Noise and vibration; changes to adjacent landforms and/or unintended impacts on adjacent enterprise



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A Suggested Approach – 1st Step: Operational

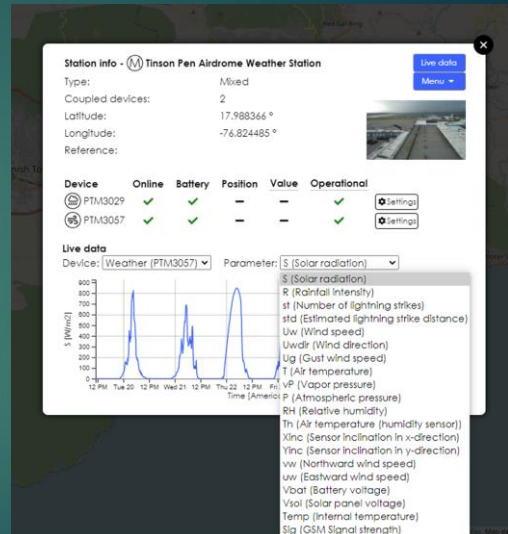
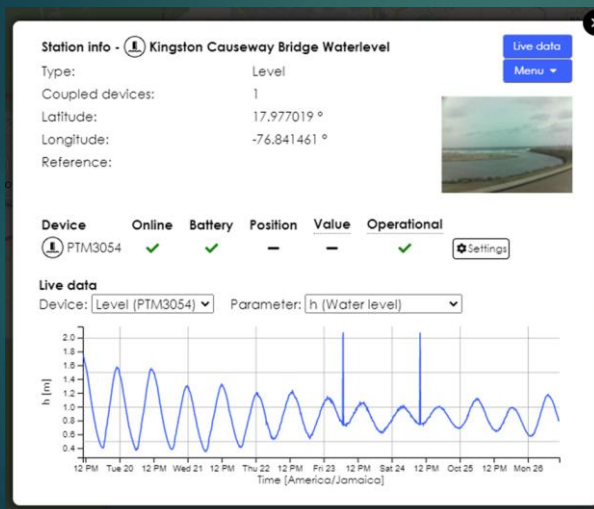


- Proposed real-time monitoring programme for Port Authority of Jamaica (PAJ) at Kingston
- Waves
- Weather
- Water Levels
- Camera



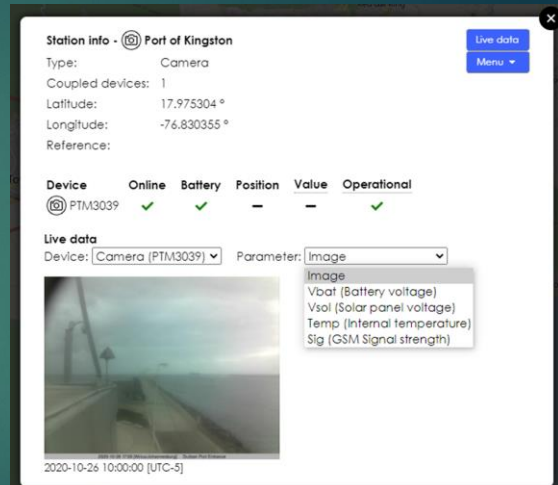
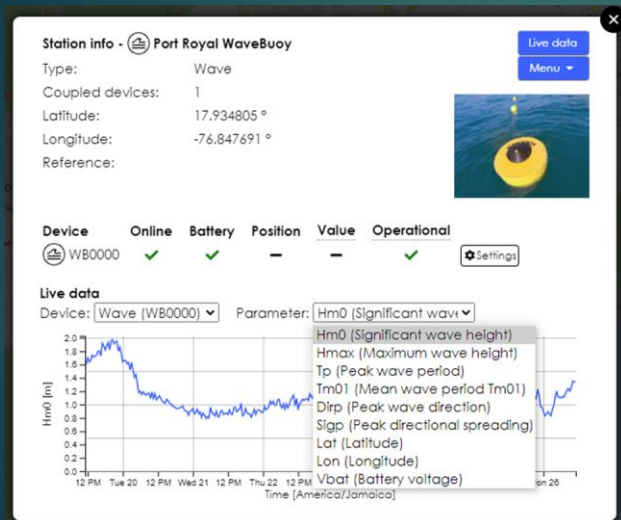
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Environmental Monitoring – Water Levels, Weather



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Environmental Monitoring – Waves, Camera



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Environmental Monitoring in the Transport Sector

Conclusions

- ❑ Environmental monitoring of Caribbean ports is strongly recommended for inclusion in port operations
- ❑ Monitoring includes at least three (3) impact streams
- ❑ Data collection (operational) is possible on a real-time platform to facilitate decision making. Analysis may be done afterwards to identify trends
- ❑ Monitoring of environmental/ecological parameters is recommended monthly and analyses of trends annually
- ❑ Monitoring of societal impacts may be done continuously also on a real-time platform

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▶ Thank you!



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