MAYFLOWER compund

Ship design: The mayflower team opted for a trimaran design giving it a low, highly stable and dynamic profile. Made from aluminium and composite materials, the Mayflower is very lightweight: about 5 tonnes at 15 meters long and 6.2 meters wide.

Edge computing systems: As MAS will not always have connectivity in the middle of the ocean, it uses a fully autonomous IBM edge computing system powered by several onboard NVIDIA JETSON AGX Xavier devices.

Machine learning: Over the past two years, the Mayflower team has trained the ship´s AI models using over a million nautical images collected from cameras in the Plymouth sound in the UK as well as open source databases. To meet the processing demands of machine learning, the team used an IBM power AC922 fuelles by IBM power 9 CPUs and NVIDIA V100 Tensor core GPUs, the same technologies behind the world´s smartest AI supercomputers.

AI captain: MAS has no human Captain or onboard crew. Instead it features an AI Captain enabling it to sense, think and make decisions at sea. MAS´s AI captain is a bespoke AI built by Marine AI based on a number of IBM technologies including: IBM visual Insights computer vision software, IBM operational decision Manager automation software and IBM edge computing.

Power supply: The power supply is a Lithium ion-phosphate batteries, in addition to solar panels on the ship´s exterior, provide power to the computer systems onboard in addition to supplying energy to the motors for propulsion.

Cargo bay: The modular cargo can hold ocean scientific equipment up to 700 KG.

Dual motors: Dual 20 KW permanent magnet electric propulsion motors help to propel the ship at nearly double the speed of the original Mayflower, while producing less carbon than traditional diesel-burning engines.

SENSORY INPUTS

* Radar detects multiple hazards in MAS’s path, 2.5 nautical miles ahead.
* Onboard cameras provide visual input to an IBM computer vision system which identifies hazards like cargo ships, fishing vessels, and even partially submerged shipping containers floating in the water.
* Automatic Identification System (AIS) provides specific information about the other ship’s class, weight, speed, cargo, etc.
* GPS Navigation System provides MAS’s current location, heading, speed and course.
* MAS’s nautical chart server provides geospatial information about its chosen route.
* Weather data provided by The Weather Company.
* Attitude Sensors assess local sea state (how MAS pitches and rolls due to waves).
* Fathometer provides water depth measurements.
* Vehicle Management System provides operational data such as MAS’s battery charge level, power consumption, communications, science payloads etc.

SWIFTS OUTCOMES

AI Captain determines the best action for MAS, As a hypothetical example let’s assume that MAS is in the open ocean, approaching Cape Cod, with no current network connectivity. In its path ahead is a cargo ship which has had a collision with a fishing vessel and lost some of its load. In this scenario, MAS’s AI Captain will use a host of technologies and processes to independently assess the situation and decide what action to take, without ever connecting to a land-based mission control.

The MAS’s Safety Manager verifies the decision is safe.

And AI Captain instructs MAS’s Vehicle Management system to change course and speed.