

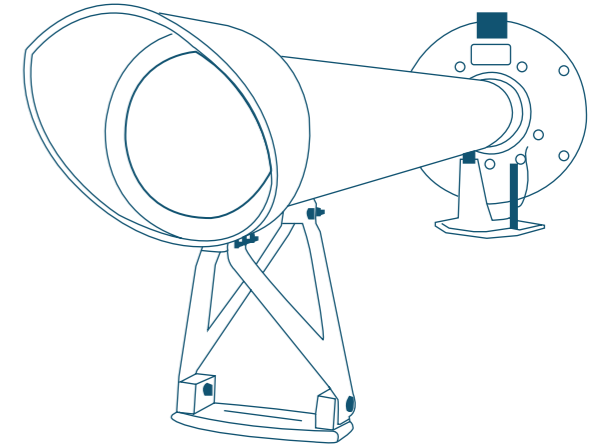
**Design & Installation of a Sector Light**  
for the Port of Bridgetown in Barbados

# 1. Introduction

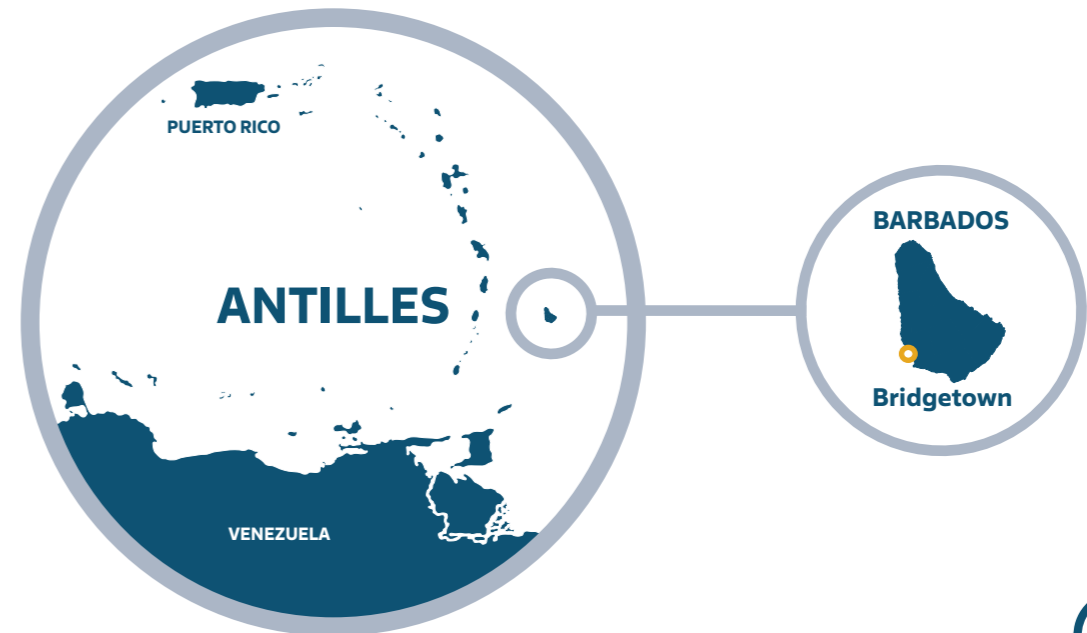
The **Port of Bridgetown** is located on the southwest coast of the island of **Barbados**, it is the island's main seaport and cruise terminal, handling over 1.5 million tonnes of cargo each year and over 600,000 passengers per cruise season.

The port has been undergoing a significant **project for the expansion of berthing capacity**. The introduction of the new **Berth 6** impacted the existing layout of Aids to Navigation, requiring the installation of a sector light to replace an existing set of Front and Rear Leads.

**MSM** and **M-NAV** Solutions were engaged to explore options for the design and installation of a single Sector Light solution.



<b>PROJECT</b>	Upgrading the leading line of the Port of Bridgetown entry with a sector light.
<b>PRODUCT</b>	MEL500L Sector Light
<b>LOCATION</b>	Port of Bridgetown, Barbados
<b>DATE</b>	2023 / 2024



**MEL500L High-precision Sector Light**  
(Port of Bridgetown)



# 2. Challenges

Fitted with range lights, the previous Leads had provided navigational assistance for the approach into the Port. Due to the expansion of port and berthing facilities, the existing Front and Rear Leads would be obstructed to the point that they could no longer perform their specified function as a leading line.

The Front and Rear Lead AtoN were critical for providing directional guidance through the channel entrance and into the port. Whilst there are other supplementary AtoN supporting navigation into the Port it was the Leading Line that provided mariners with critical directional information to establish a safe approach.

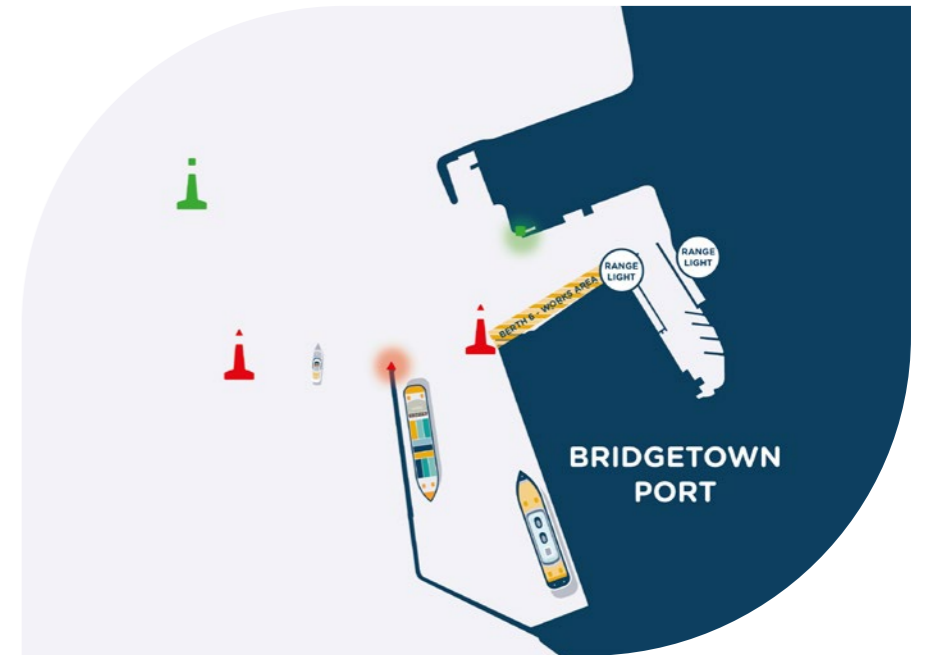
It was preferred that the **existing Leads be replaced by a single Sector Light**, therefore allowing the use of one lantern and one site.

The use of a **Sector Light** negates the requirement for a Front and Rear Lead to form the transit as it **displays different colours over designated arcs, providing directional information to the mariner**, to indicate whether the vessel is on the centre of the navigable channel or near one of both lateral limits.

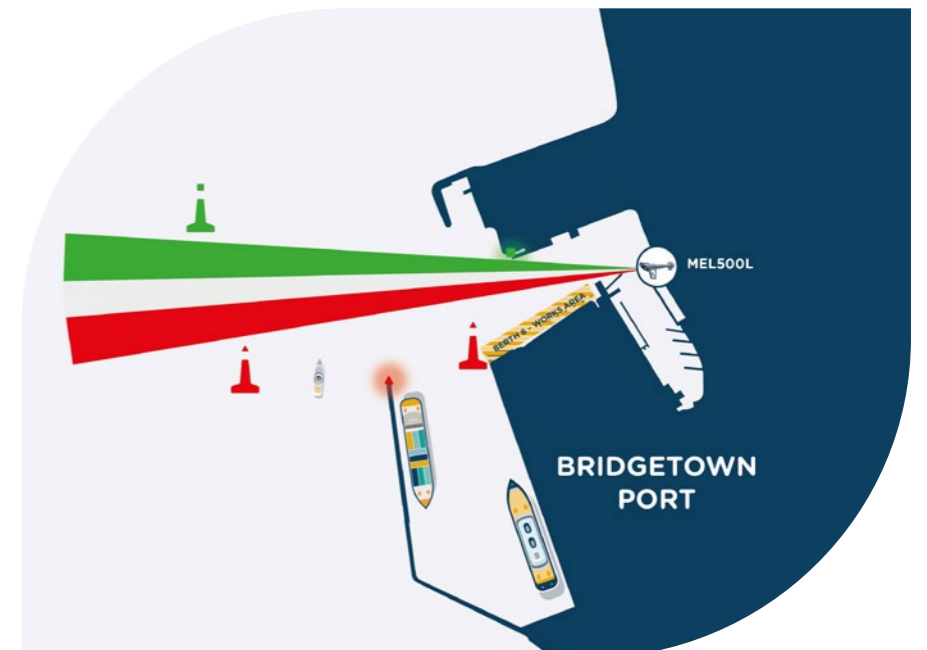
As the Front Lead had already been removed during the expansion activities and the previous bearing was obstructed, **it was necessary to establish a new structure to facilitate installation of a single sector light**. This location was chosen on the shoreline / edge of road, north-west of the current Rear Lead.

- **Replace the two existing Leads**
- **Use one lantern & one site for the new Lead**
- **Provide directional information to the mariner**
- **Use a Sector Light installed in a new location**

*Previous > port AtoN network with the Front and Rear Leads*



*Current > port AtoN network with the MEL500L Sector Light*



## 3. The Solution

After an initial study of the ranges, total sector divergences and port layout, MSM and M-NAV proposed the installation of a **high-precision sector light**, the **MEL500L-15°**, to be installed in the new location on the shoreline, to **ensure the continued provision of directional information to mariners for navigating the passage.**

The new location was identified to provide the optimal bearing for entry into the Port, without too much deviation from the original bearing of 88°.

MSM and M-NAV completed a Sector Design Report, which was submitted Barbados Port Inc's review and approval. **Design of the Port of Bridgetown Sector Light was carried out as per the general design methodology outlined in Section 12 of 'IALA Guideline G1041 – Sector Lights'.**

As tourism and cruise ship revenue is of critical importance to the economy of Barbados, vessel sizes were carefully considered during the design process, noting the reliance of the sector light for providing guidance to cruise ships.

*The installation of a high-precision sector light MEL500L with 15° divergence in a new location.*

After formal review and approval, the Sector Light was manufactured and shipped to Barbados. The system included a back-up power supply capable of providing 10 days of stable, autonomous power in the event of a mains power outage.

**The existing tower** previously used for the Rear Lead / Range was removed, refurbished, and **relocated to the new location nominated in the design.** Installation and commissioning of the Sector Light was completed in May 2024.

Commissioning included an initial alignment from shore by visually checking the bearing through the lantern scope and sighting vessels transiting through the centre of the channel. After the shore alignment, sea checks were carried out at night, to confirm locations of the colour changes between sectors during transverse passes across the channel and then the correct bearing on approach.

The **existing tower** previously used for the Rear Lead / Range was removed, refurbished, and **relocated to the new location.**







## Features of the Port of Bridgetown MEL500L Sector Light



### Day Range of 4 nm

The MEL500L was custom-designed to provide a nominal **day range of 4 nm** and a nominal night range of 13 nm, to suit the navigational requirements of the Port.



### State-of-the-art LED technology

The use of high-intensity LED diodes ensures **minimum consumption, reliable operations** and reduced **maintenance requirements**.



### High accuracy between colour sector boundaries

The coloured sector configuration was customized to suit the Port layout and channel parameters, with an accuracy between sector boundaries of **<0.05°**.



### Horizontal divergence of 15°

The sector was configured to suit the Port's navigational requirements, with the model chosen to provide a maximum **beam width of 15°**.



### Minimum consumption

The advanced LED light source and luminous system provides high efficiency **during both day and night** operations with minimum power consumption. The back-up battery power source, connected to mains power, is capable of providing 10 days of autonomy in case of a mains power failure.



### Easy alignment through the scope

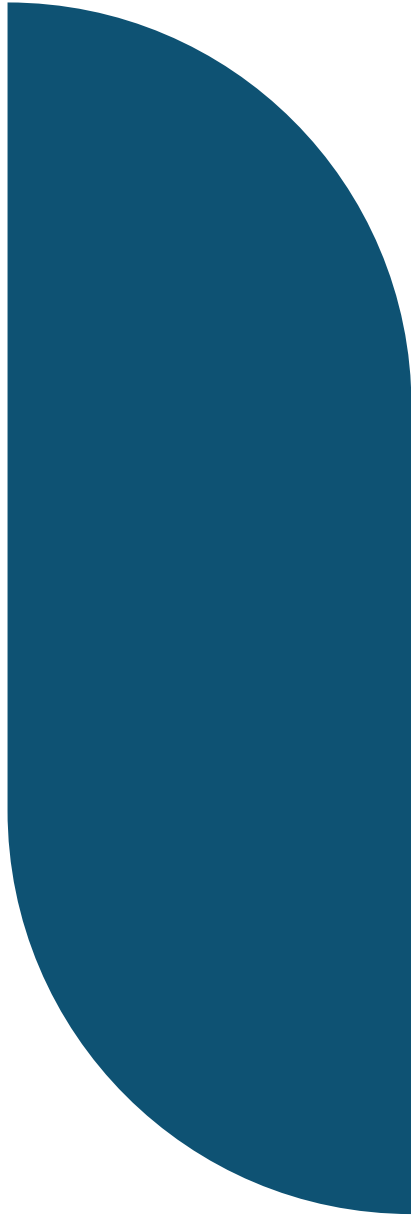
The integration of a **scope** on the lantern assists with the manual alignment of the lantern along the required **bearing**.

## 4. Conclusion

Through a thorough needs analysis and design process, the **MSM** and **M-NAV Solutions** team provided a solution that responded to the Port's expansion challenges, and optimized the AtoN network within the port by using a single high-precision sector light : the **MEL500L**.

An efficient, low-power solution that adapts to the new needs of the Port of Bridgetown, and facilitates and enhances safe and efficient navigation of vessels into the Port.





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