FIRE AND EXPLOSION COUNTERMEASURES IN CONFINED SPACES

Our research focuses on developing novel ways of combating fires and explosions in confined spaces. This includes fixed structures such as defence buildings, bunkers, aircraft shelters, command posts and ammunition depots, as well as the critical components of weapon platforms such as submarines (battery and engine rooms), ships (engine room), tanks and other armoured personnel carriers (ammunition storage and engine compartments).

COMPETITIVE ADVANTAGE
• Our approach is based on the use of ultra-fast water mist/liquid nitrogen suppression systems, utilising the synergies between the two working fluids
• The system is compact and lightweight
• The system causes minimal damage (if any) when deployed due to its rapid flame quenching and inerting effects, which require small quantities of water and/or liquid nitrogen

SUCCESSFUL APPLICATIONS OF RESEARCH
Design and implementation of a range of new fire and explosion countermeasures against:
• Jet fires in battery rooms (in submarines and ships)
• Pool fires in engine rooms (in submarines, ships, tanks and armoured personnel carriers)
• Deflagration/detonation in ammunition storage compartments (in tanks, ships and submarines)

PARTNERS
• Defence Science and Technology’s Maritime Division
• Victoria University

IMPACT
• The outcomes of this research will enable the Australian Defence Force to protect their assets against fires and explosions more effectively

CAPABILITIES AND FACILITIES
• Small-scale flame propagation tube, 30-metre and 100-metre long pilot-scale detonation tube
• Chilworth Technology flammable range test apparatus
• Cone calorimeter
• ANKO 20-litre spherical dust explosion unit, ANKO one-cubic-metre spherical dust explosion unit, ANKO apparatus for determining minimum ignition temperature of dust layers, ANKO apparatus for determining minimum ignition temperature of dust clouds, ANKO minimum ignition energy apparatus
• Expertise in hazard and operability study (HAZOP) analysis, hazard (HAZAN) analysis and computational fluid dynamics (CFD) modelling

MORE INFORMATION
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