



INTELLIGENCE IN SUSTAINMENT

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IT could be argued that the success of any military endeavour rests on the shoulders of sustainment. Keeping aircraft in the sky, ships out at sea, vehicles on the battlefield: it all depends on efficiently repairing and maintaining those platforms.

Through the formation of Red Ochre Labs, BAE Systems Australia is hoping to bring cutting-edge technologies to bear on the future of sustainment. The possibilities are immense and could see billions of dollars saved each year. The company refers to this as 'intelligent sustainment'; in effect, putting top-quality data in the hands of those who need it.

"At Red Ochre Labs we have our eyes on the horizon of game-changing tech, and we're implementing those that drive efficiencies to help us to do sustainment better," Karen Trezise, Principal Technologist for Sustainment within Red Ochre Labs at BAE Systems Australia, said to ADM. "We're also looking at that forward view to ensure that we're best placed to support the next generation of systems, in which autonomy and automation will be prevalent."

The company sees sustainment moving away from a reactive and physical approach to more of a predictive one, in

which advanced analytics and AI are used to drive effective decision making.

"It's going to be more monitoring, less of the physical work," Trezise said. "We're going to have technology to augment our maintainers and our operators; we're going to have more data fused platforms."

A key focus of these efforts is on mitigating the cost of corrosion, which for the RAAF alone can run to \$200 million a year. Up to 10 per cent of aircraft fleets can be grounded at a time.

The corrosion prognostic health management technology developed by BAE Systems Australia has been integrated into the world's largest defence program, the F-35 Joint Strike Fighter.

This is the first fleet of aircraft in the world with sensors installed on every production aircraft during manufacture. The technology will give each nation a sovereign ability to manage their assets to intelligently combat corrosion.

"Corrosion maintenance has generally been either completely reactive, so we fix it when we see it's broken," Trezise said. "Otherwise, we maintain based on a pre-established time interval in the hope that we nip the corrosion degradation in the bud."

"That approach is very costly. It assumes a one-size-fits-all approach to preventative maintenance."

Instead, Trezise and her team are embedding next-gen sensors and building prognostic algorithms to better time inspections and repairs.

"If we get an indication from our sensors and from our prognostic algorithm that the corrosive environment is high, we can then bring forward the inspections to minimise that impact of corrosion," Trezise said. "Maintenance becomes more condition-based."

The real focus, however, is on expanding the definition of sustainment beyond the machine.

"If we can do that for those assets, why can't we sensor and monitor the performance of our people?" Trezise said. "It's our people that also give us the capability edge."

"We're applying human factors to infer some wisdom from facial and eye tracking signals to know of and predict operator fatigue, what operator workload is like, and to improve training based on expected skill level."

According to Trezise, Red Ochre Labs focuses this vision and allows for outreach to global partners and universities.

"It definitely gives us a focused vision," Trezise said. "It gives us that enterprise approach to technology development, where we can leverage the best technologies out there."



LEFT: Corrosion management is a major sustainment cost driver.