

Security for Critical Systems

Did you know cars, insulin pumps and heart defibrillators have been attacked by cyber hackers?

Critical systems, such as aircraft, vehicles, medical devices and industrial control systems, are becoming increasingly dependent on software for functionality and are being produced with more complex functions.

This lends greater opportunities to hackers to target vulnerabilities that could threaten the safety and reliability of a system. Critical systems must perform their functions at all times. It would be disastrous, for example, if a plane stopped flying or if a medical device stopped functioning.

Defence assets are particularly targeted by cyber attackers and as such need to be able to perform their critical functions even in the face of these attacks.



NICTA is creating new software components and tools for the design and implementation of critical systems to make them safer, more reliable and more secure.

NICTA is working with Rockwell Collins and other collaborators on the US Defence Advanced Research Projects Agency (DARPA) High Assurance Cyber Military Systems (HACMS) Program to develop a complete, formally proven architecture to protect the control and communication systems of an aerial vehicle from compromise from faults and targeted attacks.

As part of the program, the high assurance systems built in the project is subjected to 'white box' attacks by an expert 'red team', to test their robustness. White box attacks are

attempts to penetrate a system by teams with complete knowledge of their target to expose any security flaws so that they can be addressed.

The overall objective of the DARPA HACMS program is to raise the bar on how critical software-controlled hardware systems are built. It is expected that the outcomes of this work will benefit other industries that rely on critical systems including in motor vehicles, medical devices and aircraft.

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Leading the Way

NICTA is Australia's Information and Communications Technology (ICT) Research Centre of Excellence, driving innovation through high quality research, research training, commercialisation and contract research.

NICTA has the largest concentration of ICT researchers in Australia. Our research focuses on use-inspired basic research that benefits industry, the community and the national interest.

Since NICTA's inception in 2002, NICTA has built strong research capability in:

- Software Systems
- Networks
- Machine Learning
- Computer Vision
- Optimisation.

Our Business Teams are the market focus of our research capabilities:

- Broadband and the Digital Economy
- Infrastructure, Transport and Logistics
- Security and Environment.

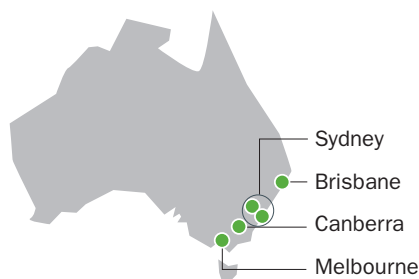
NICTA researchers work on Business Team projects supported by:

- An Engineering and Technology Development Team
- IP, Legal and other professional support.

Our work as a world-class research institute and Centre of Excellence in science and innovation brings together many of Australia's and the world's top ICT researchers. NICTA provides them with the facilities and support they require, making imagination to impact a reality.

NICTA's unique approach fosters and develops ICT research. We work closely with both industry and other research institutions to solve problems and make breakthroughs in ICT with real impact. NICTA's focus on use-inspired research means our projects have direct relevance to the challenges faced by business, government and individuals around the world. The result is breakthrough technologies that provide commercial opportunities and have a positive impact on Australia's export earnings.

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