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COMBAT SEARCH AND RESCUE IN THE AUSTRALIAN DEFENCE FORCE: THE REALITY THAT WON'T GO AWAY?

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INTRODUCTION

On 20 March 1917, Captain D. Rutherford of the Australian Flying Corps stood in the sands of the Palestinian desert after forced landing his aircraft as a result of enemy fire, watching the dust stirred by approaching Turkish cavalry. With no other means of rescue in sight, his companion circling overhead, Lieutenant F.H. McNamara, made an instant decision to land his aircraft and snatch Rutherford from imminent death or capture. McNamara's daring and successful feat not only won him the Victoria Cross but also became the first impromptu Combat Search And Rescue (CSAR) mission conducted for an Australian airman.[1] Almost 80 years later on 2 June 1995, Captain Scott O'Grady of the United States Air Force parachuted into the forests of Bosnia-Herzegovina after his F-16 fighter was shot down by a Bosnian Serb surface-to-air missile while on a combat air patrol mission in support of the United Nations Operation Deny Flight. As the world's media watched, a complex and comprehensive CSAR operation raced to save O'Grady, snatching him three days later from under the eyes of searching Bosnian Serb ground forces.

Both stories illustrate the features of CSAR and how it has changed in warfare over this century. While obvious changes are the advances in the specialised personnel, equipment and organisation, less obvious changes are the greater political and community focus on the CSAR mission outcomes. In many countries today, heightened community values and past bitter experiences have created expectations that, in future conflicts, casualties will be minimised and every effort will be made to recover survivors or the human remains from enemy territory. What has not changed is the raw courage still required by survivors and rescuers alike.

Drawing on US doctrine, the only adequate definition of CSAR currently existing for the ADF is 'A specific task performed by rescue forces to effect the recovery of distressed personnel during war or operations other than war'.[2] A common misunderstanding is that 'distressed personnel' refers only to aircrew. The term, however, also includes ground forces overrun or isolated by enemy forces and naval personnel from vessels lost in enemy waters, as well as possible civilian hostages. While the Australian Defence Force (ADF) has participated in a considerable number of peacetime Search And Rescue (SAR) missions since World War II, such as the southern ocean rescues in 1996-1997, its CSAR experience during the same period has been extremely limited. Indeed, the ADF has only recently begun examining the establishment of a CSAR capability. This paper will examine the history of CSAR, its requirements and essential elements for now and the future, how these are being addressed by the ADF, and any corrective action required.

[1] Stephens, A. and Isaacs, J., *High Fliers - Leaders of the Royal Australian Air Force*, Australian Government Printing Service, Canberra, 1996, pp 20-22.
[2] Draft Air Standard 45/134 - Combat Search and Rescue, Air Standardisation Coordination Committee, Annex A, Appendix 2, p A-2-3. (This draft is based on the US Joint Publication 3-50.2 - Doctrine for Joint Combat Search and Rescue)

HISTORY OF COMBAT SEARCH AND RESCUE

The history of CSAR essentially begins at World War II. In 1939, Britain had no formal air-sea rescue organisation and depended in the war's first year on a loose organisation. Comprised of the Royal Navy, the Royal National Lifeboat Association, the Coastguard Services and the General Post Office, this organisation sufficed until the RAF developed a formal Air Sea Rescue (ASR) service.[3] As well as losing forced down aircrew due to an inadequate rescue organisation early in the war, the RAF also suffered losses due to inadequate equipment such as life preserver jackets and the absence of dinghies. Luftwaffe aircrew had much better survival equipment and were supported by a better-equipped rescue organisation. Initially using unarmed floatplanes painted in high visibility markings prior to the Battle of Britain, these rescue aircraft were promptly camouflaged and armed after Air Marshal Dowding, the Commander-in-Chief of RAF Fighter Command, ordered that they be shot down wherever possible to prevent rescued pilots from being quickly returned to action.[4] With Dowding's action setting the precedent for removing the immunity of SAR aircraft from attack, surface and air platforms of all sides participating in future rescues would often require protection. Despite their humanitarian role, these extra assets conducting many rescues soon became baits capable of generating fierce actions.

When the US entered the war in the European theatre, an agreement was forged for the RAF to conduct all air-sea rescue missions in the North Sea and English Channel. By the end of the war in Europe, the ASR Service had expanded into a large, dedicated organisation, rescuing over 14,000 allied and 500 enemy airmen.[5] Lack of suitable resources, competing operational priorities and a hostile air environment prevented the rescues of those allied aircrew unfortunate enough to be to be shot down over enemy land. These survivors were generally dependent on their own initiative and the underground networks of occupied countries for escape. Although special operations transport aircraft performed night missions inserting and extracting agents from occupied countries, these assets were dedicated mainly to the higher priority special operations in support of the resistance movements in occupied countries. Given the priority to justify the resources, CSAR on land could be very successful as evidenced by the daring rescue of Mussolini from Italian partisans by Germany's Colonel Otto Skorzeny, using gliders to land his special forces, release Mussolini and allow his evacuation by a short take-off and landing (STOL) Feisler Storch aircraft.

In the Pacific Theatre, CSAR was just as difficult with the long distances, technological limitations and competing priorities for resources. Many rescues of downed airmen at sea were effected by both sides using flying boats and floatplanes as part of surveillance missions, and by submarines on normal anti-shipping patrols. Special ground teams also conducted rescues. In one notable example, the survivors of a RAAF C-47 crash in Irian Jaya were rescued by US forces landing in a limited space by glider and recovered out of the same space by a C-46 snatching the glider.

[3] Bowyer, C., *Coastal Command at War*, London, Ian Allan, 1979, p 115.
[4] Deighton, L., *Battle of Britain*, London, Book Club Associates, 1980, p 112.
[5] Bowyer, C., *Coastal Command at War*, p 115.

tow cable during a low pass.[6] Rescue was an important component of the US bombing campaign against Japan such that almost one quarter of the force taking part in the last B-29 bombing mission of the war - almost 2,400 men - manned rescue aircraft.[7] Although the first rudimentary helicopters became operational only towards the war's end, they marked the beginning of a new capability in CSAR.

Improvements in helicopter technology by the time of the Korean War provided the means of landing in normally inaccessible areas for rescuing downed airmen or recovering troops of the United Nations (UN) forces. During October 1950, for example, two Sikorsky H-5 helicopters and three L-5 Sentinal light STOL aircraft evacuated 47 paratroopers from drop zones that had been surrounded deep in enemy territory near Pyongyang. Range limitations, however, prevented the deep missions necessary to rescue survivors from UN aircraft performing interdiction and strategic bombing missions. Where rescues drew enemy ground action, available tactical aircraft provided suppression fire.

The Vietnam War saw many of the rescue limitations in Korea overcome through the use of specialist rescue personnel, better equipment and dedicated organisations. Aircraft such as the HH-3E 'Jolly Green Giant' and the larger HH-53 'Super Jolly Green Giant' helicopters incorporated self-sealing fuel tanks, armour, defensive armament, rescue hoists and retractable in-flight refuelling probes to allow them to conduct the first deep penetration rescues. Improved personal survival equipment incorporating locator beacons allowed rescue crews to home on, and communicate with, survivors. Rescues became more joint with US Navy A-1 Skyraider aircraft providing ground suppression fire and protection for USAF rescue helicopters. For the first time in warfare, television images of captured US airmen were politically exploited by the North Vietnamese to erode support for the war in the US, providing a further incentive to rescue survivors in enemy territory.

Australian forces in Vietnam performed many 'hot extractions' and 'dustoffs' which met all the features of the CSAR definition. In numerous operations, Iroquois transport and gunship helicopters from the RAAF's No 9 Squadron fought actions with Viet Cong forces to recover Special Air Service (SAS) patrols and other Australian Army personnel from emergency situations, as well as to rescue crews from Australian and US aircraft downed in enemy occupied territory.[8] Perhaps the most daring and long-range CSAR mission in Vietnam was the unsuccessful US helicopter assault in 1970 on the Son Tay camp near Hanoi to release POWs. Unfortunately, these had been moved only days earlier, illustrating the importance of timely and accurate intelligence. Overall, USAF rescue operations in Vietnam between 1963 and 1973 rescued nearly 4,000 Americans for the loss of 71 CSAR personnel while US Navy teams rescued hundreds more.[9]

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[6] Balfe, John, *And Far From Home: Flying RAAF Transports in the Pacific War and After*, Macmillan Australia, Melbourne, 1985, pp 58-62.
[7] Beck, Alfred M., (Chief Editor), *With Courage: The US Army Air Forces in World War II*, US Government Printing Service, Washington, 1994, p 182.
[8] Coulthard-Clark, Chris *The RAAF in Vietnam: Australian Involvement in the Vietnam War 1962-1975*, Allen & Unwin in association with the Australian War Memorial, Sydney, 1995, pp 148-157.
[9] Atkinson, R., *Crusade: The Untold Story of the Gulf War*, London, Harper Collins, 1993, pp 135-136.

In 1975, US forces lost 41 soldiers and a number of helicopters to ground fire in an CSAR operation to free 39 crewmen of the US merchant vessel, Mayaguez, captured by Cambodian forces.[10] In 1977, Israeli Defence Forces rescued most of 106 Israeli hostages from a hijacked airliner flown to Uganda's Entebbe airport in an operation that exhibited all the features of a successful CSAR mission: good intelligence, well trained forces, a well rehearsed plan, close cooperation between air and ground forces, the right equipment, and effective command and control. The absence of most of these factors in 1980 culminated in the humiliating failure of Operation Eagle Claw, a mission to rescue US hostages in Iran, which may have contributed to the downfall of US President Jimmy Carter. Initially aborted by Presidential decision after too many crucial equipment failures, two US aircraft collided at the Desert One staging post in Iranian territory, leaving the bodies of eight dead US servicemen to be displayed by triumphant Iranian leaders to the world's television audiences as evidence of the US failure. In a final, desperate effort to free the hostages, the US attempted unsuccessfully to develop a rocket-assisted, specially modified XFC-130H super STOL Hercules, designed to land and take-off from a park or football stadium in Teheran.[11]

During the Gulf War, seven CSAR bases were established under the command of General Schwartzkopf's special operations commander, Army Colonel Jesse Johnson. Johnson decreed that 'reasonable confirmation' of a survivor's location had to be established before he would authorise rescue missions and so prevent random hunts and possible losses to his CSAR forces. While some caution was justified due to the Iraqis homing on the transmissions of downed aviators, the CSAR organisation was unpopular with US Navy and US Air Force aircrew who believed that rescues would have to compete with other special forces' priorities. Of the 35 aircraft shot down in the war, only seven rescue missions were launched to save only three of the 63 downed aircrew, a rescue rate of 4.6 per cent against a rescue rate of 36 per cent in the Vietnam War.[12] Although captured Coalition aircrew were paraded by the Iraqis to the world's television audiences, these images had little affect on the war's conduct, due most probably to its short, intense nature.

Nearly two years later, television images of a dead US soldier being dragged through the streets of Mogadishu helped end the US presence in Somalia. As described by the US Chairman of the Joint Chiefs of Staff at the time of the incident, General Colin Powell, 'We had been drawn into this place by television images; now we are being repelled by them'.[13] The Somalia incident with its near total failure of CSAR and the O'Grady incident are examples indicating that the 'CNN' factor is now an influence on CSAR that can only increase in the future. CSAR has now evolved into a highly specialised capability where the lessons learnt must be examined in conjunction with its requirements and elements to determine how it should be addressed by the ADF.

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[10] Falzone, Major Joseph J., USAF, *Combat Search and Rescue - CSEL Enhancements for Winning Air Campaigns*, Air University Press, Maxwell AFB, Alabama, December 1994, pp 61-62. (An important conclusion of the *Mayaguez* operation is that the crew had been released only hours before the US assault, illustrating the competitive demands of acting quickly versus the need for accurate intelligence and timely communications.)

[11] Cook, N., 'How Credible Sport made SuperSTOL a reality', *Janes Defence Weekly*, 5 March 1997, pp 18-23.

[12] Falzone, Major Joseph J., USAF, *Combat Search and Rescue - CSEL Enhancements for Winning Air Campaigns*, p xiii.

[13] Powell, C. with Persico J.E., *My American Journey*, New York, Random House, 1995, p 588.

Lessons for the Future

From the historical analysis, the following major lessons can be drawn that are as applicable today and for the future as they have been in the past:

a. The requirements for the CSAR role now have more political focus and attract greater media attention.

b. The absence of any of the essential elements comprising the CSAR capability can seriously jeopardise the success of a CSAR mission.

c. An enemy can be expected to make significant efforts not only to capture survivors but also to destroy CSAR forces conducting operations, making the mission highly dangerous.

d. The capability required for CSAR operations closely matches that required for special operations insertions and extractions.

e. The cost of capabilities and the shrinking size of armed forces are precluding for most nations the employment of assets dedicated to the CSAR role.

f. The CSAR role is liable to include the rescue of civilian hostages from hostile territory and situations during peace.

THE REQUIREMENTS FOR CSAR

The examination of history indicates many of the characteristics of the CSAR role and its increasing importance in modern warfare. This importance is reflected by the USAF Historian, Richard Hallion, in his comment on the disappointing performance of CSAR in the Gulf War: 'CSAR in peacetime is one of the first defense items to feel the budget axe, but in wartime one can never have enough'.[14] Nations that ignore the need for a CSAR capability in peace because of resource constraints may need to adjust their priorities when the results of its absence become too evident in conflict. As a result of The L'Armèe de l'Air's failure in 1995 to rescue the two man crew of its Mirage 2000 shot down in Bosnia, for example, it is now establishing a permanent CSAR capability. Similarly, the Luftwaffe is also planning a CSAR capability with its increased commitment to multinational crisis-management operations.[15]

To provide a basis for prioritising the CSAR task in relation to other defence tasks, the identification of the requirements for CSAR is most important. Historical evidence and current defence projections provide the following reasons for a CSAR requirement:

a. duty of care;

[14] Hallion, Richard P., *Storm Over Iraq: Air Power and the Gulf War*, Smithsonian Institution Press, Washington, 1992, p 246.
[15] Hewish, Mark and Janssen Lok, Joris, 'Pinpoint and pick up: combat search and rescue', *Jane's International Defense Review*, 1/1998, pp 36-37.

b. moral reflection of national values and beliefs;

c. prevention of political exploitation;

d. prevention of information exploitation;

e. retention of valuable military skills and experience; and

f. maintenance of combat morale.

Duty of Care

Current occupational health and safety legislation requires employers to exercise a duty of care in relation to all employees in the performance of their duties. While the profession of arms is deemed to have a requirement of 'unlimited liability',[16] personnel exposed to combat expect that their equipment, organisations and procedures are designed to optimise their safety in life threatening situations. Although issued in relation to US forces, the following words of former US Secretary for Defense, William J. Perry, are equally relevant in the ADF context:

Preserving the life and well-being of our Service members and civilians who are placed in harm's way while defending our nation's interests, is and must remain one of our highest priorities.[17]

Moral Reflection of National Values

Among Australia's national values and beliefs is a high value in, and consideration for, the preservation of human life. This is reflected in Australia's participation in humanitarian operations conducted on behalf of the United Nations in countries throughout the world, the provision of aid to developing countries and the provision of emergency relief to countries suffering disasters. Since the Vietnam War, Australia has exercised considerable caution in its commitment to conflicts such as Somalia and the Gulf War to ensure that ADF personnel are not exposed to risks not arising from direct threats to the national interest.

Political Exploitation

Political exploitation of captured military personnel has increased dramatically with the influence of the world's media. Starting with radio broadcasts and forced signed confessions by UN prisoners during the Korean War, and progressing to the exploitation of television images of captured US aircrew by the North Vietnamese during the Vietnam War, the use of the world's media demonstrated how a country's population could be targeted to erode political support of a conflict. Television images showing the desecration of the bodies of dead military personnel in Iran in 1980 and Somalia in 1993 demonstrated that personnel did not have to be alive to create a political impact. Where aversion to casualties continues to influence national public

[16] Hackett, Sir John, *The Profession of Arms*, Sigwick and Jackson, London, 1983, p 202.
[17] Extract from a slide used in a briefing given by the US Joint Combat Rescue Agency at a SAFE Symposium in the USA in October 1997.

opinion, then the rescue of live personnel and the recovery of bodies may have to be an essential political requirement for the conduct of conflict.

Information Exploitation

With military forces around the world adapting to the information age, the need for information is greater than ever before in the history of war. Superior fighting forces depend on information and its timely translation into action. In the past, limited information networks and the need for limited information in the performance of military duties restricted the distribution of information to 'a need to know' basis. Now, the proliferation of information networks and the need for military specialists, especially aircrew and special forces, to access a wealth of information in the performance of their duties, make them in the event of capture valuable sources of information for exploitation by an unprincipled and information-hungry enemy. Human intelligence is still regarded as one of the most valuable sources of information and its impact, from the determination of intents to the development of counter-measures to technology, makes it of vital importance in conflict.

Retention of Skills and Experience

The high degree of professionalism exhibited by personnel in armed forces throughout the world is a reflection of an increased investment in training and the provision of opportunities such as exercises to gain skills and experience. Retention of these fighting skills and experience has become more vital as armed forces become smaller and more highly specialised. Personnel lost in action, particularly military aviators, reduce a force's overall capability through the loss of their valuable skills and experience, as well as increasing the training burden. Replacing lost personnel is not only a function of monetary cost but also a function of time and individual ability. In conflict, the loss of a person with specialist skills and experience can readily be compensated by the expenditure of money to train a replacement; what cannot readily be compensated is the replacement of those skills and experience in a lesser time. Even more important, individuals with gifted warfighting abilities may never be adequately replaced. For example, history shows that 40 per cent of victories in air combat are claimed by only five per cent of the total number of fighter pilots.[18] In the strike role, Germany's Major Hans Ulrich Rudel claimed 519 Soviet tanks destroyed during World War II.[19] Any loss from such gifted warfighters represents a significant loss in fighting capability.

Morale

As morale has long been recognised as a major contributor to combat effectiveness, it is included among the ADF's Principles of War and those of other nations.[20] Among the factors influencing the morale of personnel in combat is the knowledge that every effort will be made to rescue them in life-threatening situations through the conduct of

[18] Spick, Mike, *The Ace Factor: Air Combat and the Role of Situational Awareness*, Naval Institute Press, Annapolis, 1988, p 2 of Introduction.
[19] Price, Alfred, 'Tanks for the memory', *Air International*, Vol 54, No 6, June 1988, p 340.
[20] Australian Defence Force Publication, *Operations Series ADFP1 - Doctrine*, Draft Edition 5, Director of Publishing Canberra, 1997, Paragraph 202.

CSAR. One of the impacts on aircrew operating over water in the European Theatre during World War II is summarised in the following:

> The psychological impact on all crews of knowing that if they were forced down in inhospitable waters immediate help was on its way was a tremendous boost to morale and confidence. Facing death on every sortie was already an enormous mental strain; the realisation that every effort would be made to retrieve them from the additional hazards of a sea ditching relieved the crews' minds of such extra doubts and worrying.[21]

THE ESSENTIAL ELEMENTS FOR THE CSAR ROLE

The successful performance of the CSAR role depends on a number of essential elements comprising a CSAR capability. Any omission or degradation of these elements is likely to reduce or jeopardise the success of any CSAR mission. Importantly, the identification of these elements and their specifications are a precursor to determining what forces are required, what assets need to be acquired, how they are organised, and how they are trained and operated. The following are the major elements considered necessary for the CSAR role:

a. doctrine and organisation,

b. timely communication of distress,

c. precision survivor detection and location,

d. survivor authentication and positioning,

e. accurate environmental and threat assessment,

f. integrated rescue package composition, and

g. expeditious rescue and recovery.

Doctrine and Organisation

The starting point for the conduct of the CSAR role and the development of a capability is its identification in basic doctrine at the strategic level. Such identification provides the basis for establishing an organisation that can then determine, resource and develop the necessary capability. At the operational level, doctrine will provide guidance for the command and control of CSAR operations including the requirements for plans, training, coordination, communications and intelligence. Doctrine at the tactical level will specify equipment to be used, procedures such as Isolated Personnel Reports (ISOPREP) and Evasion Plans of Action (EPA), and the requirements for coordination with all forces likely to be involved in CSAR tasks. Because of the joint nature of most military operations, particular emphasis needs to be placed on the joint doctrine for CSAR operations.

[21] Bowyer, Chaz, *Coastal Command at War*, p 116.

With the evolution of CSAR, its tasks have increased in complexity and profile, thereby requiring the development of dedicated organisations. As the US effort increased in Vietnam, for example, so also did the size and effectiveness of the CSAR organisations and their allocated resources operated by the individual services. Since then, the cost of improved air capabilities has resulted in reductions to the number of platforms operated by world air forces, with associated reductions to CSAR organisations and forces. These reductions, combined with an increased emphasis on joint operations, have led to a more joint focus in CSAR operations so as to optimise available resources. Part of this joint focus is the establishment of a Joint Search and Rescue Centre in joint headquarters to coordinate the Component Rescue Coordination Centres of each of the Services.

Timely Communication of Distress

While many CSAR discussions begin with survivor detection, history shows that the first link for success begins with the notification of distress, when possible, as this provides the early warning to rescue services to initiate action, so increasing the probability of survival. For aircraft and ships, this may start with a beacon that emits a distress call on initiation by either the crew or impact forces acting on the platform. Aircraft can be generally fitted with an Emergency Locator Transmitter (ELT) while ships can be fitted with an Emergency Position Indicating Radio Beacon (EPIRB). Individuals at sea and on land can be equipped with a Personal Locator Beacon (PLB) for providing transmissions for their location; PLBs may also have a send and receive voice capability to allow those in distress to communicate with rescue forces.

Such PLBs are associated not only with aircrew in survival situations but also with ground forces, especially Special Forces (SF), and naval forces conducting operations. A most significant feature of CSAR with its conflict scenario versus SAR with its peacetime scenario is that the notification of distress alerts not only the friendly rescue forces; it also alerts enemy forces in search of prisoners and the benefits they may provide, and rescue forces that provide additional targets. Transmissions that aid the rescue of survivors, therefore, can be used also to aid their capture. For this reason, a PLB needs capabilities such as signal encryption and burst transmission that reduce the risk of enemy interception and fixing of the survivor location using a Direction Finding (DF) apparatus.

Precision Survivor Detection and Location

The precision detection of survivors in a CSAR scenario is critical for numerous reasons. Historical evidence shows that initial survivors have a 60 per cent survival rate if they are located within eight hours of the original distress call but only ten per cent if the rescue is delayed by more than two days.[22] But the demands of war vary significantly from peace in survivor location. In peace, the aim is to locate the survivor by available means as quickly as possible; in conflict the same aim applies but the location must be achieved without compromising the position of the survivor and CSAR forces. To satisfy the requirements of peace and conflict, a PLB requires capabilities to allow quick detection and location of the survivor by friendly forces

[22] Brief by Wing Commander Augustin (STLO NAVAIR, Australian Embassy, Washington) on the WARRENDI Personal Locator Beacon Project, File No CNA/4160/3/574 (Not Dated), paragraph 4.

plus a means for the survivor to communicate details of condition and situation, but in a way that reduces detection and location by enemy forces. In essence, this requires the PLB to transmit in bursts to increase the difficulty of enemy location by direction-finding means and to employ an encryption capability to prevent enemy interpretation of communications between the survivor and rescue forces.

Transmissions from ELTs, EPIRBs and PLBs can be on one or a number of frequencies: 121.5Mhz, 243 MHz, 282.8 MHz and 406 MHz are standard frequencies, as well as selectable channels in the range of 225-399.975 MHz. The 121.5 MHz frequency is the international aircraft distress frequency with limitations due to its characteristics. It is an analogue signal that is not capable of either incorporating information about a beacon's identity or being stored by a satellite repeater unit for later transmission. For the location of a beacon transmitting on 121.5 MHz, it must be within a 900 kilometre radius of a Local User Terminal. Armed forces use the 243 MHz frequency as the international military distress frequency. The 406 MHz frequency is able to send a digitally encoded message capable of incorporating the beacon's country of origin, how the beacon was activated, and the identity of the vessel or aircraft or unit in distress. Locating the source of the emergency transmissions can be achieved by four means: the COSPAS-SARSAT system, broadcasting a position fixed by the Global Positioning System (GPS) using synthetic voice, transmitting a GPS position using COSPAS-SARSAT, and homing on transmissions using a direction finding receiver mounted on an air or surface platform.[23]

The satellite system currently used for international peacetime SAR is the COSPAS-SARSAT system. Consisting of two COSPOS satellites in low altitude polar orbits and two SARSAT satellites in low altitude, near polar orbits, the system is designed to receive transmissions from PLBs, EPIRBs and ELTs. Each satellite has a Search and Rescue Processor unit which can receive one of the three signal types, process the signal by converting it to a frequency of 1544 MHz, store the message if necessary, and amplify it to a strength sufficient to be transmitted to, and received by, a Local User Terminal. If a Local User Terminal is not within range, the repeater unit stores the information for transmission when a terminal comes into range. Transmissions received by the Local User Terminal are processed to provide the location of the emergency and this information is then transmitted to the nearest Mission Control Centre or a Rescue Coordination Centre.

Survivor Authentication and Positioning

As CSAR assets used in rescue missions can become lucrative targets, enemy attempts must be expected to entice rescue forces into ambushes. In CSAR missions conducted by US forces during the Vietnam War, for example, two SAR aircraft and one SAR crewman were lost for every 9.2 aircrew recoveries.[24] After Scott O'Grady

[23] COSPAS is a Russian acronym for Cosmicheskaya Sistyema Poiska Avariynich Sudov, meaning space system for the search of vessels in distress. SARSAT is an acronym for Search and Rescue Satellite Tracking system operated by the US National Oceanic and Atmospheric Administration (NOAA).

[24] Falzone, Major Joseph J., USAF, *Combat Search and Rescue - CSEL Enhancements for Winning Air Campaigns*, p 3 quoting figures from Lieutenant Colonel Richard Cole, *Mission Needs Statement for Combat Search Evader Locator (CSEL) Capability*, 4 February 1992.

was shot down in Bosnia, US officials, delayed the insertion of a rescue team fearing '... it was possible that the Serbs had found O'Grady's radio or his beacon and were planning to lure rescuers into an ambush'.[25] For these reasons, isolated personnel should not receive assistance until their identity has been authenticated.[26] The vehicle for authentication is the completion of ISOPREPs by personnel likely to be operating or isolated in enemy territory. Survivors should also expect that rescue cannot occur if they have been isolated in the near vicinity of enemy forces. By submitting their EPAs prior to a mission, operational personnel likely to be in a survival situation can alert rescue forces of their intentions to position themselves to a location where rescue can be safely expedited.

Accurate Environmental and Threat Assessment

The inherent danger of the CSAR mission and the characteristics required of the rescue package depend on an accurate assessment of the threats expected, the rescue environment and the routes to be planned. Failure to make this assessment accurately can jeopardise the success of the mission, and the lives of rescuers and survivors alike. Environmental assessments determine such factors as the characteristics required of the CSAR platforms, the CSAR personnel needed to assist in the recovery of survivors, allowances for weather, climate and astronomical conditions, and the best recovery zones. Threat assessments also determine recovery zones, ingress and egress routes, ground forces needed to secure recovery zones, the programming of Defensive Aid Suites (DAS), and the other air support needed.

The greatest danger to CSAR forces is not only the transit through enemy airspace over defended territory but also the risk of ambush at the received survivor location. Capture of survivors and their beacons, acquisition of beacons from bodies, the generation of decoy transmissions, and the homing of enemy forces to the immediate vicinity of survivors are some of the potential risks most feared by CSAR forces. Only by making accurate environmental and threat assessments can CSAR authorities decide if the risk of conducting a rescue is justified.

Normally, offensive and defensive operations take precedence over CSAR operations in conflict. Any possible CSAR operation must be subjected to the same cost-benefit analysis of any other operation, with an expectation that benefits will be equal to or greater than the costs. Considerations in any analysis should include not increasing the numbers in the survival situation, not exposing highly trained forces or high value assets to a high probability of loss, and not diverting resources from higher priority missions.

Integrated Rescue Package Composition

Depending on the operations being conducted as part of a campaign plan, CSAR forces may involve various combinations of air, surface and sub-surface forces, each with their own requirements to ensure the security of the mission. For example, the level of control of the air held by friendly forces will determine the level of Rescue

[25] Thomas, Evan, 'A Daring Rescue', *Bulletin:Newsweek*, 20 June 1995, p 71.
[26] AC SI(OPS) 4-9 - Combat Search and Rescue, SARO Air Headquarters Australia, Glenbrook, 1998, p 3.

Combat Air Patrol (RESCAP) aircraft and Rescue Escort (RESCORT) aircraft for suppressing enemy air defences. If ground forces are likely to be encountered in the rescue zone, close air support by RESCORT forces may also be required, as well as the carriage of ground forces to secure the zone, to locate survivors and to assist in their evacuation. Injured or wounded survivors will also require the carriage of specialist medical personnel. Other assets such as platforms with Airborne Early Warning and Control, and Electronic Warfare capabilities may also support the task.

While fixed wing assets may be suitable for some CSAR missions, rotary wing assets generally are the most likely to be suitable. Whatever assets are used, they need to fulfil a variety of fundamental characteristics such as payload, range, endurance, survivability and suitability. Endurance provides the basis for trading range versus time-on-task for searching while increased payload is traded against endurance. For deep rescue missions over long distances, an Air-to-Air Refuelling (AAR) capability may also be required to increase endurance. Survivability is enhanced by such DAS fitments as radar warning receivers, missile approach warners, chaff and flare dispensers, defensive armament, self-sealing fuel tanks, and armoured protection of vulnerable areas. Suitability requirements include avionics for navigation, sensors for location of survivors and enemy, rescue hoists, aeromedical equipment, and rescue support equipment.

Expeditious Rescue and Recovery

The basic CSAR requirements dictate a search capability to locate survivors, a capability to effect the rescue, and the characteristics to protect both the survivors and the rescuers during the rescue process. Air rescue capabilities may involve helicopters or transport aircraft, while air protection capabilities may involve either strike or tactical fighter aircraft. Other capabilities may include surface ships, submarines and ground forces. As all of these capabilities possibly used for CSAR are in short supply in most armed forces, competition for them in any conflict may be fierce. For example, many CSAR missions depend on the use of helicopters which for Navy are part of a ship’s weapons systems, and for Army are part of battlefield mobility and attack. Withdrawal of any of these platforms for CSAR tasks may have an adverse effect on other operations.

Any proposal for a dedicated CSAR capability or associated resources must expect fierce competition from other capability submissions having equal or higher priority. In conflict, a CSAR task may be initiated by any of three services and also employ their assets. These capabilities in many cases are almost identical to those required not only to extract Special Forces behind enemy lines but also to insert them. This immediately creates both a threat and an opportunity for the CSAR role in that assets acquired for special operations will also be suitable in most cases for CSAR operations.

DETERMINING A CSAR CAPABILITY FOR THE ADF

Requirement

Currently, the ADF identifies the requirement for CSAR as 'important' and that it 'must be specifically considered as a factor during operational planning'.[27] For the RAAF, CSAR is recognised as one of the roles to be performed during wartime or contingency operations.[28] Despite this recognition, the ADF has no organisation or assets dedicated to the CSAR task. Yet the potential tasks for which the ADF may have to conduct military operations have increased following the release of Australia's Strategic Policy in 1997. In this Policy, three basic tasks - Defeating Attacks on Australia, Defending Australia's Regional Interests and Supporting Australia's Global Interests - all provide the potential for military operations which may require the conduct of CSAR missions where the ADF may have to depend on at least some of its own resources.[29] Compared to earlier strategic guidance which focussed on defence tasks within Australia, the formal recognition of defence tasks outside Australia provides the potential for CSAR scenarios that could be part of joint, combined or coalition operations. Such operations possibly may employ resources from Australia, its allies or its neighbours.

ADF Doctrine

As well as identifying the requirement for CSAR, ADF doctrine also specifies that the Land Commander Australia (LCAUST) has the prime responsibility for the conduct of CSAR. As such, he is responsible for the provision of rotary winged aircraft and ground security, and the conduct of ground operations. For CSAR at sea, the Maritime (MCAUST) Commander Australia is responsible for the provision of platforms while the Air Commander Australia (ACAUST) is responsible for the provision of escort aircraft for land and sea environments.[30] Apart from this most basic of guidance, the current ADF joint doctrine is sparse in its content.

For the RAAF, the first draft of operational doctrine based on The Air Power Manual 3rd Edition was completed in July 1998 and should be released in 1999. While CSAR is addressed in this doctrine, its coverage also is brief. A significant initiative towards closing the gap in CSAR guidance has been the release in 1998 of Air Command Standing Instruction - Operations [AC SI(OPS)] 9-2 - Combat Search and Rescue. The aim of this Instruction, based upon the procedures in US Instruction JP3-50.2 - Joint Combat Search and Rescue, is to amplify the brief contents of ADF doctrine in relation to CSAR so as to provide better direction to Air Command units until a more comprehensive ADF doctrine is developed. Issues addressed include organisation and responsibilities, coordination, communications, planning, precautionary procedures, threat analysis, intelligence and procedures.

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[27] Australian Defence Force Publication, *Operations Series ADFP2 - Divisions of Responsibility Within the Australian Defence Force*, Director of Publishing Canberra, 1997, para 2706.
[28] *The Air Power Manual*, 3rd Edition, RAAF Air Power Studies Centre, Canberra, 1998, para 5.10.
[29] *Australia's Strategic Policy*, Defence Publishing and Visual Communications, Canberra, 1997, pp 29-32.
[30] Australian Defence Force Publication, *Operations Series ADFP2 - Divisions of Responsibility Within the Australian Defence Force*, para 2707.

Another initiative aimed at improving CSAR interoperability among Australia's allies was the release of the draft Air Standard 45/134 - Combat Search and Rescue by the Air Standardisation Coordination Committee Working Party 45 at its 26th meeting. As this draft is also based on US Instruction JP 3-50.2, it addresses issues similar to that of the draft AC SI(OPS) 4-9. At the tactical level, some headway has been made with the release, over the 1997-1998 period by No 81 Wing of Tactical Fighter Group and No 82 Wing of Strike Reconnaissance Group, of guidance on the completion of ISOPREPs and EPAs.

ADF Organisation

Both the AC SI(OPS) 4-9 and the draft Air Standard 45/134 address the organisational requirements for the establishment of environmental Rescue Coordination Centres and a Joint Search and Rescue Centre when conducting national military operations, plus the adaptations for multinational operations. Such emphasis has come only after years of neglect when the ADF has conducted military exercises without including any CSAR scenarios or the inclusion of the necessary organisational element to test a potential capability. Only in September 1998 during Exercise Phoenix conducted in northern Australia has a CSAR scenario finally been included to test the capability for the location, authentication, protection and extraction of survivors.

Those ADF units with rotary wing aircraft, the assets most likely to be used for the CSAR task, do not have this task included among their roles. Without such inclusion, therefore, they are neither equipped nor trained for the task although they do have a Search and Rescue capability. Although the Special Air Services Regiment (SASR) in the past has been responsible for the ground support component of CSAR operations, this responsibility was transferred in 1997 to 4 Battalion Royal Australian Regiment (4RAR) and to No 1 Commando Regiment. As neither of these two latter units was able to develop an adequate capability in time for the crisis in the Persian Gulf in early 1998, the SASR with a CSAR role was included among other Australian forces dispatched to Kuwait for the possible Operation Desert Thunder. At this stage, both 4RAR and No 1 Commando still are working towards the development of the CSAR ground support capability.

With the ADF's limited resources, the demand may be high for its Special Forces to conduct operations with priorities that preclude their support of CSAR. For such situations, the RAAF is implementing a proposal to allocate the responsibility for CSAR support to a selected pool of Permanent Air Force airfield defence personnel and a complementary pool of Reserve airfield defence personnel. In addition to the airfield defence core competencies, personnel selected for CSAR support will be given additional competencies such as advanced parachuting, first aid, communications and the calling of fire support.

Precision Survivor Detection and Location

As precision survivor detection, following any initial distress call in those scenarios involving the loss of a platform, depends on an effective PLB, the ADF is currently replacing Air Force's AN/PRC-90, Army's RT60B and Navy's SARBE beacons with the Siemens WARRENDI PLB. Three of the weaknesses of the AN/PRC-90 are its low power line-of-sight broadcast limit, susceptibility to DF by enemy forces and lack

of a geopositioning capability.[31] Utilising the civilian search and rescue infrastructure, WARRENDI employs the COSPOS-SARSAT system to alert a distress on several frequencies, to provide an accurate position to both survivors and searchers, and to provide communications between survivors and searchers. By broadcasting an unencrpyted synthetic voice with the Mayday call, GPS coordinates and a time stamp, WARRENDI allows searchers employing only radio receivers, capable of communicating on the 121.5 MHz and 243 MHz distress frequencies, to locate survivors and to communicate with them. While this overcomes two of the AN/PRC-90 deficiencies and allows ADF aircraft and ships to locate survivors without the installation of specialist communications equipment, the ability for enemy as well as friendly forces to receive the broadcasted unencrpyted distress information makes the beacon suitable only for peacetime use.

While US forces have replaced the AN/PRC-90 with the AN/PRC-112 which has a greater range and extra frequencies to make it more secure, it still suffers from line-of-sight limitations, lack of total security, and the requirement to fit a locator system on search platforms to interrogate the beacon and to determine the distance and bearing to survivors. A variant of the AN/PRC-112, the Hook 112, incorporates an integrated GPS receiver. Most of the disadvantages of WARRENDI, the AN/PRC-112 and the Hook 112, however, will be overcome by developments such as the new Combat Survivor Evader Locator (CSEL). Overcoming the line-of-sight limitation of the AN/PRC-90 and AN/PRC-112, and the unsecure feature of WARRENDI, the CSEL will use secure satellite aided data-burst communications to provide locational information, confirmation of message receipt to the survivor, and a keypad to allow communications to be authenticated easily by rescue authorities. [32] Produced by Boeing, the first 500 units of an overall order of 11,000 were to be delivered to the USAF in the first quarter of 1998.[33] Another similar capability has been produced by Tadiran Spectralink. Known as the Airborne Search and Rescue System, it incorporates a GPS receiver, voice/data relay facilities and an enhancement capability to communicate two-way encrypted digital messages with position, waypoints and pick up information.[34]

A major reason for the acquisition of WARRENDI despite its unsecure communication is its cheaper cost, the absence of a requirement to fit rescue platforms with specialised receiving equipment, and the rapid improvements with associated declining costs in PLB technology. With regard to the latter issue, the project managers consider that in the event of conflict, a PLB could be quickly acquired incorporating the latest technological improvements that satisfy combat conditions. While these are good reasons, personnel likely to be exposed to a CSAR situation in conflict are entitled to assurances that WARRENDI will be replaced by more suitable equipment such as the CSEL in a timely manner that allows adequate familiarisation with the equipment. For example, one report indicates that greater familiarity by Captain Scott O'Grady with his AN/PRC-112 after being shot down in Bosnia would have allowed his pick up two days earlier.[35]

[31] Falzone, Major Joseph J., USAF, *Combat Search and Rescue - CSEL Enhancements for Winning Air Campaigns*, pp 19-20.
[32] *ibid.*, pp 21-24.
[33] Hewish, Mark and Janssen Lok, Joris, 'Pinpoint and pick up: combat search and rescue', p 39.
[34] Hewish, Mark, *Jane's International Defense Review*, September 1997, p 18.
[35] Bellamy, Christopher, 'US pilot's mistakes tarnish image', *The Independent*, 1995.

Integrated Rescue Package

While the ADF may eventually produce more comprehensive CSAR doctrine, establish a CSAR organisation and make contingency plans to quickly acquire a suitable PLB for conflict, the provision of suitable air platforms and trained crews are less easily satisfied. As a relatively small defence force, the ADF cannot afford to have assets dedicated exclusively to the CSAR tasks. But many obstacles have to be surmounted before current assets, the most suitable being rotary wing assets, can be considered for the CSAR task.

Perhaps the greatest problem is the formal recognition of the CSAR role and its assignation to selected units, adding an additional responsibility to their current primary role with associated training demands in peace and possible diversion from other tasks in conflict. Failure to recognise and to assign the role on a formal basis has long term effects. For example, although the RAAF in Vietnam performed CSAR tasks on an as required basis, its lack of formal recognition resulted in the task being omitted when the rotary wing force was transferred to Army. As part of this helicopter force had also performed SAR tasks primarily for RAAF operations but also for civilian agencies on an opportunity basis, the SAR responsibility was outsourced to contractors. With this outsourcing went the ADF's opportunity to gain regular experience and training in the SAR elements of the CSAR role. Similarly, tasks conducted by RAN rotary wing squadrons do not include CSAR although they are equipped for SAR tasks. With the development of CSAR doctrine and organisation must come the development of a capability based on suitable platforms, support equipment and trained crews.

If the ADF is to seriously address the conduct of the CSAR role, it must examine the options for suitable platforms. These may come from current assets, the adaptation of current assets or the acquisition of new assets. If the ADF is not to allocate any of its limited, valuable assets exclusively to the CSAR role, consideration should be made on employing and adapting those assets also used for similar operations, such as special operations. Army, for example, currently equips and trains its S-70A-9 Black Hawk crews to conduct special operations. The use of Black Hawk assets for the CSAR role, therefore, is a distinct possibility while smaller aircraft such the Iroquois and Kiowa are much less suited for the task.

Navy has the potential to use its S-70B-2 Seahawks and the soon to be acquired Kaman SH-2G Sea Sprites for the CSAR role. But the diversion of these platforms from their primary roles of anti-submarine warfare or anti-surface warfare as part of the parent ship weapons systems plus the time to reconfigure the aircraft for the task make these options unpopular. The recent reconfiguration of the Sea King helicopter from the anti-submarine warfare role to the airlift role, combined with its range, payload and speed make it a more suitable option for CSAR in the maritime environment, subject to the necessary enhancements being made.

Another problem that exists in examining current platforms is range. Any of the CSAR tasks likely to be conducted in the context of scenarios arising from 'Defeating Attacks on Australia' or 'Defending Australia's Regional Interests' may require sorties over long distances or large sea areas. With the exception of establishing possible advance refuelling sites in enemy territory, the only other option for the

Black Hawk would be the incorporation of an AAR capability. Such enhancement would involve the modification of the aircraft for in-flight refuelling similar to that of the USAF's HH-60G Pave Hawk. While most helicopter manufacturers offer probes as add-ons that can be installed within hours,[36] the problem remains of converting current aircraft such as the C-130 Hercules to a tanking capability, the extra training for crews in AAR, and the diversion of further valuable and limited resources from their primary role. For long range sorties, another option is to use Army's CH-47D Chinook and also examine its potential for an AAR capability. In Europe, for example, the Italian Air Force has deployed its CH-47Cs as part of an air intervention force for possible long range operations in the Balkans theatre.[37]

One unusual development that could be an option for CSAR in a maritime environment is a special conversion for the C130 Hercules that allows it to be configured within a day as a floatplane with an amphibious capability. In this configuration, the aircraft can operate in up to Sea State Three at the expense of a reduction of nearly 6,000 kilogram in payload.[38] The performance of the C130, combined with the amphibious capability, suit it for Australia's unique defence requirements involving over-water operations, possibly resulting in losses within the sea-air gap. Rescues arising from such losses would require the C130's long range and a possible capacity to rescue large numbers of survivors such as an AP-3C crew or the crew of a naval vessel.

Perhaps the most promising but expensive option is the possible acquisition in the future of the Bell Boeing V-22 Osprey tiltrotor aircraft of which over 500 platforms are being acquired by US forces over the next 22 years. With a top speed of over 500 km/hr, a payload ranging between 21,546 kg and 29,948 kg, a range of up to 1700 km, and the ability for vertical take off and landing, the Osprey encompasses all the advantages of fixed wing and rotary winged aircraft together.[39] Despite its expense, such qualities and flexibility make the Osprey ideally suited for both special operations and CSAR operations.

As well as the range requirement, the dangerous nature of the CSAR role requires platforms to have other essential capabilities to meet mission requirements adequately. The major capabilities are DAS, covert sensors to locate survivors, rescue equipment and survivability enhancements. Already, the ADF is advanced with plans to fit DAS to transport and rotary wing aircraft with Project Air 5394 addressing the C130J, Chinook, Black Hawk and Sea King aircraft, and Project Sea 1405 and 1411 addressing the Seahawk and Sea Sprite aircraft respectively. Suites will include radar warning receivers, missile and laser warning receivers, and flare and chaff dispensers. Some C130J aircraft will be fitted with Directional Infra-Red CounterMeasures (DIRCM) systems and towed decoys. The C130H aircraft are also being upgraded with improved DAS under Project Air 5401. This upgrade will include additional aircraft and crew protection against small arms fire.

[36] Hewish, Mark and Janssen Lok, Joris, 'Pinpoint and pick up: combat search and rescue', p 36.
[37] *ibid.*, p 36.
[38] Information provided by Director General Capability Development (Aerospace), Air Commodore N. Gray, from a briefing on aerospace developments given in US during September 1998.
[39] Flamm, Don, 'The Dual Mode V-22 Osprey', *Asian Defence Journal*, 12/95, pp 119-121.

A further initiative is Project Air 5406 which will have the US Army and the ADF cooperating on research to protect selected rotary wing aircraft with the AN/ALQ-211 Suite of Integrated and RF countermeasures, the AN/ALQ-212 Suite of Integrated and IR Countermeasures and the AN/VVR-1 Laser Protection Detection Set.[40] Covert search sensors should include a suitable receiver for encrypted PLB transmissions, night vision goggles and forward looking infra-red sensors if possible. Rescue equipment should include at least one winch but possibly two for redundancy, and aeromedical equipment.[41] Survivability enhancements should include defensive weapons mounted on the aircraft, lightweight armour in the aircraft and crew vulnerability areas, low-reflective paint and infra-red exhaust-signature suppressors.

Accurate Environmental and Threat Assessment

Any conduct of accurate environmental and threat assessments as part of future ADF CSAR operations will require the analysis of information from a number of sources by intelligence agencies at the tactical, operational and possibly strategic levels. Sources can include survivors, on-scene crews, reconnaissance and surveillance agencies, and intelligence databases. The introduction of the ADF revised command arrangements project in 1996 has seen the progressive rationalisation and reorganisation of intelligence agencies. But the omission of CSAR scenarios from ADF exercises until only recently in 1998 has prevented these agencies from being tested with a CSAR scenario.

Just as there are competing demands and priorities for platforms in conflict, so there are even greater competing demands for intelligence products. Recent conflicts such as the Gulf War and Bosnia indicate that the increased information now available to intelligence agencies can be a limitation as well as a strength due to the amount of time required for processing. Of all the information, however, the most important is the information from the survivor or forces in the vicinity. USAF doctrine, for example, specifies that 'no recovery or pick up will occur until rescue forces can determine the survivor's location, condition and threat environment'.[42] With the survivor being one of the most accurate information sources, the priority to ensure that ADF personnel operating in enemy territory have a PLB capable of adequate two-way communications beyond line-of-sight becomes an imperative for conflict.

Another source of information is from reconnaissance and surveillance platforms supplying information to intelligence agencies. While major ADF air platforms providing information are the RF-111, the AP-3C and rotary wing platforms, the dangers to these platforms in enemy territory could have task priorities and risk management strategies preventing their use for CSAR tasks. Uninhabited Aerial Vehicles (UAVs) are now being employed overseas for the dangerous reconnaissance and surveillance role which could include CSAR tasks. Under the ADF's Joint Project 129 - Broad Area Aerial Surveillance and Focal Area Aerial Surveillance, UAVs are being considered with manned aircraft as possible options. Two of the UAV types being considered - Teledyne Ryan Aeronautical's Global Hawk and General

[40] La Franchi, Peter, 'Collaborative Approaches', *Australian Defence Business Review*, 13 March 1998, p 23.
[41] Hewish, Mark and Janssen Lok, Joris, 'Pinpoint and pick up: combat search and rescue', p 35.
[42] Falzone, Major Joseph J., USAF, *Combat Search and Rescue - CSEL Enhancements for Winning Air Campaigns*, p 32.

Atomics's Predator - both offer the opportunities for high endurance missions with multiple sensors to provide real-time information at no risk to human life.

Expeditious Rescue and Recovery

With the historical statistics indicating that survival rate increases as the CSAR response time decreases, the imperative is for the ADF to be well versed in addressing the various CSAR scenarios likely to be encountered in conflict. From the description so far of the forces likely to be part of a CSAR task, the orchestration of these forces by ADF command and control authorities in meeting the task will be extremely demanding. Without the skills developed in peacetime exercises, such orchestration can hardly be expected to be attained overnight during conflict. The requirement, therefore, becomes one of identifying all the possible CSAR scenarios, the necessary organisation, all the likely participants with the necessary equipment, skills and procedures, and then exercising these elements within the various scenarios.

An important component of expeditious rescue and recovery is where the survivor is injured and requires assistance before being winched onto the rescue platform, or needs assistance to move to a safer or more secure recovery zone. Such requirements may require CSAR personnel who can parachute to the survivor to provide that assistance. Such a capability requires specialised training normally practised only by special forces. In the case of Canadian Forces Air Command, for example, SAR Technicians not only are trained for this parachute role but also are trained to perform it at night using low-profile night vision goggles.[43] If the use of Special Forces cannot be guaranteed for performing this CSAR element, night operations will need to be included in the specialist equipment considerations and the advanced parachute training provided for those RAAF airfield defence personnel selected to support CSAR.

CONCLUSION

The history of conflict is a history of casualties that, while decreasing in modern warfare, shows no indication of disappearing completely. An expectation in the public consciousness of many countries, arising from the increased exposure to conflict by the world's media, is that everything possible will be done by military leaders not only to reduce casualties but also to rescue and to recover survivors or, in certain cases, their remains. The ADF should expect no less of the Australian public. As a relatively small defence force, the ADF is already tightly stretched in fulfilling its obligations and meeting the needs of an increasing range of roles. But in any of these roles during conflict, Navy personnel may lose their vessels in enemy waters, Army personnel may become isolated behind enemy lines and Air Force aircrew may lose their aircraft over enemy territory. Australia's political and military leaders must expect to be called to account by the public if any ADF personnel or Australian citizens are lost unnecessarily due to any inability or inadequacy of the ADF to conduct CSAR operations.

[43] Hewish, Mark and Janssen Lok, Joris, 'Pinpoint and pick up: combat search and rescue', p 38.

While the ADF currently is not structured for the CSAR role, the potential resides in assets, organisation and personnel to develop such a capability. Already, the ADF conducts special operations and most of the elements of this capability are applicable to the support of CSAR. Also, the RAAF initiative to give CSAR training to selected airfield defence personnel will provide additional CSAR support. As a start, the recognition of the CSAR role in current doctrine needs to be developed to a greater depth at all levels, culminating in the assignation of the role to the necessary units, especially those with the required platforms. A CSAR organisation needs to be established and tested against CSAR scenarios in the various exercises. Command and control at the operational level needs to be exercised through the establishment and the testing of component rescue coordination centres and a joint search and rescue centre. Shortfalls in equipment and training at unit level need to be identified and filled, with opportunities then being exploited to exercise and so gain experience that can be applied to doctrinal development. If budgetary constraints dictate that some compromises can be tolerated in peace, such as the unsecure limitation of the WARRENDI personal locator beacon, then contingency plans must be made for the immediate removal of any limitations at the first emergence of tensions leading to possible conflict.

Australia has shown itself a world leader in the morality it embraces as part of its national values. In defending these values, the ADF has demonstrated over its history that it can adapt to take on new roles. All that is required for the ADF to develop a CSAR capability is commitment by its leaders. Ignoring the need for an adequate CSAR capability ignores the reality of conflict and goes against the national morality with repercussions that may be strategic in impact. While recent history provides examples of these repercussions, the words of Marcus Flavinius around circa 50 BC provide a timeless warning: ‘If it should be otherwise, if we should leave our bleached bones on the sands in vain, then beware of the anger of the legions’.[44]

[44] US Joint Publication 3-50.2, *Doctrine for Joint Combat Search and Rescue*, Joint Chiefs of Staff, 26 January 1996, page 1-1.