



SINGAPORE NORWAY INNOVATION CONFERENCE, 18TH NOVEMBER 2022

Navigating the future with Autonomous Shipping

For safe, efficient, sustainable shipping

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Today's operations

Most tasks rely on human performance:



Observations



Data fusion & positioning



Risk assessment



Decision-making



Control

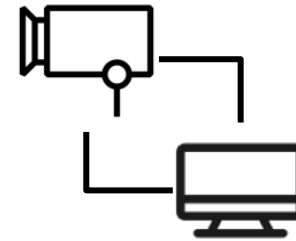
Where automation comes in

Combining the strengths of human and machine



Human strengths

- Handling of uncertainty
- Applying knowledge and experience
- Creative problem-solving
- Human judgement



Machine strengths

- Continuity, objectivity
- Repeatability and consistency
- Very slow/very fast occurring events
- Machine does not get tired, does not forget

Concept of autonomous control

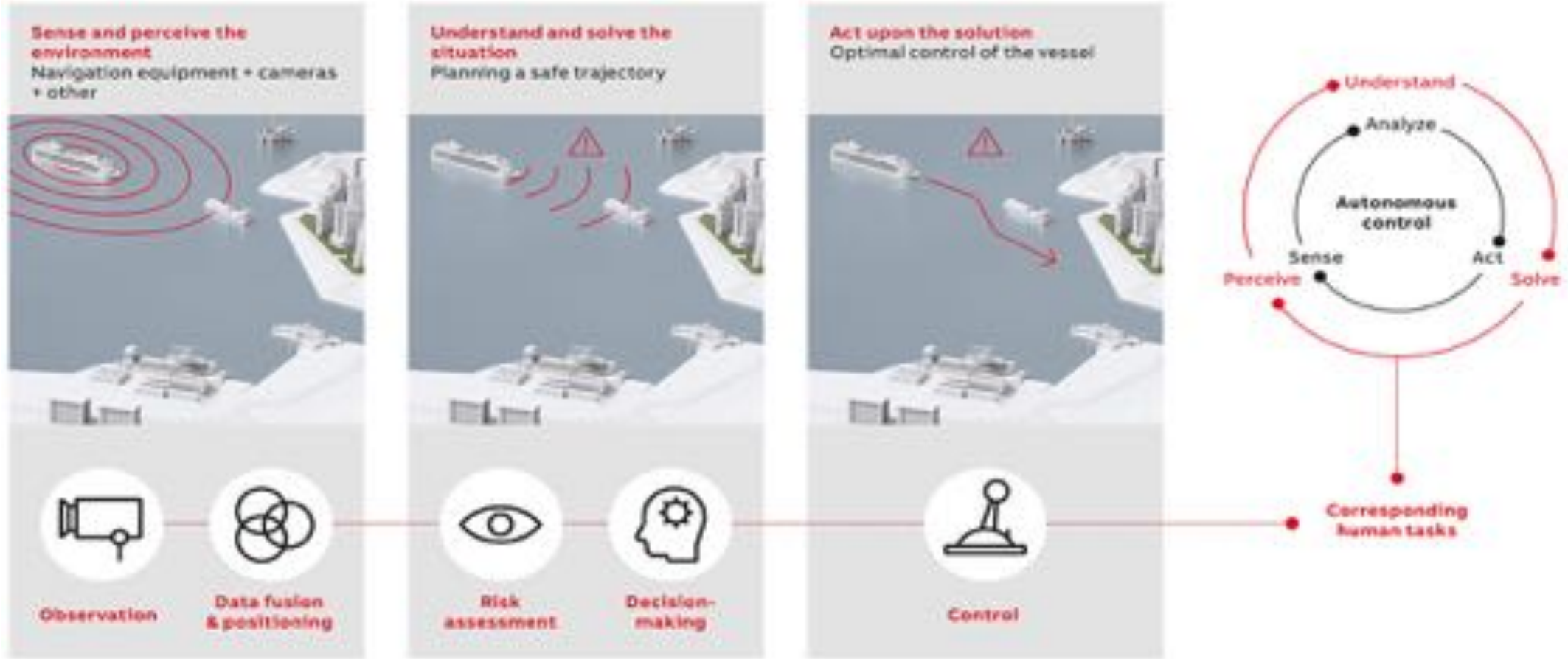


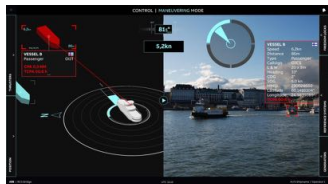
ABB Ability™ Marine Pilot product family

Remote operation



ABB Ability™ Marine Pilot Vision
(Situational awareness, risk assessment, decision-making support)

ABB Ability™ Marine Pilot Control
(Simplified control throughout the voyage)



Lookout Assistance



Docking Assistance



Collision Avoidance Assistance



Joystick & DP



Autopilot



Automated functionalities

Lookout Assistance

Deep-Learning based Computer Vision



Lookout Assistance

Benefits

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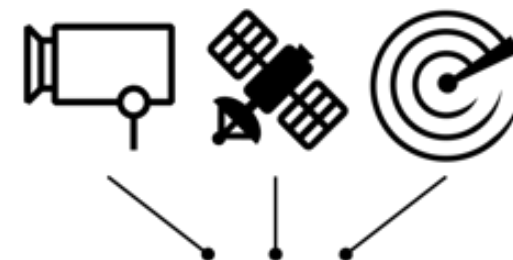
Enhanced situational awareness

Sensor fusion



Measurement and detection

Measure data from various equipment.



Estimation and mapping

Using all data sources, estimate own vessel motions, own position, and map the surroundings.



Tracking and fusion

Based on sequence of observations, estimate how the objects move. Fusion of different modalities.



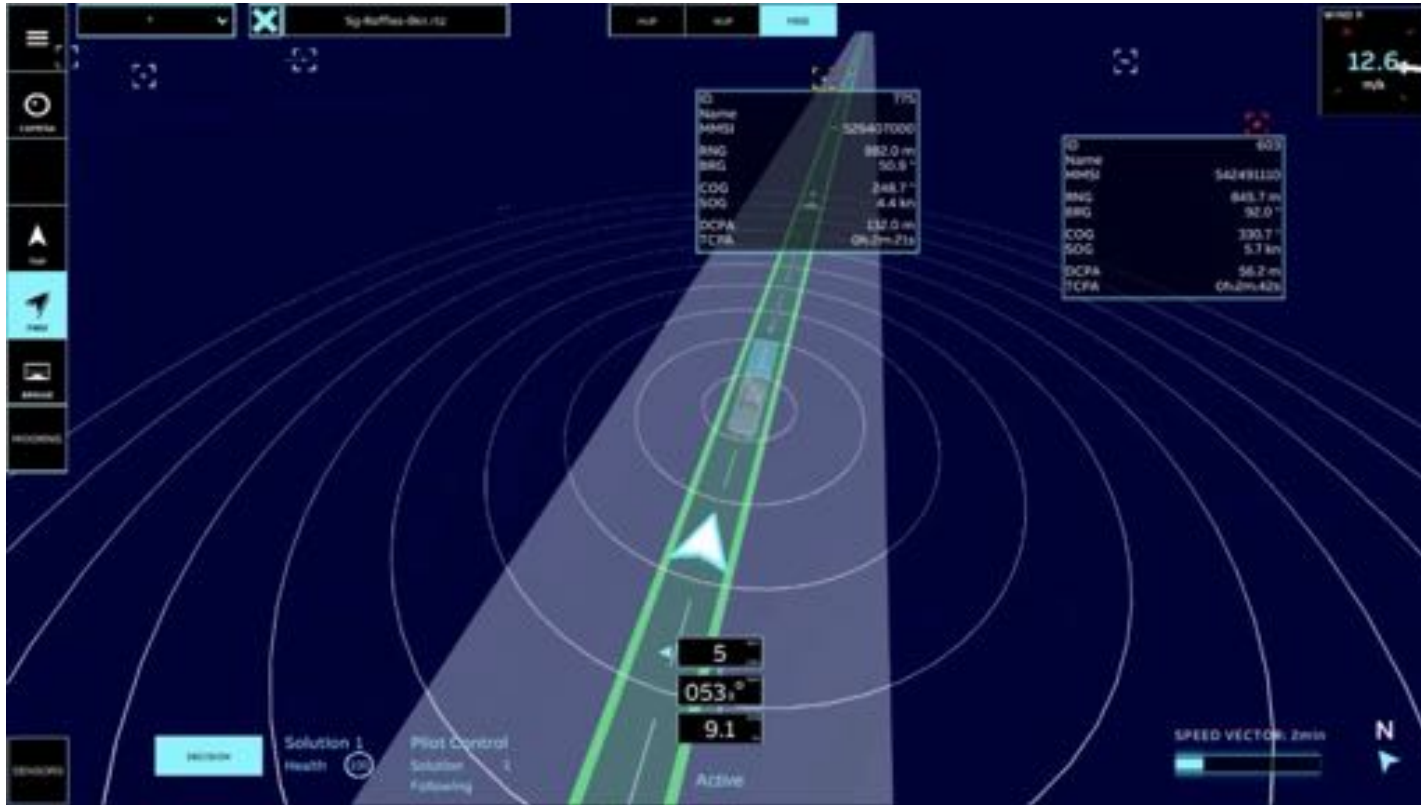
Prediction

Based on the tracking and types of objects, predict their anticipated future trajectories.



Collision Avoidance

Continuous risk assessment and decision-making support



Objects, charts, mission

Predicted behavior of objects, nautical charts, data-driven charts, mission/original route.



Risk assessment

Determine the risk associated with the current plan by considering all static and dynamic obstacles.



Decision-making

Decide how each obstacle is treated by considering the mission, rules, space, capabilities and the situation.



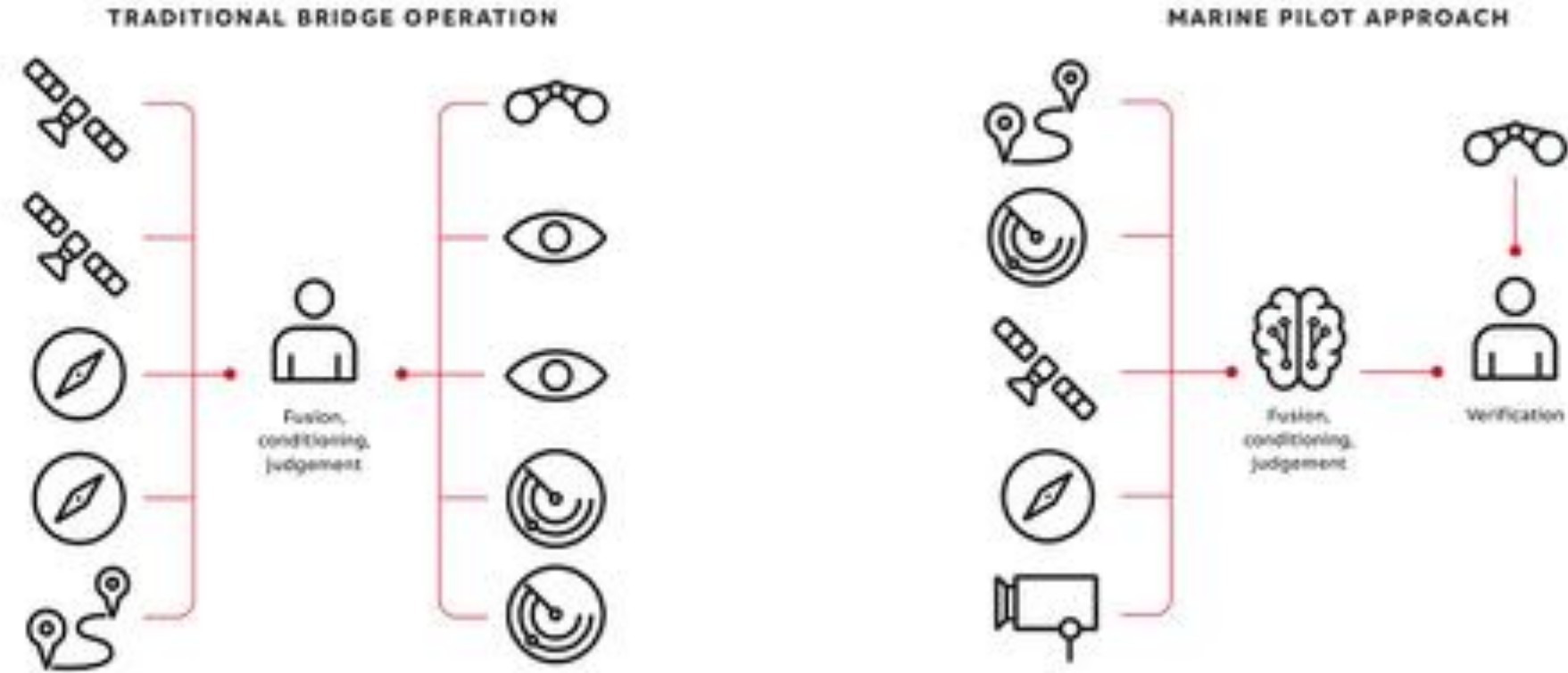
Action planning

Plan a safe and efficient trajectory by considering changing course and/or speed.



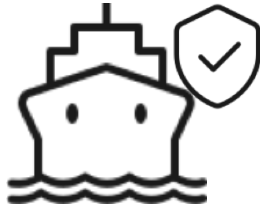
More autonomy

Allowing humans to focus on critical tasks



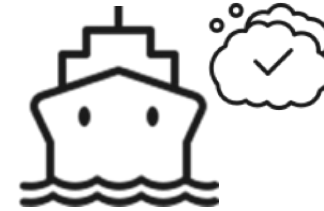
Benefits of autonomous technologies

Safe, efficient, sustainable shipping



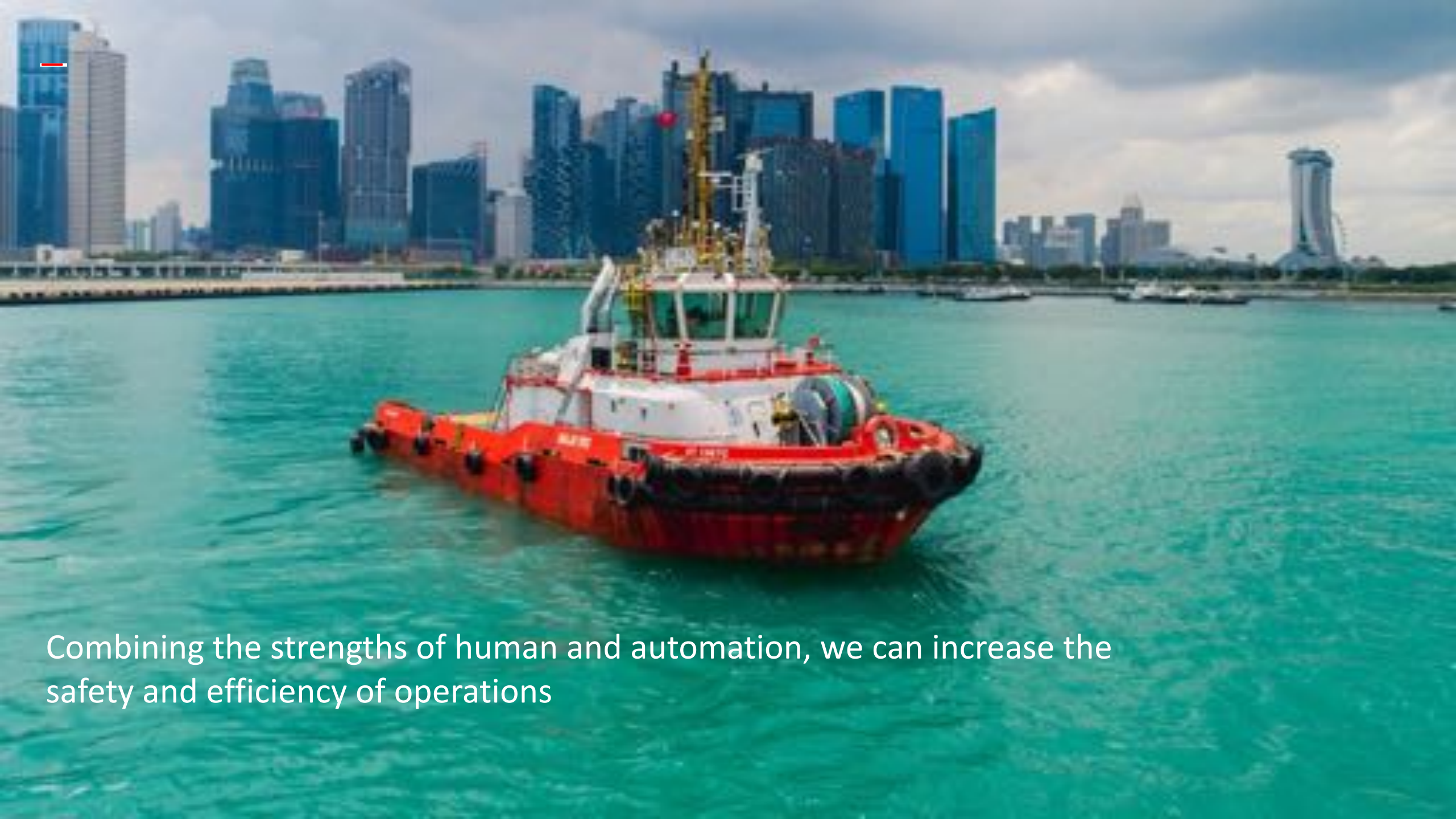
Increase safety

- Enhanced situational awareness
- Continuous automatic risk assessment and decision-making support for crew
- Allow crew to focus on overall situation



Improve operation and fuel efficiency

- Route optimizing, increasing voyage efficiency
- Smooth and early reactions in encountering situations
- Time savings in maneuvering and docking translating to fuel savings



Combining the strengths of human and automation, we can increase the safety and efficiency of operations

ABB