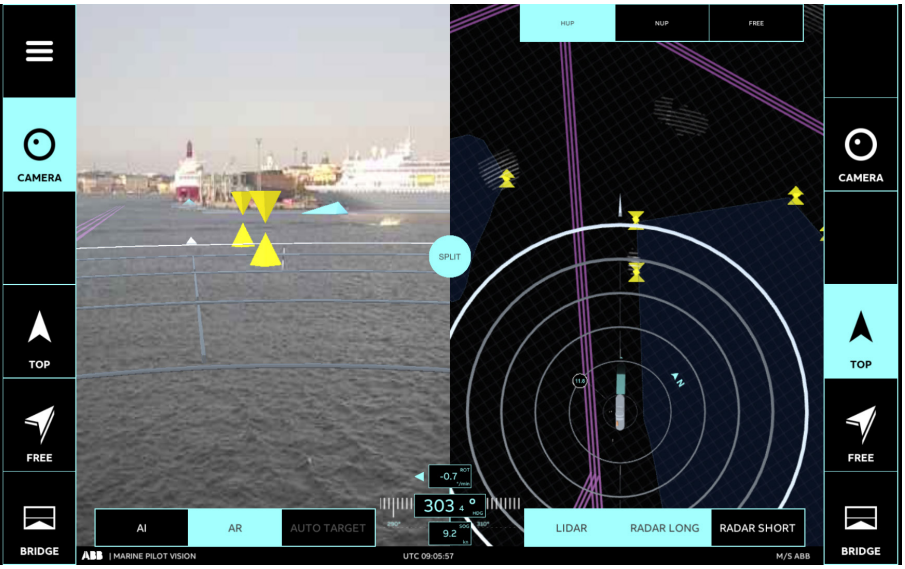
MARINE & PORTS

ABB Ability™ Marine Pilot Vision

Modular Situational Awareness Platform



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True ship intelligence requires electrification, digitalization and connectivity as they make ships more efficient, simpler and more flexible.

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01 Pilot Vision screenshot showing integrated Augemented Reality overlaid on a forward looking image, alongside the virtual 3D world.

02 High resolution sensor data integrated with Electronic Navigational Charts allow the user to generate perspectives that suit operations in real time.

Introduction
ABB Ability™ Marine Pilot Vision takes advantage of the latest advances in sensor technology and computer vision to offer multiple real-time visualizations of a vessel's surroundings and new ways of perceiving a vessel's situation.

Modularity
Pilot Vision is a modular platform which can be adapted to the needs of the customer. The architecture has been designed to support configurations of sensors placed in locations within the vessel. The distributed computing architecture enables analysis and data compression, as well as machine learning algorithms to decrease the network traffic. As a result, the experience of operating a ship becomes a more holistic and safer experience

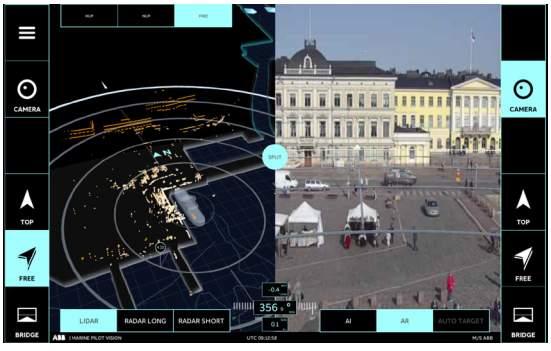
Base Platform
The base platform includes the required computer infrastructure as well as the necessary interfaces to existing systems. The functional applications along with the sensor packages are chosen by the customer on top of the base platform. The customer can upgrade later with new functionalities to the base platform by acquiring the required sensor packages for the specific functionalities.

Product Application Modules
Four initial solutions are provided as solutions to specific operational challenges the customer might be facing:

- **Lookout**: hightened watchkeeper support
- **Weather**: low visibility situational awareness
- **Fairway**: highly accurate mid range awareness
- **Docking**: close range assistance

These modules have differing requirements for sensors that are required on top of the base platform permitting full scalability based on need.

Sensor requirements are outlined in the table.



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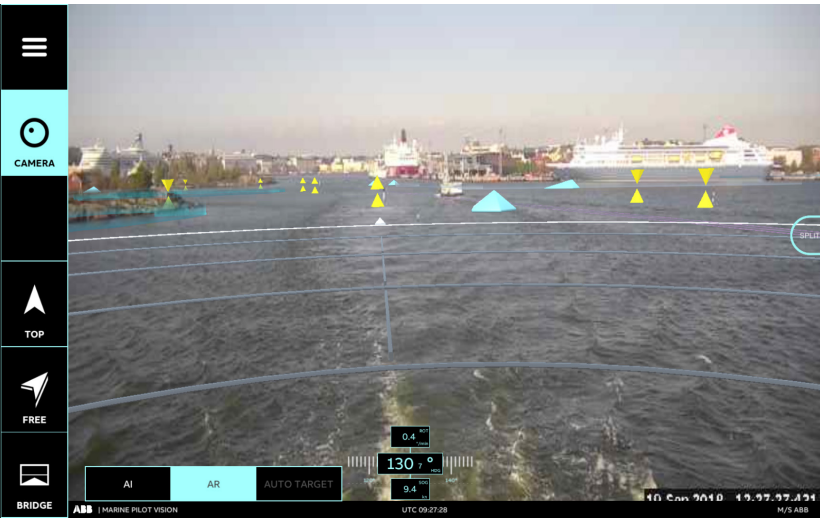
Base Platform	Notes
Computer Infrastructure (Server, HMI & Screen)	
Inertial measurement unit	
Interfaces for exisiting systems (eg Gyro, GPS/ GNSS, radar downlink, wind & AIS)	
Network Communication Interface	Remote service functionlaity
ENC map data interface	

Lookout Module	
Wide-angle stationary camera	

Weather Module	
Bi-optic PTZ camera	
Wide-angle stationary camera	
Wide-angle stationary thermal camera	

Fairway Module	
Bi-optic PTZ camera	
Wide angle stationary camera	
Wide angle stationary thermal camera	
High resolution radar	500 meter range
3D long range LiDAR	1000 meter range

Docking Module	
Each node may contain the following sensor package: - Wide angle camera - Thermal camera - High resolution radar - 3D LiDAR	Exact sensor suite defined per project requirements



ENC Integration
The Pilot Vision platform uses standard Electronic Nautical Chart (ENC) charts overlaid to the virtual view with sensor and AIS data. Pilot Vision is able to utilize the data layers available in ENC charts. For example, safe waters can be plotted based on the actual draft of the vessel.

SOLAS Visibility
Forward looking camera field of view is able to be extended to match SOLAS requirements by the addition of cameras.

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