



BAE SYSTEMS AUSTRALIA

the equipment can meet some desired specifications.

“But if the control team isn’t able to get the particular hardware to meet those specifications, it gets sent through another hardware design iteration.”

Professor Manzie’s team is instead aiming to reduce the number of prototypes required, a process that could reduce the length of the design cycle for a range of platforms – including hypersonic weapons systems.

“What we were trying to do is use computational techniques and optimisation techniques to push the control design right up to the front and have fewer hardware prototypes and reduce the length of the design cycle itself,” Prof Manzie explained. “We’ve continued to push that work into the hypersonic space and are now looking at hypersonic co-design problems in collaboration with the University of Queensland.”

The second program Prof Manzie is involved in is developing aspects of autonomous systems in collaboration with DST Group and the University of Queensland.

“We’re looking at two parts of the autonomous system. The first is multi-objective path planning, which involves working out a trajectory for a vehicle through potentially uncertain and risky environments in order to meet certain objectives,” Prof Manzie said. “The other part of the program is verifiable autonomy. We want to ensure that when you put together the various components of an overall system, the combination of those components remains within the desired operating region of the controller.”

For Prof Manzie, the formation of Red Ochre Labs will accelerate progress in these kinds of joint research projects.

“I think it’s a fantastic initiative because it allows academia and BAE to co-locate, and often it’s those synergistic discussions that accelerate progress significantly,” Prof Manzie said. “It also ensures that we’re all on the same page on where strands of the program are heading, so that we end up with a more cohesive overall program.”

“I can’t speak highly enough of the initiative.”

ACADEMIA ALLIANCES THE WAY FORWARD

EWEN LEVICK | SYDNEY

THERE is a common thread looping through all these stories on BAE Systems Australia’s formation of Red Ochre Labs: cooperation with Australian universities and academics. The company works alongside experts on a range of different projects and programs.

A prominent example is Professor Chris Manzie, head of the University of Melbourne’s Department of Electrical and Electronic Engineering, whose team is

working alongside BAE Systems Australia on two programs: the ‘co-design’ of aerodynamic platforms; and path planning and verifiability within autonomous systems.

“We started working with BAE Systems Australia nearly a decade ago actually, starting in the supersonic space and looking at co-design of aerodynamic platforms,” Prof Manzie said to *ADM*. “Think of the traditional design cycle. The engineering team goes through wind tunnel testing with a piece of hardware. It’s then handed over to a control team in order to design and tune the control loops so that

ABOVE LEFT: Unmanned systems are a huge collaboration space for BAE Systems Australia and universities.