

DSI-HAC

Operational Vignettes

INTRODUCTION

When considering your submission we encourage you to take into account the future operational context and related considerations for future defence capabilities. This document summarises some possible future scenarios and related potential capability considerations that are relevant to the DSI-HAC call for submissions; they have been developed in consultation with Defence stakeholders and align with strategic guidance. Note these are provided to stimulate and shape research ideas that are focussed on leap ahead Australian Defence Force (ADF) capabilities for operating in CBRN environments; they are not meant to be prescriptive and we encourage your creativity on potential future capabilities.

OPERATIONAL CONTEXT

Humanitarian Assistance Disaster Relief Operations (HADR)

Consider Banda Aceh immediately following the Boxing Day Tsunami (2004), but project to 2035 and include a SARS pandemic. The region has suffered around 25,000 fatalities, all infrastructure within two kilometres of the coast is destroyed or heavily degraded. Over 100,000 people have been displaced. Thousands of people are injured, trapped inside collapsed buildings, vehicles and the like.

The ADF is required to deploy at short notice into the heavily degraded environment with minimal functioning infrastructure to provide critical services to the local population for an extended period with the added challenge of a viral pandemic.

ADF Priority of Effort:

1. Provide medical assistance to casualties within the local population.
2. Contribute to/lead efforts to manage/control/reduce risks of the population's exposure to pandemic pathogens.
3. Contribute to the management of potential water borne and vector borne diseases.
4. Provide environmental health support to displaced persons.

Operational Challenges:

1. If the affected region includes industrial zones (common in the Indo-Pacific), it is likely that there will be an uncontrolled release of hazardous toxic chemicals (e.g. Phosgene, Chlorine) or nuclear material (e.g. as in the Fukushima disaster).
2. It may take seven days for the ADF to deploy the full HADR capability; however, casualties need to be located and triaged as soon as possible following the event.
3. Human centric methods of detecting exposure to pathogens (e.g. swabs) place the operator at risk of exposure.

Future Capability Considerations:

HAC Theme#1: "Novel sensor technologies and heterogeneous sensor networks for early detection of biological pathogens and or accurate characterisation of low concentrations of chemical agents of Defence relevance at large standoff distances."

Stand-off 'survey' of large areas of complex terrain (e.g. medium sized cities) to:

1. Identify and assess casualties, communicate and provide direction;
2. Detect human exposure to pathogens;
3. Detect pathogens within the environment to inform/guide decontamination efforts; and
4. Identify Chemical and Radiological agents (i.e. toxic industrial chemicals and nuclear materials) and mitigate exposure risks for the local population including through decontamination measures.

HAC Theme #2: “Novel tools, methodologies, techniques and technologies to enhance physical, physiological, psychological and cognitive resilience of humans operating in environments in which CBRN threats are present.”

Enhance the resilience of ADF personnel to:

1. Sustain physiological performance in order to optimise individual capacity to execute mission requirements.
2. Sustain cognitive performance to execute the measures necessary to avoid exposure to the pandemic pathogen over prolonged periods (>30 days).
3. Sustain psychological health in an environment where there are mass casualties and fatalities, including children, and persistent risks to physical health from multiple sources.

Non-combatant Evacuation Operations (NEO)

Consider that in 2035 a foreign country (“Host Nation”) suffers internal disruption (rioting and criminal violence) and the Australian Government has agreement with the Host Nation to evacuate Australian citizens using ADF assets.

The ADF deploys a Joint Task Force as part of an Inter-Agency effort (including the Department of Foreign Affairs and Trade) to evacuate Australian civilians. During the NEO a criminal or terror group releases a chemical agent to further destabilise Host Nation Authorities. The agent (e.g. Sulphur Mustard, Phosgene) is manufactured from widely available industrial chemicals and distributed via a UAV and/or other explosive devices.

ADF Priority of Effort

1. Ensure the security and safety of Australian civilians.
2. Provide medical assistance to Australian civilians.
3. Evacuate Australian civilians (by sea or air).

Operational Challenges:

1. In the absence of intelligence for a specific threat, the ADF is likely to tailor and deploy its forces for a conventional NEO. The emergence of the chemical threat may require the ADF to adopt a posture for the chemical threat with little or no notice.
2. Detect the origin, extent of contamination and concentration of the chemical agent. Identify the chemical agent and monitor its spread.
3. Alert Australian citizens to the chemical risk without compromising the NEO mission (e.g. by inducing panic).
4. Concentration of Australian citizens at collection points requires them to use existing infrastructure (roads, rail, vehicles etc.). Consequently, evacuees have very limited freedom of action to avoid the chemical agent.
5. Transport of evacuees from evacuation points to assembly areas is likely via road or air (i.e. helicopter) and in unprotected vehicles.
6. Australian citizens have no training in chemical protection measures.

Future Capability Considerations

HAC Theme#1: “Novel sensor technologies and heterogeneous sensor networks for early detection of biological pathogens and or accurate characterisation of low concentrations of chemical agents of Defence relevance at large standoff distances.”

Stand-off ‘survey’ of large areas within a littoral environment (e.g. a large island in the Indo-Pacific) to:

1. Detect and identify low concentrations of chemical agents within the environment to enable the ADF to either:
 - a. Take preventative action to eliminate the threat; or
 - b. Adapt the operational plan (i.e. assume a CBRN posture and operate safely within the contaminated environment).
2. Monitor the dispersion of the chemical agent to:
 - a. Prioritise the evacuation operations in relation to the proximity of chemical agent plume and risk of exposure of Australian citizens; and
 - b. Inform the manoeuvre plans for air, maritime and land force elements (i.e. avoid the chemical plume and/or contaminated areas).

Low Intensity Conflict

Consider that in 2035 Australia is lead nation in a multinational force operating in accordance with UN Resolutions to restore peace and security in a neighbouring Indo-pacific nation (“Host Nation”), similar to the ADF’s role within INTERFET and Timor-Leste.

An opposing force (OPFOR) is conducting an insurgency against the Host Nation and the ADF is engaged in low intensity operations against the OPFOR at a tactical level by Combat Team sized group¹. These tactical actions are performed in high country, open savannah and jungle terrains; ADF personnel are mounted (in armoured vehicles), motorised (transported in trucks) and dismounted (infantry on foot). The operations are physically demanding.

The OPFOR is supported by a third nation through the provision of weapons and logistics; OPFOR operates from bases within the third nation’s territory and infiltrates across a landed border shared with Host Nation.

The ADF’s superior capability threatens to defeat the insurgency, forcing the OPFOR to deploy unconventional munitions to disperse low volatility incapacitating chemical agents (e.g. fentanyl-type analogues). These are deployed via various means including rockets, mortars, UAVs and are used to contaminate vehicles and equipment, limit the ADF’s freedom to move by contaminating specified land areas, and to disrupt the ADF during offensive tactical activities.

ADF Priority of Effort

1. Support the Host Nation by minimising the risk to the population of exposure to the chemical agent.
2. Retain the operational initiative and maintain a high operational tempo to defeat the OPFOR. This includes the following types of operations:
 - a. Patrolling and ambushing;
 - b. Cordon and search; and
 - c. Fix and destroy missions.

Operational Challenges

1. Synthetic chemical agents with similar characteristics and properties to fentanyl are likely to be difficult to detect.
2. Tactical operations of this nature are physically arduous; adopting a CBRN posture may limit the effectiveness of the ADF (which is OPFOR’s goal).
3. Full decontamination of vehicles and equipment will reduce their availability and increase maintenance demands.

¹ A Combat Team comprises around 150 ADF personnel.

4. If the ADF is forced to avoid contaminated areas within the battlespace, the OPFOR is likely to use contamination to shape the ADF manoeuvre engagement into areas where they can target them with the greatest effect.

Future Capability Considerations

HAC Theme#1: “Novel sensor technologies and heterogeneous sensor networks for early detection of biological pathogens and or accurate characterisation of low concentrations of chemical agents of Defence relevance at large standoff distances.”

Stand-off detection of low volatility chemical agents can enhance operational effectiveness through:

1. The development of a common understanding (sometimes described as a ‘common operating picture’) of the constraints and limitations the ADF faces in manoeuvring within the area of operations (e.g. the location, type and concentration of contaminated zones). This provides commanders with enhanced situational awareness to form and adapt their plans.
2. The survey, assessment and remediation of contamination of vehicles and equipment to enhance the efficiency and efficacy of decontamination efforts.

HAC Theme #2: “Novel tools, methodologies, techniques and technologies to enhance physical, physiological, psychological and cognitive resilience of humans operating in environments in which CBRN threats are present.”

Enhance the physical resilience of ADF personnel to:

1. Enable the completion of physically demanding tactical tasks to meet mission objectives in a CBRN threat environment – the ability to operate at close to the same standards and perform most of the same tasks as would be performed in a conventional threat environment.
2. Provide tactical commanders with sustained cognitive performance to ensure optimal decision making in dynamic and lethal environments.