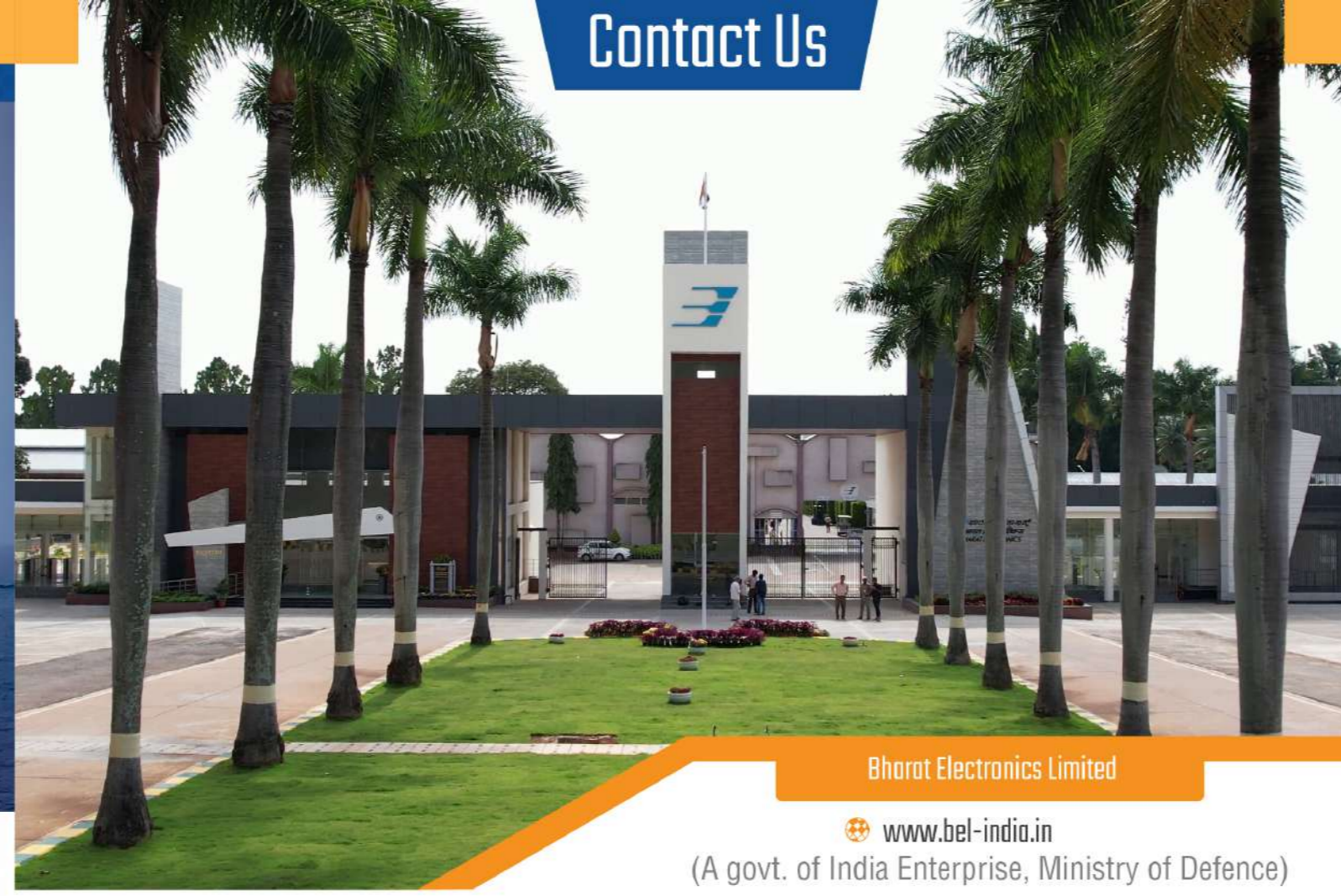




Smart Ship Operations

TRANSFORMING MARITIME AWARENESS THROUGH AI-DRIVEN VISION



Bharat Electronics Limited

www.bel-india.in

(A govt. of India Enterprise, Ministry of Defence)



Smart Ship Operations

Overview

Smart ship operations is an advanced, AI powered maritime intelligence framework that leverages computer vision to redefine how ships perceive, monitor and respond to surroundings.

By seamlessly integrating modules such as Detection and Classification, Warship Finder, Gangway management and Harbour Watch, the system delivers continuous and automated surveillance and situational awareness across shipboard and harbour environments.

Designed for modern naval and strategic maritime platforms, Smart Ship Operations enables faster threat recognition, safer harbour activities and smarter navigation, ensuring mission readiness in both peacetime and high alert scenarios.

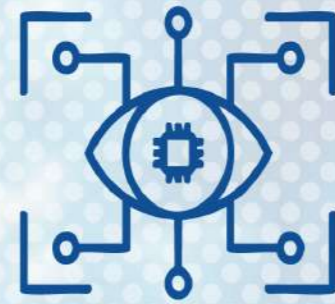
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“ **BHARAT ELECTRONICS LIMITED (BEL)** is Navratna PSU under the Ministry of Defence, Government of India. It manufactures state of the art electronics products and systems for Defence and Non defence Domains. Software solutions for these systems are realised using cutting edge tools and technologies at Software Strategic Business Unit.

SOFTWARE SBU with technically competent resources has been developing AI Based solutions for challenging operational environments. Software SBU is diversified into latest technology domains and also provides Software Assurance Services. ”

AI Based Object Detection and Classification



AI-Based Object Detection and Classification is an advanced AI-driven maritime intelligence solution that transforms ship-borne surveillance, navigation safety, and operational decision-making.

The platform fuses data from Electro-Optic (Day/IR) sensors, Radar, AIS, and GPS into a unified system, enabling reliable perception and analysis of the maritime environment.

Powered by cutting-edge computer vision and sensor-fusion algorithms, it delivers superior situational awareness to ship crews across all operational conditions — day and night.

Key Capabilities

- Real-time object detection and classification
- Multi-target tracking
- Tailored fishing vessel zone classification
- Force Protection Measures
- Advanced multi-sensor data fusion
- Collision detection and alerting



AI Based Harbour/Anchorage Surveillance

AI-Based Harbour / Anchorage Surveillance is a comprehensive AI-powered maritime security solution designed for port-wide surveillance, anchorage monitoring, and perimeter protection, delivering continuous Maritime Domain Awareness.

The system integrates fixed Electro-Optic / Infrared (EO/IR) sensors and advanced analytics to enable persistent monitoring across wide maritime areas during day and night operations.

It significantly improves situational awareness and operational control across harbour and anchorage environments under all operating conditions.



Key Capabilities

- Fixed EO/IR camera integration for day and night operations
- 360° panorama generation for wide-area monitoring
- Real-time target detection and classification
- Automated smoke and fire detection
- Intelligent alerting for security and safety events
- Interactive monitoring and control user interface



Key Capabilities

- AI-based warship classification
- Identification of Warship Class, Country, Length etc
- Integrated digitized Fighting Ships Book
- AI-powered conversational assistant for naval intelligence queries



Gangway Management System

The Gangway Management System is an intelligent access control and security solution designed specifically for naval ship gangway operations, ensuring that only authorized personnel are permitted to board or disembark the vessel.

The system leverages real-time face detection and recognition, secure identity management, and watch list monitoring to provide instant access decisions at critical ship entry and exit points.

It significantly enhances onboard security and force protection, ensuring controlled, traceable, and reliable management of personnel movement.



Key Capabilities

- Real-Time Face Detection & Recognition
- Crew & Visitor Identity Management
- Watch list / Blacklist Monitoring
- Secure Face Enrolment & Database Management
- Interactive & Operator-Friendly User Interface



Warship Finder

Warship Finder is an advanced AI-driven warship classification and intelligence platform that enables rapid and accurate identification of naval vessels from a single image.

The platform seamlessly links classification outputs to a digitized Fighting Ships Book, offering instant access to authoritative technical specifications and verified reference data.

Designed for operational environments, Warship Finder features a secure, web-based interface and an AI-powered conversational assistant, enabling users to retrieve and analyze complex naval intelligence through natural language queries.