



SIDUS CaseStudy

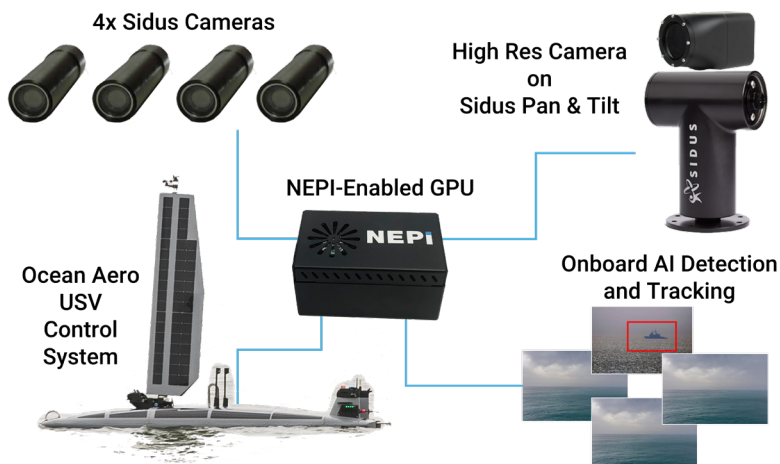
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Ocean Aero Uses NEPI and Sidus Cameras for AI-enabled Maritime Threat Detection

THE PROJECT

Ocean Aero, creator of the TRITON autonomous underwater and surface vehicle (AUSV), launched an internal development effort to deploy at-sea AI-enabled inspection automation capabilities to its TRITON robotic platforms. In support of the Defense Innovation Unit's (DIU) Unmanned Systems For Maritime Domain Awareness program, the first project was to automate 360-degree maritime threat detection between a suite of on-board cameras and on-board artificial intelligence models integrated onto a forward-deployed TRITON AUSV platform, and send detected threat information wirelessly to remote operations centers.

NEPI-ENABLED MTD AUTONOMOUS SOLUTION



>>> THE SITUATION

With over seventy percent of the earth's surface covered by oceans and impossible to protect with large manned military vessels, the US Navy is looking for smaller, less expensive [Intelligent Autonomous Systems](#) (IASs) to fill this threat detection gap. The concept involves fleets of unmanned surface vessels like Ocean Aero's wind and solar powered TRITON platform integrated with onboard AI detection and mission automation software able to autonomously search the oceans for possible maritime threats, (i.e. manned and unmanned military vessels), then provide details on detected targets, (i.e. pictures, speeds, directions), to remote operations centers for coordinated information planning and response efforts.

>>> THE CHALLENGE

Building a maritime AI detection and tracking solution required integrating various technologies including cameras, actuators, control systems with an on-board GPU, then writing all the software to automate AI detection and tracking processes along with system management user interfaces. Once that work is completed companies must then develop middleware for deploying and managing artificial intelligence models and automation scripts. All of this must happen before companies even start developing their specific robotic automation solutions, which significantly delays full product solution testing and delivery to end customers.

KEVIN DECKER, CEO | OCEAN AERO

"The combination of Numurus' NEPI smart system software, off-the-shelf compute hardware, and its responsive engineering support team was a big factor in the success of this project. It saved our internal team from a lot of development work we'd otherwise have to do ourselves"

SIDUS

Sidus Solutions provides high-performance cameras and pan & tilt devices for demanding environments. Through its partnership with Numurus, Sidus hardware, like the SS400 camera and SS109 pan & tilt systems, integrates seamlessly into NEPI's edge AI and automation software systems. This collaboration allows customers to quickly deploy Sidus products with minimal integration effort, accelerating automation projects with ready-to-use sensing and control solutions.



THE FUTURE

Building on the success of this initial in-field robotic automation demonstration and leveraging their new ability to host and manage libraries of deployed edge-processing, AI, and automation scripts on-board deployed TRITON vehicles, Ocean Aero is looking to rapidly expand the TRITON platforms' unmanned automated inspection and monitoring capabilities to other important maritime applications including:

- In-port vessel and asset protection
- At sea search and rescue
- Subsea survey and inspection
- Multi-vehicle domain awareness

>>> THE SOLUTION

To accelerate their at-sea AI and automated solution development, Ocean Aero turned to Numurus for off-the-shelf edge-compute hardware preinstalled with Numurus' NEPI smart system OS with a library of plug-and-play abstracted sensor drivers, drag-and-drop AI and automation management features, and built-in local and remote system and data management features. By leveraging Numurus GPU hardware with pre-built drivers for Sidus Solutions' hardware and AI processing software, Ocean Aero was able to eliminate the need for custom integration work, speeding up their development timeline while ensuring reliable operation of their vision and detection systems

>>> THE RESULTS

Within 6 months of kicking off their 360-degree maritime detection automation project leveraging off-the-shelf NEPI-enabled hardware development platforms with minimal support from Numurus' professional services team, Ocean Aero successfully interfaced 5 directional cameras with onboard AI models, then fielded, tested, and demonstrated automated maritime domain awareness capabilities running on its TRITON AUSV systems. The inclusion of Sidus Solutions' camera and pan & tilt systems supported by NEPI's pre-built drivers and AI management software enabled rapid automated threat detection and tracking solution development. This resulted in less dependency on an operator to detect and identify threats and increased delivery of actionable information to local and remote end-points.



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