

SMI Automation and Autonomy Seminar
24 April 2015, Singapore

How to implement modern computer technologies in practice ?

24th April 2015

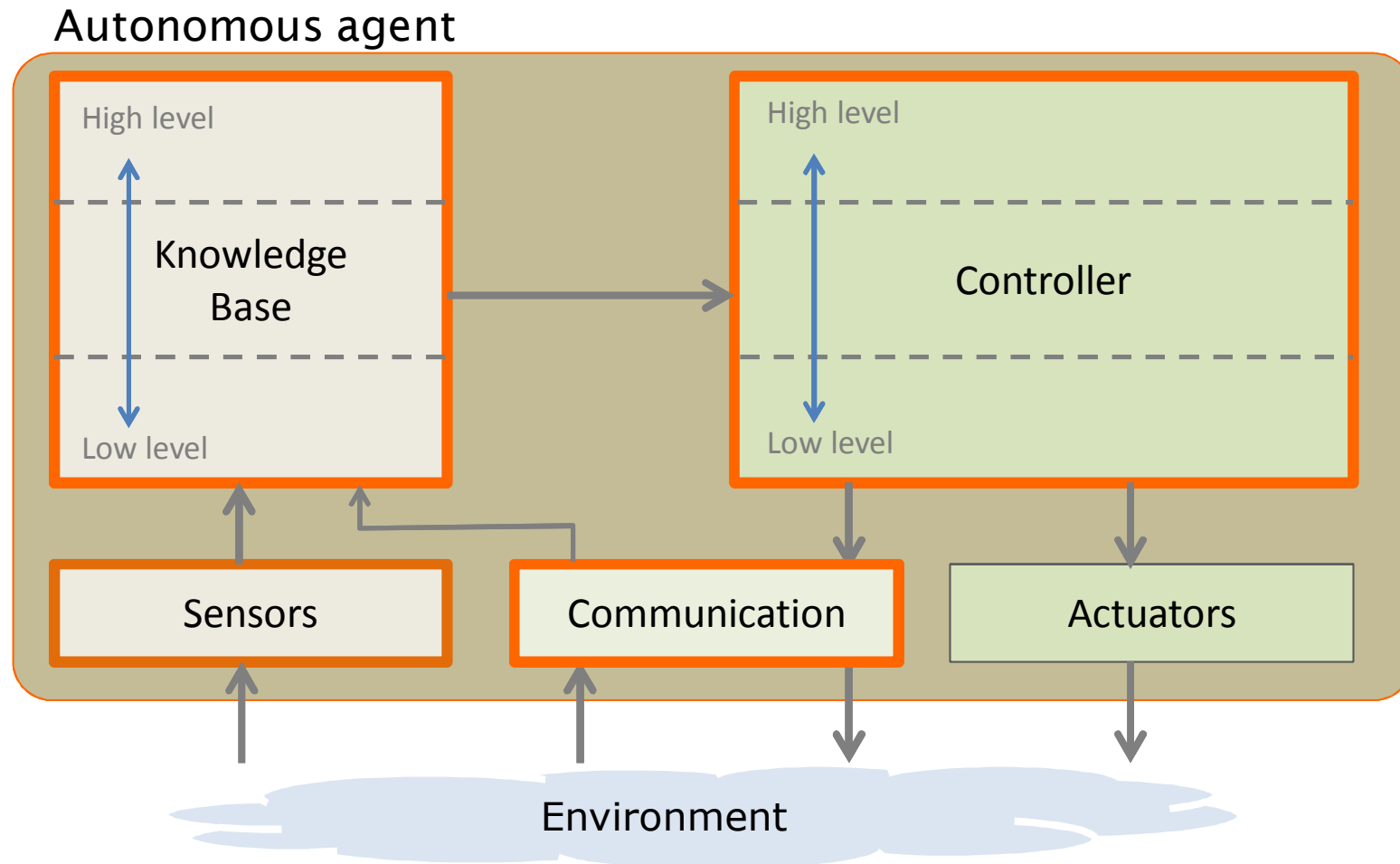
Hideyuki Ando, MTI

A view of autonomy in Artificial Intelligence



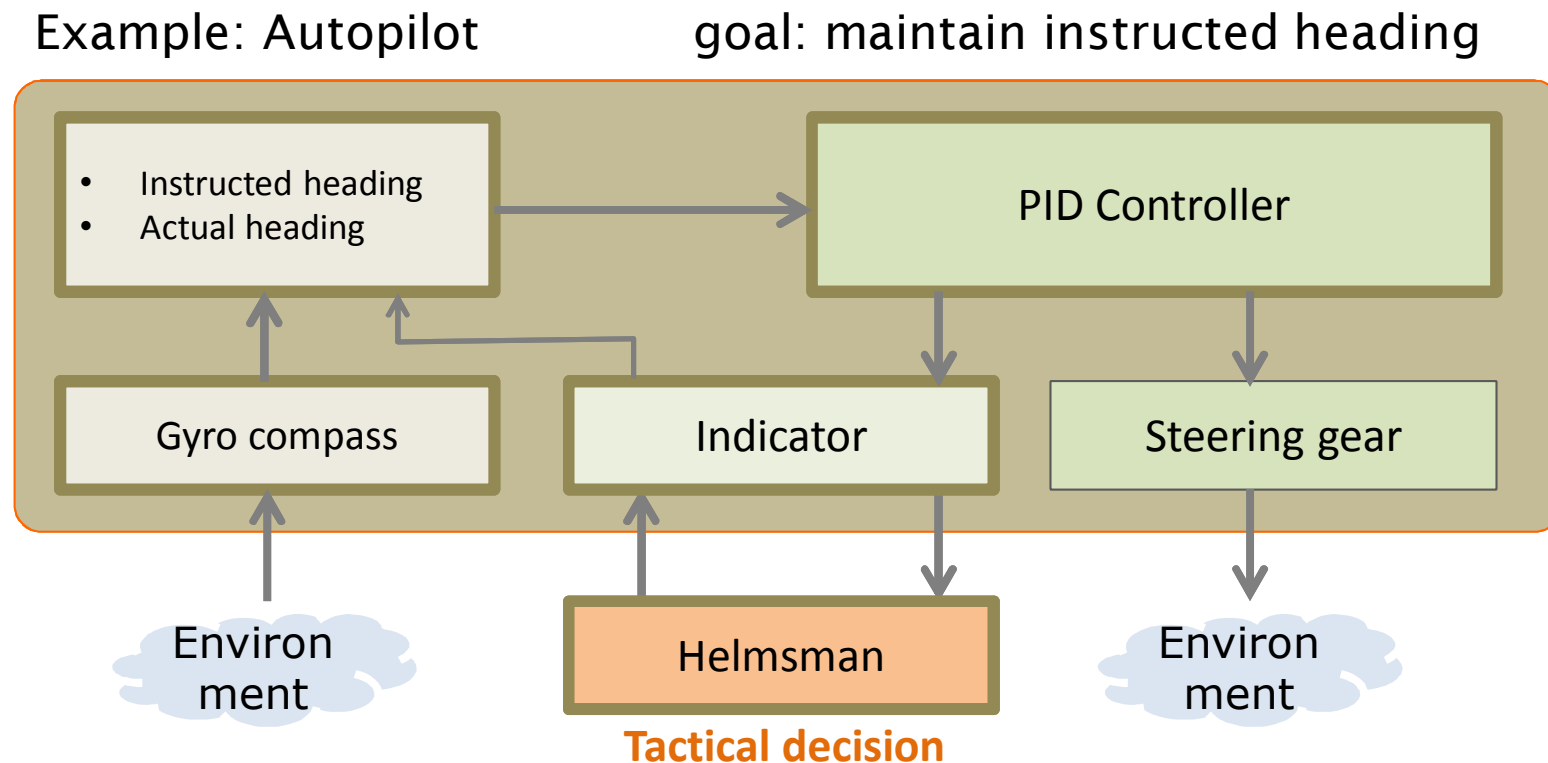
Is this view simply applicable to ship navigation ? -> NO

Architecture of autonomous agent



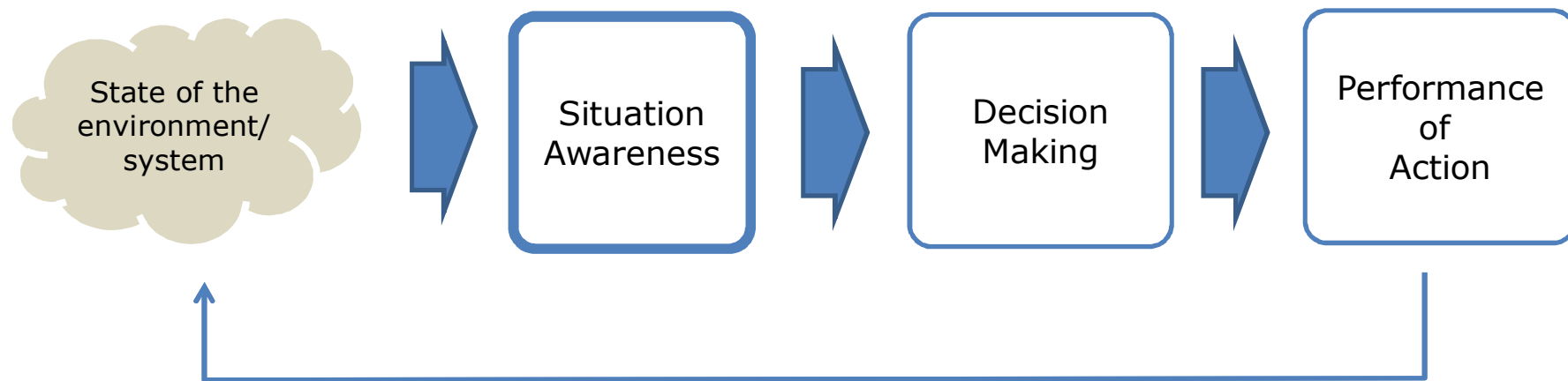
Implementations of Sensors, Knowledge Base, Controller and Communication for whole ship navigation aspects are impossible. It is too complicated.

But for limited scopes, autonomy is applicable



- One approach for autonomy is limiting scopes to solvable problems
- But still tactical decisions cannot be solved by autonomy

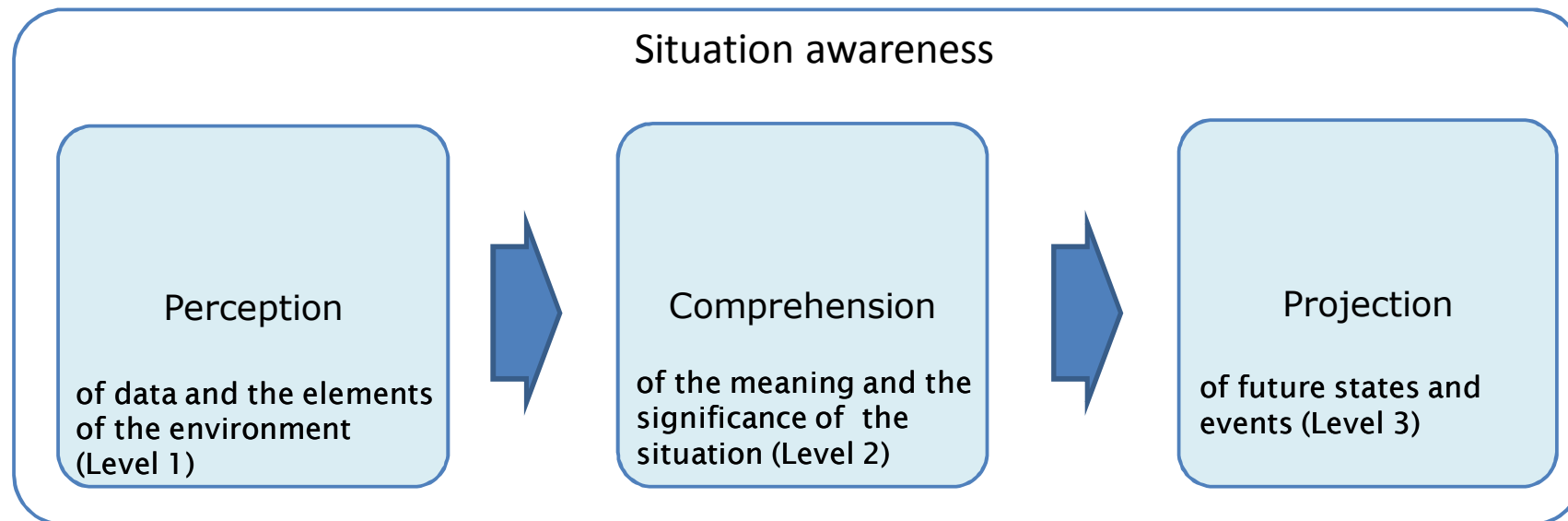
Naturalistic decision making



(M. Endsley 1990)

- According to incidents analysis results in aviation industry, human errors in “Situation Awareness” are major causes of incidents

Enhancing situation awareness of human and organizations – the next target



(M. Endsley 1990)

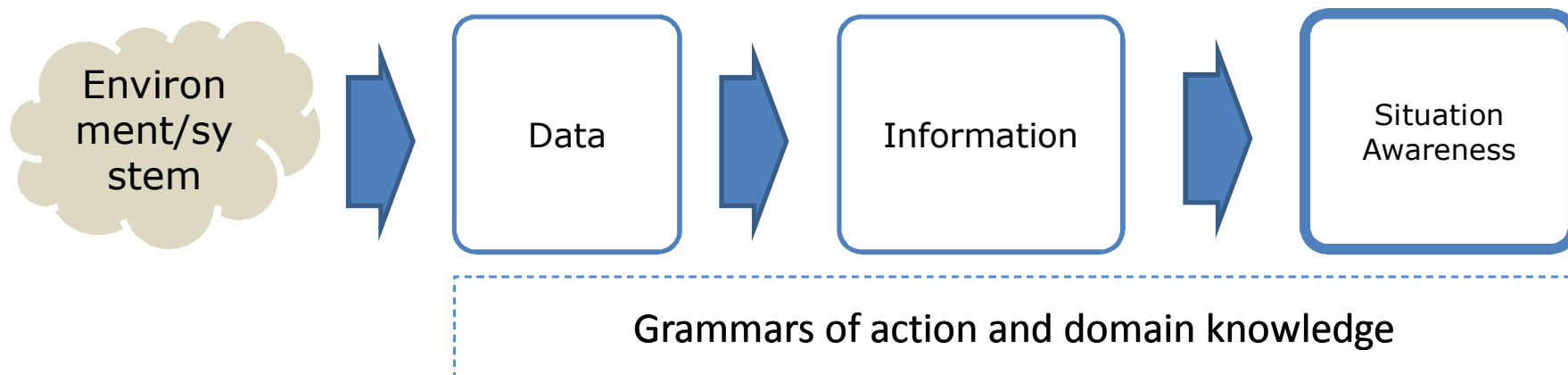
- Higher level decision support to enhance safety and efficiency might be achieved by enhancing situation awareness

How to support situation awareness ?

- Good understandings of the target domains
 - Grammars of action ... how human activities have been structured

(P. Agre, Surveillance and Capture - Two models of privacy, 1994)

- Domain knowledge



IoT of Ship

- IoT (Internet of Things) of Ship will come.
- Good collaborations of IoT and our domain understandings are necessary to make solutions

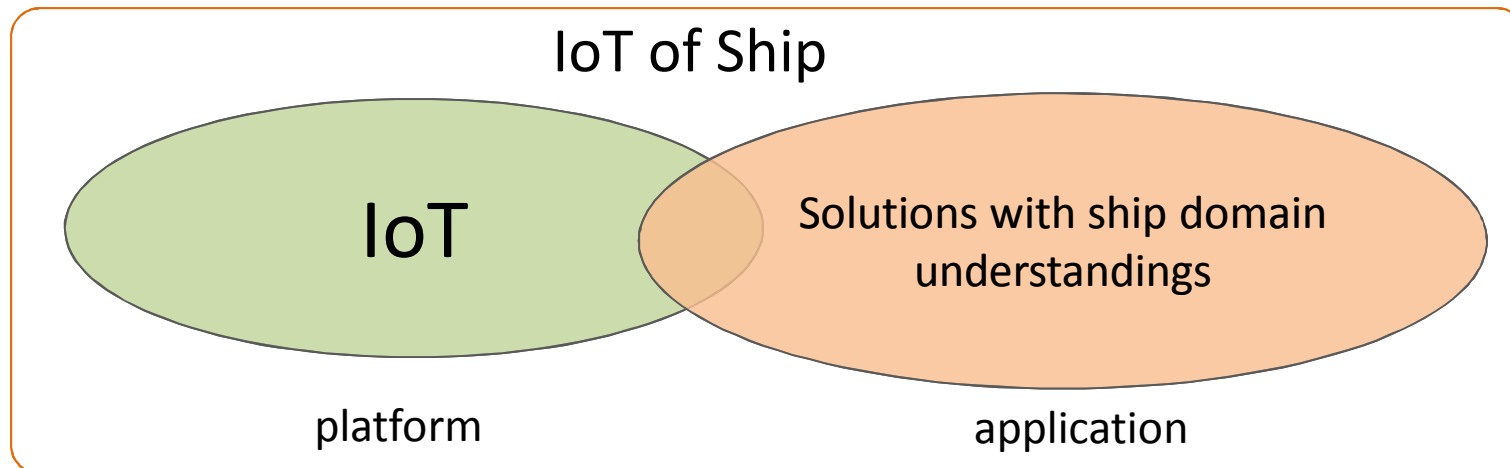
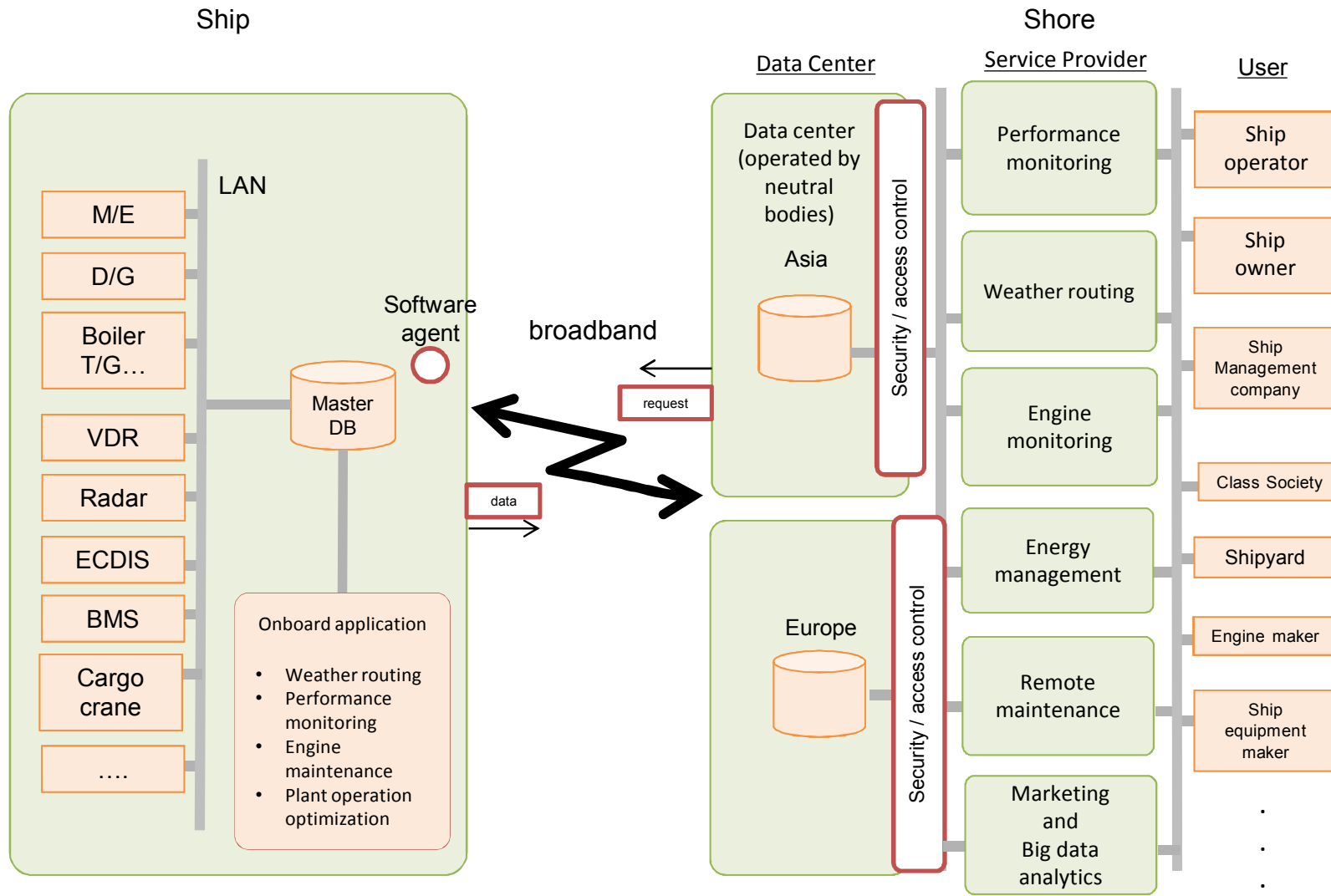


Image of ship – shore open platform



Courtesy of Smart Ship Application Platform (SSAP) Project of JSMEA 2014-15

Summary

- To implement autonomy in our industry, we will take the following approaches
 - Limiting scopes to solvable problems – e.g. autopilot
 - Enhancing situation awareness of humans and organizations is the next target
- Good understandings of the target domains are indispensable
 - Grammars of action
 - Domain knowledge
- The same story is applicable to IoT of Ship. We have to make solutions by good collaboration of IoT and our domain knowledge.
- Concept of Ship-Shore open platform is introduced