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Editorial

Following the SIGLA[1] webinar on Expeditionary Logistics and Southern African Operations: What Next for the South African Military? held at the South African Military Academy in February 2024, this special issue focusses on the broad theme of Expeditionary Logistics and Southern African Operations. It also considers in general terms whether militaries in the Southern African Development Community (SADC) particularly the South African National Defence Force (SANDF) – are "fit for purpose" over expeditionary distances in Africa.

With respect to the SANDF in particular, one broad conclusion reached by many of our special edition authors, is that there is a marked difference between the unique logistics doctrine of the SANDF (and "what works in Africa") and the need to stay on a par with research, logistics doctrine, and best practice of modern militaries, especially those in the North Atlantic Treaty Organisation (NATO). Despite this tension, considering the logistic challenges that the SANDF experienced in multiple deployments since 2013,[2] there is a clear need to implement better logistics doctrine and systems in the SANDF. Research and doctrine development will be important elements in this process.

The term "expeditionary logistics" is generally applied to sustainment occurring far enough from a domestic support base to require sustainment over longer distances with increased time intervals. Since logistic and financial capacity for expeditionary operations in this sub-region is limited, the optimal use of scarce resources to prepare forces and sustain them during operations is critical. There is thus a need for further research on operational and expeditionary logistics in Southern Africa, particularly in terms of case studies, and a future perspective.

While all the authors who contributed to this special issue either have a military background, or are still serving as senior military officers, the articles in this special issue can be divided into two general groups. While the first four articles are predominantly academic or research articles, the last two contributions involve research combined with personal accounts from a practitioner's perspective reflecting unique data and personal reflections.

Ronald Ti used the case study of the Russo–Ukraine War (since 2022) to derive logistics implications for Southern Africa with reference to the use of uncrewed aerial systems as surveillance and weapons platforms, the extension of the "last logistic mile", the denial of

airspace, restricted medical support and the growing use of civilian contractors in current warfare. This article provides an important conceptual foundation on current logistics, supply chain management, military logistics and other key concepts in this regard.

Abel Esterhuyse and Evert Jordaan give a holistic perspective of SANDF logistics with reference to expeditionary operations since 1994. The authors provide conceptual clarity on resources and logistics from an operational perspective, and highlight the importance of logistics as a key indicator of the efficacy of a defence organisation and military power. They also explain that political ideology has a significant influence on logistics doctrine and the adaptability of armed forces during operations. The influence of the ambitious, revolutionary politico-ideological policies of the African National Congress on national planning priorities, foreign policy, socio-economic objectives, key industries and funding for defence is discussed. In particular, the tension between this political thinking and the inherited Western logistics system of the SANDF is highlighted.

Roy Marais and Wouther de Bruin analysed the difficulties involved in sustaining expeditionary forces in Africa, from a South African (SA) perspective. In their article, they explain the concept of logistics as well as military supply chain management, and performance-based logistics. They outline how logistics in the SA military evolved with reference to the Border War, the establishment of the SANDF, and its involvement in peace support operations in sub-Saharan Africa. The authors argue that, although the SANDF coped well supporting peace operations, the effectiveness of the SANDF logistic system was held back by centralised procurement and acquisition systems, restructuring according to business principles, and a dichotomy between logistics doctrine and practice. Marais and De Bruin argue that logisticians should be involved in the entire planning and execution phases of expeditionary operations to ensure that any strategy is viable by supporting material demands.

Leon Steyn's article reflects a historical perspective of the development of the South African Navy (SAN), its roles, interdepartmental support, and naval operations in the Southern Ocean from 1947 to 2016. The expeditionary-type capabilities and Southern Ocean operations of the SAN and its forerunner, the South African Naval Forces (SANF), are the focus. Steyn considers the Southern Ocean as the "third" ocean in which the SAN should be able to operate, not only to protect the exclusive economic zone of South Africa, but also to fulfil international obligations under the Antarctica Treaty.

Charles Ross's article explores the first involvement of the SANDF in peacekeeping operations in Africa, the doctrinal adjustments it had to make, as well as the lessons learnt from these operations from 1999 to 2003. Ross writes from both a personal and Joint Operations Division perspective, where he served as a senior staff officer for United Nations peace support operations. In these operations, he was closely involved with the logistics planning and memorandum of understanding with the UN in terms of the contribution by the SANDF to the United Nations Organization Mission in the Democratic Republic of the Congo (MONUC). Ross explains how the SANDF had to adapt to the new

training, equipment and sustainment demands of peacekeeping in Burundi, the Democratic Republic of the Congo (DRC) and Sudan – against the background of internally focussed defence reforms, integration of former forces, and "corporate" restructuring of the SANDF. Ross also provides background on the establishment of the Joint Operations Division, and the restructuring it required to direct not only domestic operations, but also peacekeeping operations.

Finally, Eeben Barlow provides a unique personal account from the perspective of a leading private military company contractor involved in logistics for expeditionary forces in Africa, following widespread operational experience on the continent through the work of the South African-based private military company – Executive Outcomes (EO) and later STTEP International. Barlow explains how since 1993, EO had to adjust its predominantly SA military logistics doctrine for various operations, starting in Angola. Barlow provides a logistics viewpoint of how EO assisted the Angolan government during operations against UNITA[3] forces, and how this experience provided numerous "lessons learnt" to refine EO logistics for subsequent operations in Sierra Leone, Uganda, the Central African Republic, and Nigeria. Barlow presents the operational findings and solutions from private military company logistics as practised by EO and STTEP in Africa, and as contained in his book, *Composite Warfare*.[4]

This issue also features five book reviews. David Jacobs reviewed David Kilcullen and Greg Mills' book, titled *The Art of War and Peace: Understanding Our Choices in a World at War*. Employing a Clausewitzian perspective, the authors highlight the pervasiveness of battlefield-centric approaches within a complex international strategic context, with ongoing war in, for instance the Middle East, Europe and Africa, and discuss the challenge to turn the use of military force into beneficial political results and enduring peace. Schalk Welgemoed reviewed *Professionals Talk Logistics: Sustaining Strategy and Operations* (edited by Jon Klug & Steve Leonard). This book emphasises the dependence of strategy and operations on logistics (including the supply chain environment), and the influence of technology (such as drones and artificial intelligence) in shaping the modern and future battlefield. This review highlights the tension between operational planners who are driven to project power and manoeuvre forces, and logisticians who must establish balance by indicating the sustainment limitations.

Louis du Toit reviewed *War of Intervention in Angola, Volume 5: Angolan and Cuban Air Forces, 1987–1992* (by Adrien Fontanellaz, Tom Cooper and José Augusto Matos), based on an expeditionary perspective. The review underlines the geographic, logistic, technical and command-and-control difficulties that the Soviets, Cubans and Angolans had to address in order to dominate the skies during this intense phase of the war in southern Angola. Johnny O'Neil reviewed the comprehensive interdisciplinary *Handbook of Military Sciences* (edited by Anders McD Sookermany), which covers various fields in social sciences, engineering and technology.

Point of Failure: British Brigadiers in France and Norway 1940 by Philip McCarty was reviewed by Graeme Plint. This review highlights the wartime careers of 156 brigadiers of the British Army from 1940, using social network analysis. Plint discusses the use of the latter methodology, and the presentation of McCarty's findings regarding the influence of upbringing, training and experience on career advancement in the British Army.

As editors of this issue, we extend our sincere thanks and appreciation to all the authors of articles and book reviews for their scholarship, professionalism and perseverance. This level of commitment enabled us to finalise the peer-reviewed content of this issue over a particularly short period.

Guest Editors

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Endnotes

1 The Security Institute for Governance and Leadership in Africa (SIGLA) is a research institute of Stellenbosch University, located at the Faculty of Military Science, Saldanha, South Africa.

2 These deployments include the Central African Republic intervention in 2013, the SADC Mission in Mozambique from 2021 to 2024 and the SADC Mission in the Democratic Republic of the Congo from 2023 to 2025.

3 Union for the Total Independence of Angola (Portuguese: *Uniao Nacional para a Independência Total de Angola*).

4 E Barlow, *Composite Warfare: The Conduct of Successful Ground Force Operations in Africa* (2nd ed.) (Pinetown: 30 Degrees South, 2016); E Barlow, *Composite Warfare: The Conduct of Successful Ground Force Operations in Africa* (2nd ed.) (Pinetown: 30 Degrees South, 2025).

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Observations from the Russo–Ukrainian War: Implications for Southern African Regional Expeditionary Logistics

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Abstract

A number of key observations affecting military logistics taken from the Russo–Ukrainian War carry important implications for logistic operations in Southern Africa. Despite these two areas of operations being quite dissimilar at a number of levels (i.e. geographically, climatically and politically), these have distinct implications, and the aim of this article is to outline five principal observations. Briefly stated, these are the use and evolution of uncrewed aerial systems and their role as surveillance and weapons platforms; the elongation of the so-called "last logistic mile"; the denial of airspace; the strategic importance of medical support; and the increasing presence of civilian contractors in the battlespace. This article will reflect on the importance of these observations, and highlight their importance in operational logistic planning in a future Southern African battlespace. Military logistic planners within South African Development Community[1] militaries should note and apply these observations to their own specific circumstances.

Keywords: Logistics; Expeditionary Logistics; Uncrewed Aerial Systems; Operational Logistics; Medical Support

Introduction

The term "expeditionary logistics", is generally considered to describe sustainment occurring at long distances with increased time intervals from a given national support area;[2] however, the term "expeditionary" itself is poorly defined. As one example, the 2023 *Australian Defence Strategic Review* has emphasised archipelagic manoeuvre operations to the north of Australia[3] and, given the distances involved, this clearly requires expeditionary logistics; however, the actual definition of "expeditionary" is missing. In an analogous way (with ocean replaced by land), potential operational areas extending northwards from South Africa also require sustainment through expeditionary logistics. Focussing on the current Russo–Ukrainian War[4] since 2022, logistic difficulties encountered by the Russian military in the initial phases have exposed its inability to deliver expeditionary logistics, with some observers arguing that logistic deficiencies have had a greater influence on the campaign than strategic deficiencies.[5] The distances involved are significantly less than those in Southern Africa, indicating that the term "expeditionary distances" represents any distance that is sufficiently long enough to attenuate and degrade a given military logistic (MILOG) system, regardless of absolute kilometres.

The study on which this article is based, demonstrated that, despite apparent differences across a number of parameters (for example in terms of geography, distances, character of war, operational intensity), key observations on military logistics gathered from the Russo–Ukrainian conflict can be applied to logistic operations undertaken regionally in Southern Africa.

The article will proceed in the following way. Following an initial disclaimer, the first section will define logistics, providing essential background information for non-specialist readers. The discussion will then proceed to a section focussing on the North Atlantic Treaty Organization (NATO) definition of logistics before outlining an archetypal joint logistic support network considered for current standard echelon deployment when undertaking logistic operations. A summary of the key logistics concept of push-and-pull sustainment then follows.[6] Subsequent sections will highlight five key operational observations that have been prominent in the Russo–Ukrainian War, and will also provide both observations gathered and clear implications for military logistic operations in the Southern African region. These extend to future Southern African military logistic operations, and each will be discussed according to every key observation identified in this article.

The five observations described in this article are based on recent commentary from writings by experienced military commentators since 2022.[7] The key observations arising from the Russo–Ukrainian War, which are the focus of this article, are:

- The development and constant evolution of uncrewed systems;
- The elongation of the "last logistic mile" concept;
- The presence of commercial logistic providers in the battlespace;
- The strategic importance of medical support; and
- Denied airspace.

While part of the intent of this special issue is to examine whether South African Development Community (SADC) militaries,[8] including the South African National Defence Force (SANDF), are fit for purpose over expeditionary distances in Africa, the emphasis in this article will be different. The aim of this article is to highlight operational logistics lessons learnt from the Russo–Ukrainian war since large-scale combat operations commenced in February 2022. The article does not discuss the operational capabilities of the military logistic system of each individual SADC member state, except in a general way with some brief comments. Further detail falls outside the scope of the current study. The article further assumes that military logistics is being conducted by small to medium-sized land forces typical of SADC militaries. Individual SADC militaries – and the degree of interoperability between the logistic systems of SADC militaries, especially in terms of doctrine and policy- are not discussed. In particular, the current study did not examine the operational logistics practised by the SANDF, although this would be widely considered the most prominent of these SADC militaries. While this article focusses

on generic medium-capability land forces (of which the SANDF could be considered a representative example) no direct commentary on the actual capability of the SANDF will be included. References to recent SANDF African operations will be made but only to emphasise certain points. The next section will provide a summary of logistics for the non-specialist reader.

Logistics

Militaries of all eras have always required sustainment and replenishment to continue to wage war and win battles. The first formal mention of the term "logistics" dates back to *The Art of War* by the nineteenth-century French general, Baron Henri de Jomini.[9] This work was the first to offer a succinct definition of logistics as the practical art of moving armies. In Article XLI of the work, Jomini considers one of the major functions of logistics to be the preparation of all the material necessary for setting the army in motion. This fundamental Jominian concept of movement continued to underpin the modern theory and practice of logistics, and the principles of supply movement elucidated in the nineteenth century have remained a fundamental doctrinal principle of modern military logistics. Every principal element of logistics discussed by Jomini in his 1838 work continues to be present in modern logistic doctrine.[10]

Logistics shares sustainment, support, and transport functions with the contemporary discipline of supply chain management (SCM). Much as with the term "defence logistics", the terms "supply chain management" and "logistics" are frequently used loosely and interchangeably in popular discourse and even combined as in the common use of the phrase "logistics and supply chain management". There is no agreement about the differences between SCM and logistics, with multiple definitions appearing in non-academic writing that are often inconsistent. A common point of difference is centred on whether the commentator holds a military versus a non-military, academic, supply chain discipline, or commercial provider perspective.[11] What is generally accepted, particularly in industry, is that the term "logistics" is regarded as one originating from the military, and that there is an equally broad definition of "supply chain management". Given the historical origin of logistics in the military, the following sections will define "military logistics" briefly.

Military Logistics

Following the description of logistics in the previous section, military logistics is a specific branch of logistics that enables the mobility, endurance, and sustainment of military forces, and is often referred to as "defence logistics", with the terms "military logistics" and "defence logistics" commonly used interchangeably. The current research utilised the NATO doctrinal definition as it reflects a widely accepted, multinational logistics doctrine that is in current, mainstream use. By being multinational, NATO doctrine is not nation-specific and is consistent with the generic content of this article. In addition, operational logistic doctrine in many Southern African countries is especially under-documented; hence, the use of multinational NATO doctrine addresses this gap. The principal reference is the NATO capstone logistic doctrine contained in Allied Joint Doctrine for Logistics

(AJP 4) Edition B, Version 1. According to AJP 4, "logistics" is defined as:

> [T]he science of planning and carrying out the movement and maintenance of forces. In its most comprehensive sense, the aspects of military operations which deal with:
>
> - design and development, acquisition, storage, movement, distribution, maintenance, evacuation, and disposition of materiel;
> - transport of personnel;
> - acquisition, construction, maintenance, operation, and disposition of facilities;
> - acquisition or furnishing of services; and
> - medical and health service support.[12]

North Atlantic Treaty Organization (NATO) logistic doctrine further defines military logistics as a grouping of logistic functional areas. This logistic doctrine identifies six discrete logistic functional areas.[13] These six NATO logistic functional areas as defined in AJP 4, the current, capstone NATO logistic doctrine document, are:

- Supply;
- Materiel life cycle support;
- Equipment maintenance;
- Movement and transportation;
- Services; and
- Medical.[14,15]

The NATO MILOG functional areas are effectively a collection of separate but non-mutually exclusive systems. A military logistic system can be regarded as a "system of systems" with each interacting dynamically with the others as well as with the external operational environment. Like the NATO doctrinal definitions presented above, the logistic functional areas can also be assumed in the present discussion on the Southern African operational context.

Operational Logistic Networks

Current NATO logistic doctrine describes operational logistic support as a system of logistic bases connected through logistic lines of communication. This doctrinal NATO operational logistic network is known as the Joint Logistic Support Network (JLSN) and is defined as:

> [A] system of interconnecting logistic nodes, activities, organisations and sites, and their multimodal links in the Joint Operations Area (JOA) … a typical JLSN will consist of, but not be limited to, points of debarkation points of embarkation; lines of communication (LOCs); logistic bases principally the theatre logistic bases (TLB); convoy support centres and staging areas.[16]

The JLSN is shown in Figure 1, as reproduced from NATO logistic doctrine. This shows a typical NATO force-level configuration of logistic units and support bases with representative communications and transport architecture connecting each part of the network. Figure 1 below shows the theatre logistic base (TLB), a force-level logistic structure sitting centrally within the NATO JLSN. The TLB is a concentration of force-level logistic force elements around which the JLSN is constructed. Typical logistic force elements located in the TLB are bulk fuel facilities, medical facilities, workshops, and other personnel support components, all of which are highly aggregated.

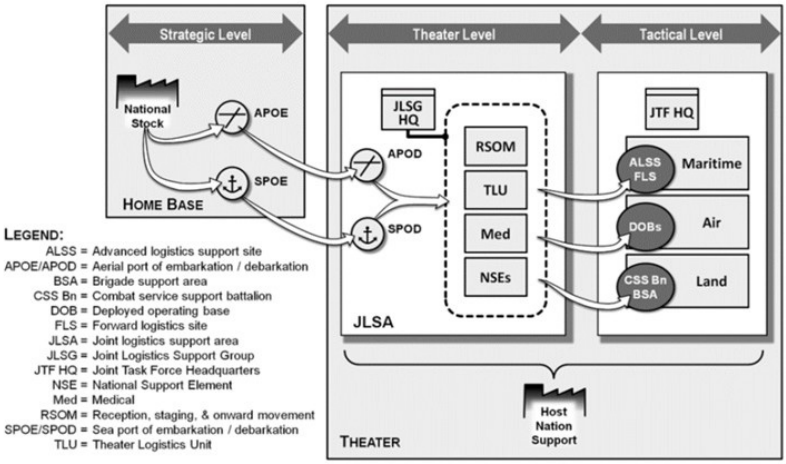

Figure 1: NATO land forces logistic support organisational chart[17]

The TLB itself occupies a substantial area, and, in the case of a NATO response force, comprises several brigade-sized units, may occupy tens of square kilometres representing a large logistic footprint. Until now, these facilities have been considered safe areas, well out of range of adversary strike. This particular logistic configuration has been employed successfully by NATO in the low-intensity environment, for example that of the International Security Assistance Force (ISAF) and OP RESOLUTE NATO[i] deployments in Afghanistan. Important enabling factors in this operational scenario were the presence of NATO air supremacy, as well as an indigenous adversary, which lacked major offensive support and effective standoff distance strike. Whilst this arrangement had worked well previously in a situation with a rear area relatively unaffected by adversary offensive fires, the Russo–Ukrainian War has shown that this is no longer the case. Whilst the NATO JLSN arrangement was adequate in providing sustainment in low-intensity and counter-insurgency environments, the Ukrainian conflict has exposed the vulnerability of aggregated logistic assets, such as a NATO JLSN TLB vulnerable to Russian stand-off

[i] The International Security Assistance Force operated under the auspices of NATO Operation Resolute from 2004 to 2010.

distance strike in the form of missiles or loitering munitions, such as the Iranian Shaheed uncrewed aerial system. For NATO to persist in concentrating its joint logistic support as aggregations of targetable logistic assets, would be inviting destruction in a zone of the battlespace previously considered out of range. The requirement for NATO logistics to deliver sustainment, all while disaggregated to reduce targetability, has been a major lesson learnt. This represented a substantial operational adjustment for NATO logistics, as systems and force structures will need to be modified to mitigate the evolving threat environment.

This description of a NATO doctrinal JLSN is relevant to a Southern African operational context for a number of reasons. First, conventional military deployments in Southern Africa employ much the same generic logistic echelon deployment as that which could be considered the equivalent of a TLB with logistic lines of communication (LLOCs) extending to more peripheral logistic nodes. It is therefore a valid model to present. Secondly, despite the likelihood that no potential Southern African conflict will involve major conflict, the same vulnerabilities to stand off distant strike, particularly in the form of weaponised uncrewed aerial systems (UAS) will be encountered. The same requirement for sustainment to be delivered by logistic nodes that are not aggregated in order to decrease their vulnerability to targeting applies to the Southern African operational context as much as it applies in Ukraine. This key fact will be highlighted in a later section of this article when the impact of UAS on logistics is discussed.

Push and Pull Logistics

In logistics, "push" and "pull" are terms used to differentiate the two principal methods of logistic sustainment. This particular terminology refers literally to whether logistics is "pushed forward" according to schedules determined by non-frontline echelon determinants, or, alternatively, is "pulled forward", with the key determinant being demand signals reflecting consumer need and usage rates. In the case of pull logistics, the end-user generates the usage-generating demand. Pull logistics ideally generates a series of demand signals, which drive the movement of sustainment forward through echelons. In the case of conflict, the end user will be the unit at the "sharp end" (frontline), which pulls sustainment from any notional rear area towards a notional forward edge of the battle area. Requests for materiel in the pull system are primarily centred on real-time demand and consumption. The main theoretical advantage of pull logistics is its responsiveness. In theory, given an effective and timely ordering system, pull logistics is the most appropriate arrangement for mitigating the invariable peaks and troughs of demand resulting from the ebb and flow of battle. The critical enabler in pull logistics is the de-centralisation and delegation of demand signal generation to the unit, which is actually located at the sharp end of the battle. The philosophy of mission command[18] underpins this approach. Expressed more formally, it is the forward logistic control element embedded within its respective combat formation, exercising flexibility and independent thought, which is the key enabler of pull logistics. Decentralised command elements, while not altogether absent, are less well represented in African military logistic systems, especially when compared to Western militaries.

By contrast, push logistics represents the conceptual opposite of pull logistics. As its name implies, push logistics is primarily driven by sustainment that is largely pre-determined. In push systems, materiel and resources are literally pushed forward, typically according to pre-determined usage rates. By contrast to pull logistics that is fundamentally consumption-driven – usage schedules determine the rate of push logistic replenishment, often determined at higher echelon levels, which are at some distance from the frontlines. By its nature, push logistics is not as reliant on the key features of decentralised command and high levels of delegation displayed in military logistic systems that emphasise pull logistics.

The diagrams below are oversimplified representations of these two logistic conceptual systems. Figure 2 depicts pull logistics, and here the end user drives the feedback loop (the red arrow) for sustainment (the blue arrow), enabled by command delegation and a degree of independence. The entire feedback loop achieves a degree of logistic homeostasis with adjustments being made primarily by the end user. It is important to note that this representation of a single demand and feedback loop is an oversimplification that does not show the multiple feedback loops that exist between the end-user and the pull logistic system, because these systems tend to be complex and adaptive, possessing multiple parallel nodes that confer intrinsic redundancy.[19] These are important reasons underlying why pull systems empirically tend towards greater resilience than push systems.

Figure 3 shows the push logistic system placing the locus of control centrally with secondary emphasis on feedback and flexibility on the part of the end user. This is a system that reflects centralised command and control. In the stress of battle, what little feedback exists may disappear, as represented by the lightning bolt. As a result of the dominance of centrally directed logistic command and control, push systems, by contrast, tend to be channelled and lack multiple nodes. The tendency of push systems to lack collateral feedback loops is a major factor leading to lower levels of system resilience characterising these arrangements. In these stylised representations of push and pull logistics, the relative sizes of the arrows are intended to represent the volume of movement and their relative importance. In Figure 3, the push logistic systems, feedback is less prominent, as reflected by the relative size of the red arrow, whereas centrally driven sustainment tends to be pushed forward according to perceived demand.

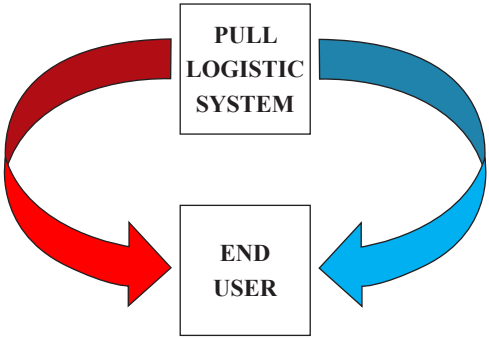

Figure 2: Pull logistics: feedback and sustainment form a dynamic feedback loop. Resilience is built into this system through delegation and flexibility.

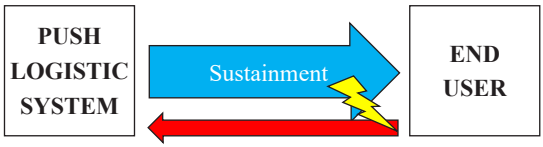

Figure 3: Push logistics: minimal feedback plus sustainment driven by usage schedules. These form a centrally driven system with poorly developed feedback loops. Push logistics is shown here intentionally as a linear system. Where what feedback exists may break down under the critical stress of warfare (as shown by the lightning flash), it becomes unidirectional.

In reality, the construct described above is an oversimplification. Military logistic systems are not exclusively push or pull in nature, and the mix will be modified according to a number of variables. One example related to Western military logistics is the extent to which contemporary SCM principles in widespread use in the commercial logistics sector have been adopted in military structures.[20] Western military logistics features widespread use of just in time (JIT) logistics, which is essentially a pull-driven system focussed primarily on cost-efficiencies, and stock management, developments which owe their origin to the SCM discipline, which in turn, is based heavily on commercial sector requirements. Notwithstanding this, in any given military logistic system, one of these methods will tend to predominate. In the Russian military, it is push logistics that dominates the Russian MILOG system. Amongst other factors, this situation reflects Russian centrally driven command systems.[21] This is a reflection of the persistence of centrally driven, relatively inflexible logistic demand systems of Soviet logistics manifesting in the newer NATO member militaries. The persistence of central control, a lack of peripheral decision-making, and the territorial, non-expeditionary nature of these former Warsaw Pact militaries (formerly aligned with the Soviet Union) have all hindered successful integration. The prior use of push logistics in such new NATO militaries is virtually universal.

It is apparent that critical deficiencies will arise in each logistic method given the shifting, unpredictable battlespace of modern warfare. Push logistics works best if usage is relatively predictable, particularly regarding optimisation of resource allocation, but can be inflexible, particularly when usage has been determined by higher logistic echelons. When the amount of friction naturally present in military command systems is factored in, the resulting time lag exacerbates the inflexibility of push logistics, handicapping its responsiveness. The comparative inflexibility of push logistics – when compared to demand-driven pull logistics – is its greatest disadvantage. In a shifting, unpredictable operational battlespace obscured by a dense, "Clausewitzian fog of war", a relatively annoying peacetime disadvantage can rapidly transform itself into a dangerous critical vulnerability. The inflexibility of Russian push logistics in the unpredictable operational battlespace of the Northern Kyiv front early in the Russo-Ukrainian war, exposed Russian critical vulnerabilities in logistics, leading to the failure of its strategic plan. The centrally driven system of push logistics was responsible for logistic difficulties in the initial stages of the 2022 invasion. Images of stalled and banked up Russian supply convoys reflected Russian push logistics, which continued to feed supplies forward without regard to the tactical and operational situation. The predominance of push systems in Russian military logistics is consistent with centrally driven, top-down command philosophies in the Russian military that are the ongoing legacy of deeply entrenched cultural and historical influences.

In the Southern African context, given the preponderance of centrally driven command systems, the most likely logistic methodology that will be employed will be push logistics. The relevance is that African military logistic systems – lacking well-developed demand signals and logistic information and relying on predetermined supply schedules – make it likely that logistic delays due to chokepoints and backlog will occur. Any expeditionary logistic planner in a Southern African military would do well to consider the balance and functionality of pull versus push logistics in their own military, particularly the level and development of the SCM system, and to plan accordingly.

Lethal Microclimates within Low-Intensity Operations

At first glance, the Ukrainian and Southern African areas of operation appear quite dissimilar. Obvious differences include not only shorter distances, a different climate and more benign terrain in Ukraine, but also fundamental differences in the character of conflict. The Russo–Ukrainian War is a major armed conflict at a much greater scale than the small wars that have characterised Southern African conflicts, notwithstanding historical engagements in which the South African Defence Force (SADF) was involved.[22] Regardless of intensity, these two situations are however linked across the spectrum of conflict by the presence of high lethality effects. While military operations in the past decade in Southern Africa have been characterised as "peacekeeping", "peace support" or "counterinsurgency operations", it is important to note that, despite these being low-intensity operations, high-lethality elements have been present, if not always applied. A useful analogy is that of a climate system, which can be described in general terms but within which microclimates exist, which may be quite the opposite of the prevailing

weather. A good example of this would be cloud forests existing in tropical climate zones. Due to the effects of altitude, precipitation and other factors, a microclimate is created that is altogether different from the prevalent one. In much the same way, the presence of certain weapons within a low-intensity battlespace creates a "high-lethality microclimate" just as deadly as that in Ukraine. Three of the five key observations that will be discussed below are directly attributable to logistics while two are high-lethality effects in the Ukrainian battlespace with directly attributable effects on operational logistics. The presence of these in the prevalent low-intensity operational environment of Southern Africa[23] results in an operational situation as lethal as the one in Ukraine. As described previously, the five key observations arising from the Russo–Ukrainian war and that will be shown to be relevant to a Southern African operational context are:

- the development and constant evolution of uncrewed systems;
- the elongation of the "last logistic mile" concept;
- the effect of commercial logistic providers in the battlespace;
- the strategic importance of medical support; and
- the effect of denied airspace.

In the sections below, each of these key observations and their relevance to expeditionary operational military logistics in Southern Africa will be highlighted.

Development and Constant Evolution of Uncrewed Aerial Systems

The Ukraine conflict has highlighted two major outcomes of widespread employment of uncrewed aerial systems (UAS) in the logistic battlespace. The first outcome is in the area of intelligence, target acquisition and reconnaissance (ISTAR). This emphasises the surveillance aspect of UAS ranging over the battlespace and acting as target acquisition enablers for long-range standoff distance strike. The second is the effect of UAS as flying ordnance highlighting their use as weaponised strike platforms.[24] The employment and evolution of these systems during the course of the Russo–Ukrainian war have changed the conduct of tactical-level logistics in particular. The effect of UAS in the tactical and operational battlespace in Ukraine is not novel, as the brief 2020 Nagorno–Karabakh conflict between Armenia and Azerbaijan was a distinct precursor, highlighting the employment of weapons systems, such as the Turkish Bayraktar TB 2 UAS, which have become well known on account of their use in the Ukraine war.[25] The Russo–Ukrainian war has highlighted the use of weaponised, UAS, employed increasingly as loitering munitions. The deployment of these particular assets with offensive-strike capability, whilst retaining their real-time surveillance functions, has increased the threat to logistic forces substantially. The ever-increasing range and persistence of UAS is further reason why the forward edge of battle area (FEBA) has now effectively been pushed further and further away from any notional frontline, presenting a real threat to rearward logistic units. In addition, the smaller size of many micro-UAS (often deployed at squad- or platoon-size tactical-level units) allows them to remain well below the detection threshold

of conventional ground-based air defence (GBAD) radar systems, further compounding the threat. Finally, despite current research, there remains a widespread lack of readily available effective weaponry against UAS, particularly for operational or tactical unit-level NATO logisticians, who often carry little more than individual small arms. This deficiency is also likely to be reflected in the case of African military logistic units.

Both Ukrainian and Russian use of UAS operating at multiple levels over the tactical battlespace in Ukraine, have been labelled by certain commentators as a game changer leading to the obsolescence of the tank in the modern land battlespace. While these kinds of opinions remain rightly disputed, what is beyond argument is the lesson that greatly enhanced ISTAR represents distinct increased risk and lethality for operational-level NATO logisticians. In addition, the Russian military deploys UAS directly from lower echelon, tactical-level units, unlike most equivalent NATO forces where UAS are generally deployed from centralised units often in brigade-sized formations or at higher divisional levels. It should be noted that, although this may have been the case at the beginning of the Russo-Ukrainian war, this situation has changed as a result of lessons observed from the conflict, with further refinement expected in NATO forces. Furthermore, the net result of such a preponderance of UAS across echelon levels within Russian organisational charts was an overall reduction in the 'reconnaissance-target acquisition-targeting-battle damage assessment' loop.[26] This has not only increased the rapidity by which Russian indirect fire assets acquire targets and execute fire missions, but also the speed at which these assets can adjust and then re-direct targeting. The result is to increase risk even further to NATO logistic units who are vulnerable at greater distances than previously. In a potential Southern African battlespace, whether during international or non-international armed conflict, deployed militaries can expect to encounter UAS deployed by potential adversaries. In a potential Southern African conflict, such adversaries may include non-state actors or insurgent groups.[27] The comparatively low costs of these systems has led to their widespread use and their cheapness and availability has made these systems a particular threat in asymmetric conflict situations of the kind that are likely to be encountered in a Southern African operational context.

The lethality of UASs has recently been increased considerably through augmentation of weaponised UAS with real-time streaming of flight vision in the form of "First-Person View" UAS (FPV UAS). Reports from the Ukrainian battlespace reflect how the use of these weapons in particular has affected MILOG survivability-and resilience.[28] Although both UASs and FPV drones are obviously not a logistic issue, what is important is that both their presence and effect in the modern battlespace have a direct influence on military logistics. Especially given the increasing range of these systems, safe rear area logistics bases (such as the TLB and logistic nodes located within an archetypal JLSN described earlier in this article) are no longer secure but directly targetable. Finally, the increasing use of wire-guided UAS which are not able to be jammed by conventional counter-UAS methods as well as the appearance of UAS enabled by artificial intelligence (AI) are worrying developments whose appearance in a Southern African operational battlespace can be expected. Countries in the SADC deployed to eastern Democratic Republic of the Congo (DRC) have already encountered weaponised UAS in eastern DRC. Recently

(August 2025) these have included "unjammable" fibre-optic cable-controlled first-person view drones.[29] One consequence of the appearance of UAS in the battlespace is the prolongation of the so-called "last logistic mile", a situation that will be described in the next section.

The Elongation of the "Last Logistic Mile" Concept

The phrase "last logistic mile" is used in logistic literature but, like the word "expeditionary", it is ill defined. In general, "last logistic mile" is used as a metaphor for that part of the logistic supply line subject to adversary action. The last logistic mile has generally been reckoned to be 15 km, a figure, which equated directly to the average 9-mile range of field artillery in 1914. In 2025, the reach of standoff distance strike weapons platforms and the increasing ranges of weaponised UAS have exposed these previously "safe" rear area logistic installations to attack far from any frontline. The last logistic mile now stretches effectively hundreds of kilometres, and has long since exceeded an actual mile. In the case of operational logistic nodes occurring along a logistic line of communication (LLOC) in future Southern African operations, the implications on force protection requirements are significant. Joint logistic support network arrangements consisting of operating bases, theatre logistic bases, and other aggregations of logistic facilities have been prominent in much of the African operational context. In the current threat environment, to mitigate the risk of targeting, such long-established logistic arrangements require re-evaluation, particularly with regard to key elements, such as dispersal, concealment, electromagnetic signature management, disaggregation, command arrangements and force protection. The last logistic mile concept has now been elongated to extend over hundreds or even thousands of miles. In fact, the phrase may now be a true metaphor, especially given that any relation to actual linear distance is now obsolete. If the last logistic mile is the distance over which operational logistic units can be targeted, then – given contested logistics in all five operational domains – the last logistic mile starts at the national support area itself. As an example of this, contested logistics in the cyber domain can target commercial shipping providers who may be responsible for expeditionary sea movement of land forces. As these commercial networks are overwhelmingly insecure, targeting these logistic elements would produce contested logistics before a force had even left port. The last logistic mile would then begin at the very first logistic node, and not the last. In the next section, the increasing presence and dilemmas of using commercial logistic providers in the modern battlespace are discussed.

Effect of Commercial Logistic Providers in the Battlespace

Observations related to contractors and commercial firms supporting expeditionary logistics are considered in this section. While these have not been a prominent feature of operational logistics in Ukraine, operational commercial support has now become a major component of Western expeditionary logistics and has resulted in widespread use of commercial firms to provide logistic capabilities, such as strategic airlift, fuel services, camp real-life support services, and multi-modal transport in major Western militaries. The key force protection issue with commercial firms relates to their "targetability" in a battlespace where the last logistic mile (as outlined in the previous section) is now

potentially hundreds of kilometres long and starts essentially from the national support area itself.[30]

Civilian contractors are generally considered under international law to be non-combatants;[31] however, this rule is not ironclad. There is insufficient space here to discuss the full scope of international law; however, as a generalisation, it is possible for an adversary to target contractors who are regarded as directly engaging in operations aimed against that adversary. A commercial logistic firm providing transport of fuel or ammunition close to the forward edge of battle area might be considered a legitimate target. In the Southern African context where adversaries may not be nation states but non-state actors, where non-international armed conflict (NIAC), rather than international armed conflict (IAC) was present, the situation becomes less clear-cut. The greater question is how an adversary – which might be a non-state actor and which, by definition, cannot be a signatory to international law and the laws of armed conflict (LOAC), engaged in a non-international armed conflict – can be held accountable, or indeed, will respect these rules at all. Furthermore, international law and LOAC only apply during IAC. On the commercial side, critical issues manifest as a result of the presence of contractors, such as insurance, commercial risk mitigation, compensation arrangements, and contract pricing effects. Any future Southern African military considering expansion of its expeditionary logistics capability to include commercial logistic outsourcing will need to consider all the relevant risk and force protection issues and then factor these into its logistic operational planning. It should be noted that virtually all current SADC member states place significant reliance on commercial logistics providers at all levels (strategic-operational and even tactical).[32] The next section highlights the key logistic functional area of medical support and its strategic importance.

The Strategic Importance of Medical Support

Ukrainian forces in the Russo–Ukrainian war have not only been challenged logistically by maintaining forward movement of materiel but also by rearwards movement of battle casualties. In future Southern African expeditionary situations, medical stabilisation followed by strategic aeromedical evacuation is not only a critical logistic, personnel support task, but it will also have major political importance in terms of strategic communication and perception management.[33] This is not the situation of a strategic corporal but rather that of a strategic casualty. In a constrained political environment where political will and perceived domestic support are critical enablers of any military operation, the effectiveness of medical personnel support may be a determinant of operational success in future African military operations, particularly if casualties are anticipated.[34] Strategic communication issues arising from medical support issues may well be a critical factor for future Southern African governments in retaining public support for future military operations. The essential requirement is for expeditionary logistics to include robust medical support systems, including deployable medical units suitable for treating, stabilising and evacuating casualties from the Southern African area of operations back to fixed tertiary facilities in the respective national support area. A critical element in the effective medical evacuation of casualties is aerial movement, which requires access to

the airspace. Denial of airspace has been a key feature of the battlespace with adverse effects on aeromedical evacuation, essentially stopping this means of emergency transport. The problem of denied airspace is presented in the next section.

Denied Airspace

Denial of the tactical and operational air battlespace over Ukraine has been a prominent feature of the Russo–Ukrainian war.[35] This has produced important lessons for NATO logistic planners, and in this air-denied battlespace, the NATO reliance on airpower, particularly its reliance on air superiority, has been highlighted. Some commentators have cited NATO over-reliance on airpower as a critical vulnerability exposed by the war.[36] The reliance by NATO on airpower has, in turn, resulted in a reciprocal under-emphasis on both ground-based air defence (GBAD) systems and on investment in surface-based strike capabilities, such as surface-to-surface missiles (SSMs). Another important capability required by NATO logistic units exposed by the Russo–Ukrainian war is the requirement for intrinsic GBAD systems at operational logistic levels. The war has demonstrated how lower operational echelon-based GBAD systems can produce a lethal tactical airspace for aircraft, at all altitudes and distances, resulting in denied airspace. The clear implication for Southern African military logistic operations is the vulnerability of logistic units and assets, which only a short time ago, were considered to be in "safe areas" well out of range of adversary action. As discussed in previous sections of this article, given the availability, cheapness, accessibility, lethality and range of UAS, the clear implication for Southern African logistic operations is the need to protect logistic assets as well as to disperse them. Unless Southern African military logistic units have organic GBAD systems, which are also effective against near-ground UAS, they will be critically vulnerable in a future operation. The important observation is that the GBAD system must be available at tactical and operational levels in land forces undertaking Southern Africa operations, particularly in supporting logistic units. With the increasing proliferation of UAS, the near-ground air domain has become a critical space, with its importance emphasised by the relative lack of effective counter-UAS systems.

Finally, as observed in the Russo–Ukrainian war, air denial has particular important implications for the essential personnel support function of aeromedical evacuation. The air-denied environment in the Russo–Ukrainian war has virtually halted the widespread evacuation of casualties by helicopter, a major feature of past low-intensity conflicts where Western forces have enjoyed air supremacy. The wider availability and distribution of GBAD systems have severely restricted the virtually unrestricted movement of helicopters in the land battlespace. Such unimpaired air movement was a common feature of the "bush wars", which the SADF undertook especially in Namibia and southern Angola from 1966 to 1989. Given an adversary with access to GBAD systems, particularly man-portable ones, this is no longer the case. The more widespread use of GBAD systems in Southern Africa has been shown recently in the DRC with both the United Nations Organization Stabilization Mission in the Democratic Republic of the Congo (MONUSCO)[37] and SADC forces being confronted by Rwandan-backed M-23 rebels equipped with sophisticated mobile GBAD systems in the eastern DRC.

Conclusion

The overall principal observation for logistics obtained from the Russo–Ukrainian war is that operational logistics has become more dangerous and considerably more vulnerable than ever before. Whereas in previous conflicts, logistic units were placed further back in rear echelons removed from the frontline of a linear battlespace, this is now no longer the case. Due to the appearance of uncrewed aerial systems together with the range, availability and lethality they represent, the long-standing concept of a logistic rear area, where logisticians would historically conduct sustainment operations in relative safety, has ceased to exist in the modern battlespace, as particularly demonstrated by the Russo–Ukrainian war. This article has highlighted five observations from the Russo–Ukrainian war, which would affect the conduct of operational logistics in future Southern African operations involving SADC militaries. These five key observations have a considerable implication for logistic planning for militaries with a high dependence on commercial logistic providers (such as the SADC militaries) for the reasons previously stated. Civilian, non-combatant contractors are even more vulnerable to the effects described in this article. Given the recent logistic difficulties experienced in eastern Congo by the SADC regional peacekeeping force, SADC military logisticians would do well to take note of the observations from the Russo–Ukrainian war described here.[38]

Endnotes

[*] Dr Ronald Ti was awarded a PhD in Military Logistics from Defence Studies Department of King's College London in 2025. He researched the resilience of NATO military logistic units at the tactical level of war in NATO Article V large-scale combat operations. Dr Ti is currently an affiliate lecturer in the Defence Studies Department, King's College London at the UK Defence Academy at Shrivenham, an affiliate lecturer at Maynooth University, Ireland, and a visiting lecturer at the Finnish National Defence University in Helsinki, Finland, Baltic Defence College in Tartu, Estonia, and the Swiss Military Academy in Zurich, Switzerland. He is currently a colonel in the Australian Army Reserve and in a 30-year career has been engaged principally as a logistician/staff officer.

[1] The Southern African Development Community (SADC) is a regional economic community comprising 16 member states.

[2] The term "national support area" is generally taken to mean the nation from which that military originates and which is the primary source of its sustainment. For example, for a given SADC country, the national support area would be that particular nation, i.e. Botswana in the case of the Botswana Defence Force.

[3] Australian Government, *National Defence: Defence Strategic Review* (Canberra 2023), 7.

[4] This article focussed on the period from February 2022 when the Russian invasion or so-called special military operation commenced. It is acknowledged that Ukraine has been in direct conflict with Russia since 2014.

[5] R Ti & C Kinsey, 'Lessons from the Russo-Ukrainian Conflict : The Primacy of Logistics over Strategy', *Defence Studies*, 23, 3 (2023), 381–98. https://doi.org/https://doi.org/10.1080/14702436.2023.2238613

[6] Specialist (logistician) readers may choose to skip these initial sections and read from this point forward.

[7] Ti & Kinsey, 'Lessons from the Russo-Ukrainian Conflict'; P Skogland, T Listou & T Ekström, 'Russian Logistics in the Ukrainian War: Can Operational Failures Be Attributed to Logistics?', *Scandinavian Journal of Military Studies*, 5, 1 (2022), 99–110. https://doi.org/10.31374/sjms.158; M Zabrodskyi, J Watling, OV Danylyuk & N Reynolds, 'Preliminary Lessons in Conventional Warfighting from Russia's Invasion of Ukraine: February–July 2022', *RUSI Special Report*, 30 (2022), 69; J Watling, *The Arms of the Future* (London: Bloomsbury Academic, 2024); R Ti, *Russian Military Logistics* (Tallinn: International Centre for Defence and Security, 2022); R Ti, 'Logistics Lessons Observed: A Critical Enabler and Vulnerability', in T-D Young & J Gryz (eds.), *Tactical and Strategic Insights from the Russo-Ukrainian War* (Exeter: University of Exeter Press, 2025), 184–202.

[8] For SADC, see https://www.sadc.int/pillars/defence

[9] AH de Jomini, *The Art of War* (GH Mendell & WP Craighill, trans.) (Philadelphia: J B Lippincott & Co, 1862), 69.

[10] For example, quoted in current Australian Defence Force (ADF) logistics doctrine, see ADF, Australian Defence Doctrine Publication 4-0, *Defence Logistics*, AL1 (2017), 1A-2.

11 For a typical and recent (2021) commentary originating from the commercial supply chain management sector, see A Jenkins, 'Supply Chain Management vs Logistics: Differences, Similarities and Roles', *NetSuite*, 25 July 2022. <https://www.netsuite.com/portal/resource/articles/erp/supply-chain-management-vs-logistics.shtml> [Accessed on 30 December 2025]. This offers a commonly repeated definition of the "difference" between logistics and SCM; however, the definitions presented in non-academic writing of this kind frequently lack supporting research or references.

12 NATO, Allied Joint Publication (AJP-4) *Logistics*, Edition B, Version 2 (2018).

13 NATO, Allied Joint Publication (AJP-4) *Logistics*, Edition B, Version 2 (2018), 5-5.

14 NATO, Allied Joint Publication (AJP-4) *Logistics*, Edition B, Version 2 (2018), 5-5.

15 The NATO Logistics Committee is the highest-level authority in NATO on logistics. On 10 February 2023, a working paper was circulated that reclassified the NATO logistic functional groups and added a number of "logistic-related areas". The working paper differentiates between "logistics" and "sustainment" and describes four logistic functional areas, being supply, movement, maintenance and services. "Medical" is classified by this paper as a 'logistic-associated area' and no longer a core logistic functional area. While this working paper was written to reflect lessons emerging from the Russo-Ukrainian war and the 2022 NATO Summit in Madrid, it has not yet been reflected in current NATO logistic doctrine, which accordingly is yet to be updated. The current AJP 4, from which the current study took its basic definitions, is likely to remain unchanged for at least two years (Source: Personal communication with the Department Head of the NATO Multinational Logistic Coordination Centre, Finnish National Defence University, Helsinki, 26 November 2023); NATO Logistics Committee, *NATO Policies and Principles for Logistics*, Working Paper, MC 319-4, 23 January 2023.

16 NATO Logistics Committee, *NATO Policies and Principles for Logistics.*

17 NATO, Allied Logistics Publication (ALP 4.2) *Land Forces Logistics Doctrine*, Edition B, Version 1 (2015), 2–9.

18 Mission command philosophy is universally taught, practised and promoted throughout many militaries, particularly in the West. Mission command makes units less reliant on one central point of command, devolving command and leadership away so that in the event of the central point of command being neutralised or made ineffective, subordinate units can (theoretically) continue to function. Mission command devolves much decision-making to subordinate levels of command and aims to make clear to these subordinate levels what the intent of the commander is. Mission command imbues the subordinate with an understanding of the mission. It enables the subordinate with the resources needed to achieve the assigned mission, but leaves the actual details of execution to the subordinate. For a comprehensive reference, see Department of the US Army HQ, *US Army Publication ADP 6-0: 'Mission Command'* (Washington, 2019).

19 H Kim, S Moon & H Moon, 'Parallel Military Supply Chain for Resilience', *International Journal of Advanced Logistics*, 6, 2 (2017), 80–87. https://doi.org/10.1080/2287108X.2018.1472966.

20 R Acero, M Torralba, R Pérez-Moya & JA Pozo, 'Value Stream Analysis in Military Logistics: The Improvement in Order Processing Procedure', *Applied Sciences*, 10, 1 (2020). https://doi.org/10.3390/app10010106

[21] It should be noted here that legacy Soviet logistic systems have been described by certain commentators as one of the principal blockages to NATO interoperability and modernisation in former Warsaw Pact nations acquiring NATO membership over the past two decades, particularly as these are inconsistent with the predominant Western mission command philosophy. See T-D Young, 'The Challenge of Reforming European Communist Legacy "Logistics"', *Journal of Slavic Military Studies*, 29, 3 (2016), 352–370. https://doi.org/10.1080/13518046.2016.1200376

[22] E Kleynhans & D Katz, *20 Battles: Searching for a South African Way of War* (Johannesburg: Delta Books, 2023), 199–255.

[23] It should be noted that this is a generalisation that obviously may not be applicable, particularly given the variation in actual scenarios. For example, operations carried out by the SADF in the 1960s, 1970s and 1980s could not be considered low-intensity operations and involved multi-domain operations, such as air combat over Angola. Compared to major, large-scale combat operations, it would however be safe to say that the majority of operations carried out in Southern Africa have been of the low-intensity, counter-insurgency kind and not major war.

[24] O Molloy, *Drones in Modern Warfare: Lessons Learnt from the War in Ukraine* (Canberra: Australian Army Research Centre, 2024).

[25] A Bakir, 'Turkey's Electronic Warfare Capabilities: The Invisible Power Behind Its UACVs', *RUSI*, 2021. <https://www.rusi.org/explore-our-research/publications/commentary/turkeys-electronic-warfare-capabilities-invisible-power-behind-its-uacvs> [Accessed on 30 December 2025].

[26] LW Grau & CK Bartles, *The Russian Reconaissance Fire Complex Comes of Age* (Oxford: Changing Character of War Centre, 2018), 180–82.

[27] H Haugstvedt & JO Jacobsen, 'Taking Fourth-generation Warfare to the Skies? An Empirical Exploration of Non-state Actors' Use of Weaponized Unmanned Aerial Vehicles (UAVs – "Drones")', *Perspectives on Terrorism*, 14, 5 (2020), 26–40.

[28] Zabrodskyi *et al*., 'Preliminary Lessons in Conventional Warfighting', 69.

[29] Military Africa, 'Fiber Optic FPV Drones Emerge on African Battlefields', 2025, https://www.military.africa/2025/08/fiber-optic-fpv-drones-emerge-on-african-battlefields/ [Accessed on 23 September 2025].

[30] R Ti, 'Military and Civilian Integrated Logistics: Caveat Emptor (Let the Buyer Beware)! Considerations for the NATO Article V Battlefield', *War Studies University Scientific Quarterly* 113, 4 (2018), 19–33.

[31] The principle of "distinction" is employed to distinguish between combatants and non-combatants, and it is in the latter category that non-uniformed civilians fall. See the International Committee of the Red Cross website, which defines these rules quite clearly: https://ihl-databases.icrc.org/en/customary-ihl/v1/rule1

[32] Personal communication with Prof. A Esterhuyse, Professor of Military Science, Stellenbosch University, Saldanha, 19 February 2024.

[33] R Ti, 'The Strategic Vulnerability of NATO Blood Supply Logistics : A Case Study of Estonian National Defence', *Defense and Security Analysis*, 38, 3 (2022), 1–20, https://doi.org/10.1080/14751798.2022.2076343

[34] A Epstein, R Lim, J Johannigman, CJ Fox, K Inaba, GA Vercruysse, RW Thomas, MJ Martin, G Konstantyn & SD Schwaitzberg, 'Putting Medical Boots on the Ground: Lessons from the War in Ukraine and Applications for Future Conflict with Near Peer Adversaries', *Journal of the American College of Surgeons*, 237, 2 (2023), 364–73, https://doi.org/10.1097/xcs.0000000000000707.

[35] J Bronk, N Reynolds & J Watling, 'The Russian Air War and Ukrainian Requirements for Air Defence Special Report', *RUSI*, 2022. <https://rusi.org/explore-our-research/publications/special-resources/russian-air-war-and-ukrainian-requirements-air-defence> [Accessed on 30 December 2025].

[36] J Bronk, 'Regenerating Warfighting Credibility for European NATO Air Forces', *RUSI*, 2023. <https://static.rusi.org/whr_regenerating-warfighting-credibility-nato_0.pdf

[37] Established in July 2010, MONUSCO is the UN Peacekeeping mission established in Eastern DRC. See: https://peacekeeping.un.org/en/mission/monusco

[38] As one recent example of the failure of SANDF logistic support in the recent SANDF deployment to eastern Congo, see G Martin, 'Budget Cuts Have Facilitated SANDF's Decline, Holomisa Says Amid DRC Crisis', *Defenceweb,* 30 January 2025. <https://www.defenceweb.co.za/sa-defence/sa-defence-sa-defence/budgets-cuts-have-facilitated-sandfs-decline-holomisa-says-amid-drc-crisis/> [Accessed on 23 September 2025]. For another source that specifically describes logistic support as "limited" or "absent", see T Mandrup, 'Lessons From the SADC Mission in Mozambique (SAMIM)', Conflict & Resilience Monitor, African Centre for the Constructive Resolution of Disputes (ACCORD), 2024. <https://www.accord.org.za/analysis/lessons-from-the-sadc-mission-in-mozambique-samim/> [Accessed on 23 September 2025].

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South African Military Logistics: A Holistic Perspective

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Abstract

During peacetime, the South African military has experienced cyclical neglect to the detriment of its ability and readiness to conduct and sustain expeditionary operations. Since the South African democratic transition, this pattern of neglect manifested again, which left the military largely unprepared for interventions and expanding involvement in peace operations in Africa since the late 1990s. The aim of the study on which this article reports, was to provide a contextual understanding of logistics as a strategic variable for the South African military, with specific reference to logistics related to expeditionary operations. Within this context, logistics is considered an important indicator of the functionality of a defence organisation. In the post-1994 period in South Africa, various dichotomies emerged between the political ideals of the ruling party pertaining to foreign policy, economics and development on the one hand, and the limitations that government placed on the South African National Defence Force in terms of its roles, funding and deployment, on the other. The paradigmatic tension between the design principles of the logistic system of the defence force and the predominant political thinking in government is discussed. Within the military context, the influence of leadership, old paradigms and legacy equipment on logistics and finances receives attention. The restructuring of the defence force in the late 1990s and the disruptive influence thereof on procurement systems and generic logistic functions, is covered. It is argued that the military has not undergone the necessary doctrinal innovation or reforms to promote efficiency, accountability and effectiveness within the domain of logistics for expeditionary operations.

Keywords: South African National Defence Force, Logistics, Expeditionary Operations, Peace Operations, Doctrine, Defence Procurement, Restructuring, Deloitte & Touche

Introduction

The article was not written by logisticians for logisticians. Rather it is an outside-in holistic perspective that explores South African military logistics from a strategic and top-down perspective. The article therefore aims at providing contextual understanding of logistics as a strategic variable for the South African military, with specific reference to logistics related to expeditionary operations. Although Department of Defence (DOD) annual reports and strategic business plans over the last two decades have confirmed serious logistics problems in the South African National Defence Force (SANDF), the breadth and depth thereof are often not sufficiently covered. From both an inside and an outside perspective, there seems to be consensus on the observable logistic problems in

the SANDF, which hamper expeditionary operations, but there is often no clarity on the origin of these problems, the higher-order limitations, or how to address these challenges.

Defence policymakers in South Africa are well aware of the importance of expeditionary logistics. Ideally, deployed SANDF units should have 'joint and expeditionary sustainment capabilities that support the full spectrum of conflict, consistent with the joint operational concept',[1] which implies the existence of a 'single, integrated, responsive, end-to-end distribution system, capable of interfacing with inter-agency and multinational capabilities'.[2] As with other relatively young democracies after the Cold War, the achievement of such an ideal was hampered by legacy political and military thinking, and misconstrued assumptions about the role of society to fund the perceived needs of the armed forces.[3] Insufficient military reforms and innovation since the SANDF became involved in peace operations, has inhibited the retention and enhancement of the expeditionary capabilities of the SANDF and its ability to support such operations logistically within a rapidly changing battlespace. The SANDF remained largely fixated on viewing peace operations as a secondary function to be performed through the collateral utility of its conventional 'Growth-Core Force Design', as specified in the 1999 White Paper on South African Participation in International Peace Missions.[4] The extent of SANDF peace operations and foreign military commitments however quickly outstripped its initial assumptions for a limited external role. For over two decades (2005–2025), the DOD has acknowledged that the SANDF is facing significant logistic shortcomings with the maintenance and repair of vehicles, equipment and facilities, as well as limited skills and experience of logistic personnel.[5]

The article commences with a discussion of the concept of logistics and the importance of resources in the formation of military power and logistic capacity to sustain expeditionary operations. In the second part, the enduring role of the South African military in expeditionary operations since its inception is explained, but also the tension this created with localised military roles and logistic systems that came under increasing pressure since democratisation, especially during unilateral and intervention operations. The third part of the article presents a discussion of the influence of legacy political thinking and doctrine on a military, and the importance of logistics as an indicator of the functionality of a defence organisation. Here, the tension between centralised and decentralised approaches is discussed with reference to South African (SA) political and military transformation since 1994. The fourth part covers the influence of centralised approaches in the SANDF with reference to leadership, decision-making, logistics and finances. The fifth section considers the influence of legacy paradigms and systems from the Bush War era on SANDF capability development and logistics. The sixth section explains the detrimental influence of the restructuring of the SANDF during the late 1990s on its logistic capabilities. The seventh part discusses the logistic difficulties experienced during expeditionary operations within the context of joint operations doctrine and planning, decreasing funding, as well as procurement challenges. The penultimate section covers Project Thusano and the influence of Cuban technical projects, among others on the serviceability of SANDF vehicles. The last part pays attention to the lack of logistic reforms and accountability management in the SANDF.

Logistics Matter: An Old Refrain!

Logistics is the oldest and most complex managerial aspect of war.[6] Logistics, i.e. the management of military means and resources, is an essential, critical, and very tangible reality of anything military. Militaries exist because of logistics, and can act strategically only if their logistics allows them to do so. There is no strategy or tactics without logistics. As Martin noted in a pragmatic way in a recent publication, 'if you only get one thing right as a leader, opt for a correct strategy before anything else … once you have worked on the strategy, you must always base your plans on sound logistics'.[7] It is logistics that eventually makes the tactical and strategical possibilities possible; it is truly the art and science of military organisations and operations.

Kress defines logistics as, 'a complex mix of physical entities, processes, and rules – a system – governed by mostly abstract concepts and principles, aimed at physically supporting military operations'.[8] This definition highlights the fact that logistics is an integral part of the nature of military organisations as physical entities and, as such, is an essential, perhaps the most critical, part of a force development strategy – that dimension of strategy that has as its purpose the development of military institutions as an instrument of strategy. Force development, Drew and Snow remind us, concerns resources for getting the job done:

- The quantity of resources required;
- The kind of resources that are necessary; and
- The way these resources are moulded and shaped into a force structure with the potential to act as an instrument of strategy.[9]

The availability and moulding of raw resources into a tangible instrument of military power is therefore the first and most fundamental reality pertaining to military logistics.[10] Resources are the first key ingredient to the practice of strategic effect by means of force development. The basic resources that are required for force development are well known, and are the critical raw materials needed for the manufacturing of military hardware, and their sophistication will have a defining effect on the eventual quality of armed forces – a sophisticated industrial base, a skilled population, technological sophistication, and economic refinement. The manipulation of these resources, taking advantage of its material strengths and offsetting the weaknesses, define the quality of the military organisation and the forces that are developed to shape the art of "the possible" in force employment outcomes. Very often, force employment decisions are made primarily to ensure access to these resources as an intermediate step on the pathway to strategic effect.

Ferris explains the intricacies in the making and formation of military power as the dichotomy of the material endowments of the state – geography, demography, and the economy – against the administrative or bureaucratic capacity and the political structure and will of the state. It would be possible to express this as an equation: military power equals material factors multiplied by bureaucratic capacity multiplied by political will. The material capacity of the state defines the military potential of the state; bureaucratic

competence and political will and structure define how much of that potential will eventually be harvested in the creation of concrete military capability. To quote Ferris, in aligning these three variables, resolve often outweighs wealth. Military capability, from a logistical perspective, is a concrete quality rooted in the resources a state taps for strategic purposes, as against those it might, but does not.[11] In short, the role of political will and bureaucratic capacity should not be underestimated in the military logistical process underpinning force development.

The second dimension of logistics 'aimed at physically supporting military operations'[12] refers to the art of "the possible" by means of force employment. Any discussion of the logistics of force employment ought to begin with the basic argument that only forces that are in existence, prepared, and available, can be employed. Force employment or the 'use of forces in a broad, national sense',[13] is informed by the nature of the threat agenda and revolves around two basic questions:

- Where will forces be employed, and
- Against whom will they be employed?

The answers to these basic questions have profound logistical implications. The employment of forces ought to be informed by or rooted in the logistical capacity to project, support, and sustain forces in time and space within a theatre of operations. Against whom the forces will be employed is underpinned by the logistical capacity to provide armed forces with the right logistical mix in support of combat and combat support elements to ensure tactical, operational, and strategic effectiveness in a theatre of operations.

A third critical reality pertaining to logistics and that should be harvested from Kress' definition, is the interplay between the 'complex mix of physical entities, processes, and rules',[14] that he describes as a system that is governed 'by mostly abstract concepts and principles'.[15] In short, logistics is made possible by means of both logistical hardware and software, the development and existence of military hardware, and the doctrinal ability to supply and sustain this hardware on operations. It is the software of logistical doctrine that makes possible the training and preparation of logisticians to ensure the effective management of logistics by means of operational procedures.

Eventually the military logistical system reaches its apex with the ability to get everything the soldier needs into their hands,[16] 'to support military operations and sustain the troops who take part in it'[17] by means of its ability to:

- Facilitate movement and fire;
- Treat and evacuate casualties;
- Deploy and position human resources; and
- Supply the troops with food and other personal needs.[18]

Martin narrows the logistical needs of a military in operations down to four basic elements that the logistical system ought to transport to the front line for operations: ammunition, fuel, spare parts, and food and water.[19] In supplying these four basic elements within the operational zone, military logistics must be managed by means of four critical guidelines, namely militaries ought to:

- Position their logistics as close as possible to the point of consumption;
- Predict their consumption within certain parameters;
- Move their logistics to where it is needed; and
- Make provision for a reverse feedback or flow of logistics to be able to recover both personnel and equipment from the area of operations.[20]

In writing about operational logistics, Kress makes the point that armed forces have three options in the management of their logistics.[21] The most primitive approach is for armed forces to obtain their logistics from the field of battle; alternatively, from within the direct operational zone they are operating in. An alternative is for the troops or the force to carry their logistics with them into operations. Both these two approaches are historical in nature, and have a tensive and dividing effect on the forces involved, which places a limitation on the sustainment of operations over time. The modern approach is to have the logistics shipped to the area of operations. The fighting elements then have to withdraw their supplies from depots that are as far forward to the front as possible. This is often the case where the battlelines are static and the fighting more attritional in nature. Alternatively, the fighting forces are being supplied by pushing logistics forward based on expected consumption. In the armed forces of the developing world, especially in Africa, it is not uncommon to have a combination of these three logistical options as a means to supply their forces.

Several critical developments on the modern battlefield are shaping contemporary military logistics.[22] The first is the existential growth in the scale of operations due, in part, to developments in the range, complexity, diversity, and geographical reach of the weapon systems. Increasingly, the logistical supply chain is required to supply an extensive range of logistical items, over a broad area of operations, and at a high tempo. Obviously, technological progress also benefits the optimised management of military logistics. The developments in the scale of war however also imply that modern military logistics is much more vulnerable than in the past, and exposed to precision destruction over long distances.

The development of precision weaponry in the 1990s is the second critical development. These new precision technologies enabled more precise targeting from afar, mostly by means of airpower. It led, however, to a debate as to how precision technologies ought to be incorporated into existing combined arms manoeuvre operations.[23] The employment of precision weaponry is dependent on the availability of precision intelligence and precision logistics. Precision logistics in turn necessitates the detailed and precision management of logistics from the factory to the front in terms of the handling of highly sophisticated weapon systems.

Lastly, the dronification of war, i.e. the increased use of drones and unmanned aerial vehicles in military operations, affects military logistics in a profound manner as vividly demonstrated in the ongoing war in Ukraine.[24] This raises the question about what the effect of the dronification of war is and what it will be in future, especially with the proliferation of drone technology in land, maritime and air warfare in the latter war.[25] Bordering on speculation, it is possible to argue that the future might perhaps see fewer personnel in the area of operations, a greater reliance on technology, and growth in data management and analysis because of the large volumes of data that are generated through on-board sensors, cameras, and communication systems. Logisticians have to take responsibility of advanced data storage, processing, and analytics capabilities to handle the advanced influx of information generated by drone missions. The unique operational requirements of drones may also require modifications to existing military infrastructure to accommodate their unique operational requirements. This could involve the construction of new runways, hangars, communication facilities, and storage depots tailored specifically for drone operations. Together and as part of the growth in scale, the dronification of war means that logistics in depth has become exposed and vulnerable to attack over long distances by drones.[26]

Looking from the Outside: Contextual Realities Underpinning South African Military Logistics

Historically, the SA military had to fulfil three critical roles. The military had to serve as a deterrent against external threats. At the same time, though, the military was invariably, and since the creation of the SA military in 1912, required to conduct expeditionary operations, mostly into Africa. The most important and sustained involvement of the SA military, however, has always been in the domestic security domain.[27] In a strange and somewhat ironic way, the SA military has habitually been very reluctant to deploy inside the country, and has never been fully orientated, equipped, and prepared for domestic military operations, with the 1980s and early 1990s perhaps exceptions in this regard. Logistically, the roles of deterrence, expeditionary operations, and domestic deployments are divergent in their requirements. Deterrence necessitates the maintenance of comprehensive strategic reserves. The logistical needs for expeditionary operations place the emphasis on an agile logistical projection capability. Domestic deployments have consistently relied on the decentralised prepositioning of logistics for the rapid projection of force. Domestically, the need for the logistical maintenance of strategic reserves, an agile ability to project logistics internationally – predominantly into Africa – and the need for the decentralised prepositioning of logistics domestically have placed a heavy and carefully calibrated demand on the management of logistics by the SA military.

Moreover, Africa as a strategic landscape and domain has placed – without exception – a heavy demand on logistics, and this is also increasingly the case for the domestic deployments of the SA military. The most critical variable has been the limited, disconnected, and often poorly maintained infrastructure that made the projection of logistics over long distances via road and rail highly frictional or difficult. These factors are compounded by the challenging geography that often impedes the quick and agile

projection of military logistics to the point of consumption. Those who have never been to Africa are often surprised by the extensive distances over which logistical supply is done in Africa. From a cultural, and perhaps quite sensitive perspective, logistics are also often impeded by a culture of deconstruction and vandalism that is especially acute in the current SA strategic landscape,[28] as demonstrated with attacks on commercial vehicles within the context of labour disputes over foreign truck drivers.[29]

From a historical and logistical perspective, South Africa has a pattern of peacetime neglect of its armed forces.[30] It happened in the 1920s and 1930s in the era after the First World War; it happened in the 1950s after the Second World War; and it is the case in the period of relative peace in the aftermath of the Cold War. Moreover, SA military logistics have predominantly been based on a continental strategy with the Army as the primary actor in the logistical drama. From a legacy perspective, the SA military logistical system – in doctrine and equipment – relies extensively on the SA military experiences in Southern Africa in the 1970s and 1980s.

Since 1994, SA military logistics has been profoundly influenced by variables in the SA society in general and within the SA military. From a broad societal perspective, South Africa already had to face the realities of network and systems disintegration and, in some instances, also failure.[31] This specifically concerns the SA rail, road and air transport networks as well as the electricity, water and sewage systems, which cannot meet the needs of the private sector to enable sufficient economic growth. This is tied to a process of bureaucratic ineptitude and deindustrialisation in society in general, which also deeply affects the armaments industry and other state-owned enterprises (SOEs), and the support of the latter industry and SOEs to the SA military in South Africa specifically. Following the underfunding of the military and the lack of government support to promote products, the SA defence industry, with recognised expertise especially in landward solutions, has shrunk from 3 000 companies employing 130 000 personnel in 1990, to 120 companies with only 12 500 employees in 2017.[32] This has compelled several companies to focus predominantly on export markets without government support. Defence research and development funding has also declined,[33] which has a negative influence on maintaining expertise to address future military technology and capability needs.[34] Even basic commodities are affected by a declining industry. This includes the hollowing out of Denel as an SOE.[35] At times, for instance, shortages in ammunition and propellant occur due to limited local manufacturing,[36] accidents at munitions factories, and arguably, various export orders.[37]

From the inside, the SA military has gained valuable experience through force projection operations into Africa and domestic military deployments. At the same time, however, the military was exposed to institutional erosion and degeneration of its corporate logistical memory, specifically concerning an in-depth and operational understanding of the military logistical doctrine. This is often tied to the neglect of the logistical management of strategic risk and the absence of comprehensive and detailed contingency planning for scenarios that may unfold within the society and the region.

Historically, the SA way of war often implies that South Africa deploys alone or as the lead nation, except in United Nations (UN) and/or African Union (AU) missions. The SA military is therefore seldom employed as part of a higher-order coalition or alliance in expeditionary operations. The peace mission deployments into Africa the last number of years are, perhaps, an exception to this rule. Although the SA military preferred in recent years to deploy within a multinational context for purposes of legitimacy, as was the case with recent deployments to Mozambique and the Democratic Republic of the Congo (DRC), the de facto reality is that the SA military operates mostly by relying on its own support systems. That means that they are mostly reliant on their own logistical system from South Africa during unilateral operations (e.g. Burundi in 2001),[38] and especially during intervention operations, such as Operation Boleas in Lesotho (1998),[39] the Central African Republic in 2013,[40] as well as the 2023 deployment to the DRC as lead-nation for the Southern African Development Community (SADC) Mission in the DRC (SAMIDRC).[41]

Institutionally, the SA military is an interesting blend of the British regimental system, the experiences and practical approach to war of the Boer commandos, and the irregularity of African war.[42] In addition, and from a doctrinal perspective, the nature of African conflict and of African geography[43] have always had a profound influence on the SA way of war and its logistical supply system. It is a way of war that places a high emphasis on mobility, independent manoeuvre, delaying battles (*vertragingsgevegte*), and the avoidance of the occupation of geographical features and destruction of infrastructure, such as towns and cities.[44] Historically, the importance of intelligence, the agile projection of power, and strategic reach were key building blocks of the SA military doctrine. This provided South Africans with freedom of action to fight on their own terms in foreign territory.[45] South African equipment and firepower were designed specifically for agility and reach in the hot and dry conditions of savanna-type terrain. At the same time, the SA way of war often lacks a clear operational design underpinned by comprehensive operational planning and design processes driven by realistic and achievable operational objectives. South African operational preparation then often suffers from a clear outline of the military end state, a description of what success will look like.

South African Military Logistics and Contemporary Political Realities

According to Young, logistics is an important indicator of the functionality of a defence organisation, and the political thinking, concepts and military doctrine that inform and drive logistic systems become embedded within organisations, and are difficult to change.[46] Whereas Western logistic concepts and systems are optimised and decentralised for expeditionary operations to enable commanders to plan and execute missions successfully, Marxist-inspired systems assume that 'society and the economy exist to provide the necessities to the armed forces to protect the country, party and revolution'.[47] In dysfunctional defence organisations, logistics is centralised, while procurement is not necessarily optimised for operations or to empower commanders for mission success, but rather to achieve broad developmental or nationalist goals.[48] Centralised logistic systems

cannot meet the demands of fast-changing conditions or the actual requirements of commanders at the front in expeditionary operations. Since democratisation in 1994, SA governance, society and consequently also the armed forces have undergone significant political and organisational changes that have influenced military logistics and operational effectiveness.

The policy of the African National Congress (ANC) and its tripartite alliance partners to correct the injustices of apartheid through a National Democratic Revolution (NDR) became government policy in April 1994, with a strengthened socialist focus in 2007.[49] The NDR had to transform the SA state and economy, through central planning, into a non-racial and classless society in which wealth would be shared.[50] Government expected the DOD to contribute towards national development in terms of reducing inequality, unemployment and poverty, which competed with the fulfilment of the constitutional role of the SANDF.[51] The ANC considered state intervention in the economy a necessity, and SOEs as the 'vanguard of the developmental state' in South Africa.[52] The retention of and continued government bailouts for underperforming SOEs, such as Transnet, South African Airways and Denel, especially since 2009, demonstrates the ANC policy to retain central government control over key logistic sectors. There is, however, a great need for privatisation and the removal of SOE monopolies, particularly to improve logistic infrastructure in order to facilitate increased exports and economic growth.[53] According to Cawthra, security decision-making under the Mbeki administration, including decisions on external military operations, had become increasingly centralised within the presidency,[54] instead of arguably allowing decentralised planning and coordination between departments to help shape political objectives with consideration for limited means, especially military resources for peacekeeping commitments. This occurred despite the establishment and role of the National Office for the Coordination of Peace Missions (NOCPM) within the Department of Foreign Affairs (DFA)[55] in 1999,[56] since the DFA was responsible for coordinating and overseeing peace missions 'at a national and international level',[57] in consultation with the DOD. Resultantly, in 2003, Alden and Le Pere raised concerns about the limited capacity of the SANDF relative to the ambitious SA foreign policy.[58] One of the unanswered questions is why Parliament allowed the SANDF to be deployed in peace operations beyond the set limit of one battalion group as specified in the 1998 *Defence Review*[59] and the 1999 White Paper on South African Participation in International Peace Missions.[60]

The constitutional role of Parliament to exercise oversight over external operations was insufficiently performed.[61] The Joint Standing Committee on Defence (JSCD) often considered deployment letters on an ad hoc basis, and with frequent delays with reference to the deployment dates. The JSCD, for example, did not debate deployment letters in 2004, 2009, 2010 or 2012.[62] Following external interventions with significant battle losses in Lesotho (September 1998) and the Central African Republic (March 2013), the JSCD only held one review meeting, with narrow scope for debate, after each of these operations. This lack of parliamentary oversight regarding SANDF operations was indicative of the executive authority eroding the oversight role of the legislature: 'the notion of executive

dominance is central to the negative trajectory of oversight'.[63] Through the executive authority, the ruling party exercised centralised control over the economy and military affairs, which undermined pluralism, parliamentary oversight and interdepartmental cooperation on external deployments.

Since 1994, the ANC, as ruling party, furthermore allowed the continuation of its communist revolutionary culture and the use of informal Umkhonto we Sizwe (MK) structures to circumvent the SANDF chain of command,[64] as well as formal DOD decision-making bodies and processes, to make strategic decisions. In doing so, the ANC established a de facto subjective civil–military relations (CMR) system within the DOD, which undermined the *de jure* objective CMR model[65] prescribed in the Constitution,[66] and the SANDF Code of Conduct.[67] Such a revolutionary culture stands diametrically opposed to the principles of liberal democracy, especially since communist ideology is based on the 'the principle of absolute, unpredictable, and unaccountable power by the party'.[68] Consequently, former MK leaders in the SANDF became embroiled in ruling party politics, which blurred the lines between party and state.[69] This undermined the professional independence of the military profession, the ability of officers to advise politicians honestly on external operations, as well as transparency and accountability regarding strategic decisions and resource management. The ANC thus allowed centralised decision-making in the executive and informal party structures in the SANDF to have a dominant influence on military affairs, instead of allowing professional experts to inform decisions.

The SANDF Leadership and Centralised Logistics

Centralised decision-making manifested not only within the executive, but also in the SANDF, especially under the "new guard" comprising mostly former MK members. For example, the Defence Staff Council (DSC) tended to postpone strategic decisions, which prevented decentralised decision-making and mission command in particular.[70] Instead of making tough strategic decisions, the DSC thus had the inclination to become involved in the centralised micro-management of mundane logistic matters, which should have been delegated to lower-level decision-makers.[71] This tendency created a culture of indecision and of shifting decision-making further up the chain of command, which produces unresponsive outcomes, or strategy by default instead of design. This indecision and upward buck-passing reflect lip service to the principle of mission-command, distrust in subordinates, and the disempowerment of commanders.

Before 1994, neither MK nor South African Defence Force (SADF) members were exposed to decentralised budgeting, balancing budgets, transparency or public accountability in a democracy, since they were used to push-logistic systems, and war-funding models from the Cold War era.[72] The SANDF thus received a centralised logistic procurement[73] and financial system from the SADF. Former MK members also operated under a centralised logistic system during the liberation struggle against apartheid,[74] and did not understand why the SANDF had to spend so much on maintenance, since their training was based on Cold War era Russian doctrine, which preferred the replacement of equipment rather than continuous and intensive maintenance. Both former SADF and former MK members

thus functioned in centralised logistic systems during the Cold War period, and lacked the mindset and experience of managing a peace-time military in a democracy, where the SANDF leadership had to justify the defence budget relative to other national priorities. The leadership of the SANDF had unrealistic expectations that government and Treasury had to meet the budget requirements of the military, instead of proactively engaging stakeholders about the proper funding of defence, and adjusting military strategy according to allocated funding. Resultantly, the SANDF has been politically ineffective to obtain the required funding and resources to fulfil the constitutional mandate of the SANDF.

The Influence of Legacy Paradigms and Systems on SANDF Logistics

The SANDF clings to legacy military concepts of the Bush War era and conventional equipment, especially since its force design, funding and understanding of its primary role revolves around a conventional force for national defence.[75] From a defence industry perspective, the SANDF strives towards national self-reliance, and the ability to maintain all its equipment in South Africa, particularly for the conventional defence of the Republic of South Africa (RSA). The SANDF maintained this conventional paradigm despite the self-acknowledged implausibility of a conventional threat against the RSA.[76] This paradigm also inhibited the SANDF to re-design its forces and support systems properly for peace operations, which became a continuous commitment on the African continent, and required logistic support over long external lines of communication, for which the SANDF was not optimised. The logistic system of the SANDF was inherited from the SADF,[77] and was designed to support forces in northern Namibia and, at most, southern Angola for brief periods, but not for expeditionary operations in tropical Africa. As South Africa became more involved in multinational UN peace operations on the continent, the SANDF became particularly reliant on UN logistics, which was provided in the mission areas. This inhibited urgency and pressure to re-design the logistic system of the SANDF for unilateral expeditionary operations. Military training and field exercises also did not pay sufficient attention to addressing potential logistic challenges for future expeditionary operations. Resultantly, expeditionary operations, such as SA intervention in the Central African Republic in support of the Bozizé regime against Seleka rebels in early 2013, and the recent SADC Mission in the DRC (SAMIDRC) – verified the limitations of the logistic system of the SANDF and the inadequate capacity to sustain expeditionary operations.

The SANDF tended to formulate new peace-time military strategy, without planning for the phasing out of legacy systems.[78] There has been widespread reluctance to close down capabilities and phase out old systems that have become too costly to maintain. Many generals did not want a negative legacy, for instance for closing capabilities.[79] Indecision on closing legacy systems aggravated the affordability problems of the SANDF, especially operating funds to sustain operations. By 2010, the shortfall on the SANDF operating budget was R3 billion.[80]

As the "new guard" started to dominate top military positions in the new millennium, the SANDF leadership would intermittently toy with the idea of replacing certain main

equipment with Soviet-made systems, with insufficient consideration of the influence of such change on a logistic system that was designed around Western and particularly North Atlantic Treaty (NATO) standards[81] and engineering philosophies. For example, in 2013, the South African Air Force (SAAF) strongly considered the acquisition of three Russian-made Il-76 medium-transport aircraft to improve its airlift capability. According to Heitman, such an acquisition 'would mean an overhaul of the logistic system to keep them operational'.[82] As SANDF service chiefs tried to retain their conventional prime mission equipment with a declining defence budget, the need for new medium-transport aircraft, as well as the actual operational requirements of forces deployed in external missions, especially in the Great Lakes region, did not sufficiently influence defence policy, strategy or capability development for expeditionary operations. Additionally, critical logistic capabilities, such as the obsolete SAMIL family of logistic vehicles, were not replaced.

The SANDF Restructuring Project with Deloitte & Touche

After democratisation, the SANDF initiated a restructuring project with the contracted business expertise of Deloitte & Touche to make the organisation more cost-effective.[83] The implementation of this restructuring process, which was based on business management principles, commenced in 1998 and dismantled the functional provincial Command Headquarters system. This restructuring created an inflated support force structure above unit level and had a devastating influence on the logistic functions of SANDF units, particularly generic functions that enabled units to be deployed and sustained in the field. The SA Army, for example, lost control over its technical support units and certain logistic functions to the Chief of Logistics.[84] At battalion level, personnel structures only make provision for first-line logistic functions, which is inadequate for sustaining forces in the field. The SANDF furthermore lost critical support functions with the establishment of General Support Bases (GSBs), which had to be shared between various units. Unit catering, for example, was outsourced, which reduced the ability of units to deploy field kitchens for exercises and operations. Commanders therefore gradually lost control over logistics as a command function. Positions within the new GSB structures were considered "common posts", which did not require applicants to have logistic course qualifications or relevant support function experience. Consequently, GSBs were not fully staffed by logistic experts, which contributed to the failure of these support bases.[85] The logistics mustering, as a specialised field, was subsequently eroded with negative consequences for the functionality and status of the logistics corps. The GSBs were not optimised for the logistic needs of the SANDF and turned out to be more expensive than the former regional Command Headquarters. The SANDF restructuring project with Deloitte & Touche thus fragmented critical logistic functions into separate "silo" structures, which constrained the operational functionality of the defence force.

The centralisation of procurement functions at centralised procurement service centres, and the Logistics Division, disempowered unit commanders to spend their budgets according to force preparation needs. Units distantly situated from Pretoria and other procurement service centres, as well as support bases, consequently experience significant procurement delays.[86] The extended timelines involved in the procurement process in general, especially

tender processes, new contracts and registration of new service providers, aggravate delays.[87] Centralised procurement furthermore creates bottlenecks with the processing of authorisations to spend funds above certain amounts, which also makes it practically difficult to spend larger budgets or additional funding for the SANDF. This problem is aggravated by the lack of logistic specialists and bureaucratic capacity to expedite the spending of funds according to plans. This includes a shortage of full-time logistics codification experts.[88,89] In late October 2016, Brig. Gen. Edward Mulaudzi (Director: Procurement Management), explained to the Portfolio Committee on Defence and Military Veterans, that the SANDF faced serious logistic skills challenges, especially the retention of procurement skills, 'The biggest challenge in the DoD was the skills gap, which had resulted in irregular expenditure.'[90]

Since the 1998 restructuring process, a disconnect exists between logistic functions and command-and-control structures.[91] Due to incompatible systems and procurement processes, staff officers from Joint Operations had to spend an inordinate amount of time to coordinate sustainment between the various SANDF services and divisions for operations.[92] Moreover, while commanders right down to unit-level have to receive their delegated authority, responsibility and accountability for procurement and resource management from the Secretary for Defence,[93] commanders simultaneously still report to the military chain of command in the SANDF.[94] These respective setups of indirect and direct reporting lines compromise command-and-control and the integrity of the command line. This inhibits senior commanders from accounting for the performance of their subordinates regarding logistic functions.[95] It also complicates addressing systematic logistic problems. To make matters worse in terms of compartmentalisation, the SANDF uses different legacy computerised logistic information systems, which are not integrated.

According to Bester, the initial SANDF organisational structures in 1994, was 'centralised and power oriented' and the various SANDF services had 'designed their own logistical functional systems to provide in their specific needs'.[96] While the Army uses CALMIS (Computer-Aided Logistics Management Information System), the SAAF and Navy, for instance, use OSIS (Operational Support Information System). The SAAF initially used the SLIS (SAAF Logistics Information System), and in the late 1990s, the Navy commenced with a project to have joint usage of the information system of the SAAF, which became known as OSIS.[97] These systems – particularly CALMIS and OSIS – use different software applications, with different systems, and are therefore not easily compatible.[98] The use of these different information systems makes it difficult to manage and account for assets,[99] and during joint operations, locating and sending, for instance critical spare parts to frontline units, can involve unnecessary delays. The lack of integrated logistic systems also complicates audits in a large organisation, such as the SANDF, which often necessitates laborious manual audits.[100] Since 2005, initiatives by national government to integrate financial and logistic systems across departments experienced significant delays, and did not address the challenges with legacy systems experienced by the SANDF. These obsolete systems of the SANDF do not comply with the Government Regulatory Framework, and complicate the planning and control of logistics.

Joint Operations and Expeditionary Logistics

In April 1998, with the establishment of Joint Operations as an operational level headquarters[101] in the SANDF, a disconnect emerged between new command doctrine at this level and logistic functions for operations.[102] The involvement of the SANDF in Operation Boleas in September 1998 to prevent a coup in Lesotho, illustrated this disconnect and practical uncertainties about "who is responsible for what" in external operations. The main omission was that an operational level of command, with an operational commander and specialised staff was never established specifically for Operation Boleas, and only a tactical task force commander with limited staff was appointed. The necessary joint planning for logistics and medical support thus did not take place. There were also insufficient support units to sustain the SANDF Rapid Deployment Force in Lesotho. This created sustainment problems for the SANDF, with ad hoc logistic demands that overexerted the supply system.

During the SA intervention in the Central African Republic (CAR), which culminated in the Battle of Bangui in March 2013, the SANDF made similar mistakes by not having appointed an operational level of command, an operational commander or specialised staff. With only a tactical commander deployed in Bangui, and a skeleton special forces headquarters in Pretoria, the planning and providing of reinforcements, logistics, and medical support were problematic. Although this was an intervention operation against rebels, only a medical aid post was deployed with the SANDF contingent,[103] but no surgical post. During such unilateral or non-UN operations, SANDF medical support was supposed to be upgraded. The request by the tactical commander for Oryx helicopters for casualty evacuation was denied.[104] A surgical team with limited military experience was only flown in with a resupply flight, after serious casualties had already been sustained.[105] A medical evacuation aircraft was later contracted to evacuate the wounded to Pretoria.[106] During this operation, a "push logistic system" was used.[107] There were challenges with planning and arranging resupply flights, as well as the proper loading of priority equipment and supplies to ensure quick offloading, particularly combat vehicles and ammunition.[108] Since the SANDF had mostly focussed on multinational peace missions, it did not formalise or refine its operational level doctrine for expeditionary operations with regular training and the full complement of support functions, such as logistics and medical support, for such operations. Resultantly, the SANDF kept repeating the same mistakes, with dire consequences.

More recent missions have highlighted a dichotomy between established SANDF logistic doctrine and practice during expeditionary operations. In recent external operations, the SANDF did not deploy its second to fourth line of logistic support, or the necessary medical and air support. During the SADC Mission in Mozambique (SAMIM) between June 2021 and July 2024, where the SANDF was deployed from December 2021 to assist the Mozambican government to combat extremist insurgents and restore security in Cabo Delgado Province, the SA contingent lacked sufficient air support.[109] In addition, the serviceability of the SANDF Casspir armoured personnel carriers during the SAMIM mission was extremely low.[110] The inability of the SANDF to obtain spare parts for

maintaining vehicles, ships and aircraft has become common knowledge. The above-mentioned dichotomy between doctrine and practice was also clearly exemplified by the poor state of logistics and medical support for SANDF troops as part of the SAMIDRC deployment since December 2023, in order to assist the DRC government to stabilise the eastern DRC, particularly against the M23 rebels.[111] According to Greeff, the SANDF lacked critical support elements in the DRC, 'Air support and capability (medically, logistically and combat-speaking) is the crucial missing cog … Losing troops in combat is always bad but losing troops due to inadequate resources is unacceptable.'[112] Since the SANDF lacks logistic reserves, it cannot meet immediate operational requirements, and is therefore compelled to desperately procure commodities and equipment required for external missions. One of the advantages of the establishment of Joint Operations was its ability to procure equipment required for expeditionary operations directly off the shelf. During the 2006 African Union Mission for Security in the Comoros (AMISEC), in which South Africa was the lead nation, the SANDF was, for example, able to procure four-wheel drive vehicles to fulfil mission requirements despite tenuous procurement processes and delays.[113] The ability to purchase off-the-shelf equipment for specific missions can however not compensate for shortages with strategic logistic reserves.

As the SANDF capital budget decreased over the years, a shortage of critical stocks emerged. In DOD annual reports as early as 2004, the Army clearly indicated that its infantry combat readiness, including light infantry capability, was severely affected by 'constraints on the acquisition of ammunition for main combat equipment',[114] and by 2008, the Army highlighted ammunition shortages as a main force preparation risk.[115] Following the underfunding and decline of the SANDF, both the SAMIM and SAMIDRC missions have demonstrated the logistic limitations of the SANDF and the inability of South Africa to sustain two missions simultaneously. These limitations held negative consequences for the achievement of both missions, and raised concerns about the ability of the SANDF to sustain future expeditionary missions.

The SANDF has incurred extensive costs and losses for the ambitious SA foreign policy and involvement in peace missions and capacity-building in Africa since the Mbeki presidency.[116] The SANDF had to deploy much of its equipment and personnel to the Great Lakes region with transport aircraft and, at times, by sea,[117] without any forward logistic bases near the region. With the low serviceability of medium-transport aircraft in the Air Force, the SANDF has found it increasingly expensive and difficult to move matériel and vehicles to and from theatres of operation.[118] The repatriation of armoured personnel carriers is particularly expensive, and not all deployed vehicles can be repatriated economically. The recent debacle in the DRC (SAMIDRC) provides a good case study in this regard.[119] Moreover, the SA hosting of SADC Standby Force and the African Capacity for Immediate Response to Crisis (ACIRC) exercises at the SA Army Combat Training Centre in Lohatla also came at great expense to the SANDF in terms of logistic expenditure.[120]

Between 2016 and 2022, the SANDF struggled to find reliable contractors that could deliver fuel for 'operational support and day-to-day use' at reasonable prices.[121] In 2016, the SANDF reported that it had ended a contract with KZN Oils, since the latter only provided fuel, but neglected to maintain the SANDF fuel equipment.[122] In January 2022, a fire at the bulk fuel station of Air Force Base Waterkloof occurred after 'a component failure in the pipe system caused a fuel leak that was ignited by a spark from the pump wiring'.[123] This incident urged the SAAF to increase the frequency of maintaining fuel equipment. After the contract with KZN Oils had ended, the SANDF commenced with agreements with the Central Energy Fund to fulfil its fuel supply as well as equipment and infrastructure maintenance needs.[124] The SANDF also wanted to improve its capacity to store the necessary fuel reserves in accordance with logistics doctrine.

Defence Cooperation with Cuba and Project Thusano

Since democratisation, South Africa has nostalgically close diplomatic relations with countries that supported the ANC during the liberation struggle against apartheid, including pariah states, such as Libya.[125] In some cases, these relations involved a form of "payback" for assistance received during the Cold War.[126] Cuba is often hailed by the ANC for 'a historic victory' over the SADF in Angola during the Battle of Cuito Cuanavale (August 1987 to July 1988), which 'resulted in the liberation of Angola and Namibia and paved the way for the negotiations that ultimately brought an end to the apartheid regime in South Africa'.[127] In 2012, close relations between South Africa and Cuba transpired into a controversial bilateral defence cooperation agreement (Project Thusano) involving, among others, technical services, the training of transport technicians, as well as repair and maintenance work on military vehicles, including SAMIL logistic vehicles.[128] The total amount spent on the project, which has been extended to January 2025, amounted to more than R2,6 billion.[129] By 2021, 11 000 military vehicles had reportedly been serviced as part of this project.[130] Between February and August 2022 alone, SANDF mechanics and Cuban technicians finalised the servicing of 100 Mamba armoured personnel carriers in Bloemfontein, which were delivered and centrally stored at Wallmannsthal near Pretoria.[131]

A report by the Auditor-General of South Africa, however, indicated that, from 2016 to 2021, the SANDF did not follow procurement processes with Project Thusano, which involved irregular expenditure to the amount of R1,37 billion during this period.[132] Irregular expenditure for this project continued into the 2022–2023 financial year.[133] The project also involved the overly expensive training of, among others, SA military medical students and engineering students in Cuba.[134] In most cases, due to poor planning for local accreditation, there are numerous obstacles for these students who studied in Cuba who now want to register with local professional bodies in order to practice in South Africa. Efforts to provide *ex post facto* bridging programmes for these students involve additional expenses, which does not make financial sense, and have resulted in fruitless expenditure in most cases.[135] In late 2023, with ongoing irregular expenditure and disregard for procurement laws, the report by the Auditor-General on Project Thusano concluded, 'resources of the department are not used in an economical, efficient and effective way to enable best return on investment for the department and government'.[136] Instead of

restructuring and rebuilding generic support functions in SANDF units with local expertise in order to become logistically more self-reliant to support external deployments, the SANDF has thus outsourced critical technical training and maintenance contracts to Cuba. The SA political loyalty to apartheid-era benefactors – and Cuba in particular – has thus aggravated the financial woes and qualified audits of the DOD in the logistics domain.

The Lack of Logistic Reforms and Accountability in the SANDF

The SANDF has often been resistant to administrative reforms, austerity measures, aligning budgetary processes with the Public Finance Management Act (PFMA) (No. 1 of 1999), as well as audit regulations.[137] For example, for decades, the SANDF has been unable to provide a complete asset register, which has contributed to qualified audits of the DOD by the Auditor-General of South Africa.[138] The SANDF did not fully comply with these directives since the introduction of national austerity measures in 2012. Instead of maintaining key logistic facilities, generals insisted on luxury expenses, such as flying business class,[139] and procuring expensive sedan vehicles at prices that exceeded the ministerial handbook.[140] A lack of consequence management for non-compliance with supply chain management laws, together with irregular and wasteful expenditure – as well as illegal activities[141] in the SANDF – inhibits a culture of cost-saving and accountable procurement.

In 2019, the then Chief of the SANDF, Gen. Solly Shoke and other SANDF generals, argued in a position paper, also presented to President Ramaphosa, that the DOD had to be exempted from procurement legislation, and that SANDF commanders should have the power to procure as 'they see fit'.[142] The SANDF apparently proposed a unique "Defence Finance Management Act" to replace the PFMA, which Ramaphosa and the Minister of Finance dismissed.[143] This position paper arguably presented an "alternative view", namely –

- that the systemic financial and logistic problems of the SANDF are not the fault of the military;
- that the military should receive special or preferential treatment by being allowed to ignore procurement regulations, transparency and accountability; and
- that internal military reforms are not necessary to overcome logistic challenges.

In August 2024, scathing media reports appeared about the luxury benefits that top SANDF generals in Pretoria receive from the military budget in terms of rented housing, house improvements, paid municipal accounts and guards while troops have to endure dilapidated living conditions in unit barracks.[144] This has resulted in resentment among the rank and file, especially while SANDF troops in the SAMIDRC mission were 'suffering from a lack of equipment, proper accommodation and medical facilities'.[145] Problems with logistics, especially the availability and quality of equipment affected the morale of SANDF soldiers in mission areas negatively.[146] During the SAMIM deployment in Mozambique,

SANDF personnel had to endure poor rations, and during the MONUSCO (United Nations Organization Stabilization Mission the DR Congo), the combat boots of soldiers did not last long in tropical conditions of the DRC.[147] This illustrates a troublesome leadership culture of ignoring the old dictum of cavalry commanders to 'feed your horses, feed your men, then feed yourself' with the principle that 'the officers eat last'.[148] Corruption with SANDF procurement is thus a challenge in the DOD.[149]

Conclusion

The aim of this article was to provide a contextual understanding of logistics as a strategic variable for the South African (SA) military, with specific reference to logistics related to expeditionary operations. Logistics involves the art and science of managing resources to achieve the political ends of operations, and forms an integral part of military organisations and force development. The administrative and bureaucratic capacity to manage logistics is part and parcel of the military power of a country and is closely linked to political structures and political will to enable effective force development and building of military capabilities. Logistics is therefore an important indicator of the functionality or dysfunctionality of a military organisation.

The doctrine or "software" of logistics is essential to prepare logisticians to manage resources properly as well as to sustain military personnel and military hardware during operations. Such doctrine is unavoidably influenced by higher-order political thinking and ideology, which determine the adaptability of armed forces for expeditionary operations. Recent developments in warfare are placing high demands on military logistics to provide a broad variety of commodities and support to large areas of operations and the latest weaponry.

Since 1912, expeditionary operations in Africa have been inseparably part of the SA military, which presupposes the ability to project and sustain forces over long distances. The difficult terrain in Africa, as well as limited and often poorly maintained infrastructure, usually complicates force projection and maintaining long supply lines. In peacetime, the SA military has experienced cyclical neglect, particularly after the two world wars and the Cold War. The logistic system of the SANDF is largely predicated on the Western logistic systems and doctrine of the SADF, while the political structures and will derive mainly from the revolutionary Marxist thinking and ideology of the ANC.

Through centralised planning and maintaining control over underperforming SOEs, the ANC wanted to achieve socialist, socio-economic and developmental goals, which together with ambitious foreign policy, inhibited the proper funding of the SANDF to fulfil its constitutional mandate. Overall deindustrialisation, the poor management of SOEs, and the underfunding of the SANDF, have resulted in the shrinking of the defence industry in South Africa. The revolutionary ANC culture and their focus on centralised state control over the economy and defence, prevented the necessary political will and mission command to create a decentralised and responsive logistic system in the SANDF. This resulted in strategic indecision, centralised micro-management of minor issues,

upward buck-passing, distrust in experts and the disempowerment of commanders. The centralised logistic system that the SANDF inherited from the SADF, which was based on a war-funding model and push-logistics, was thus not reformed or optimised for expeditionary operations. Coupled to this, the SANDF leadership has been resistant to austerity measures and failed to provide a complete asset register for audits. Politicians and defence officials also lack the political will to implement consequence management for misconduct regarding procurement and finances.

The focus of the SANDF on retaining a conventional role, force design, equipment and legacy concepts, as well as long-term reliance on UN logistics in several Africa peace missions, has inhibited the phasing out of legacy systems, and the re-designing of the SANDF logistic system for expeditionary operations. The reluctance to phase out legacy systems further reduced operating funds to sustain external SANDF operations properly. This conventional paradigm also prevented the procurement of new medium-transport aircraft and logistic vehicles, which are essential for sustaining forces in peace operations.

The restructuring project of the SANDF in collaboration with Deloitte & Touche, based on business management principles, fragmented and removed critical logistic functions from units and commanders. Part of this restructuring involved the centralisation of procurement functions, which produced delays with tenders and contracts. This restructuring also created a disconnect between the chain of command and delegations for procurement, which complicated accountability for logistic functions. The establishment of expensive GSBs without logistic experts contributed to the failure of these support bases and the erosion of the logistics corps. The lack of logistic experts resultantly reduced the bureaucratic capacity and functionality of the SANDF to spend funds according to procurement processes. Instead of reforming the SANDF logistic system and rebuilding unit support functions, South Africa entered into a controversial defence agreement with Cuba to repair and maintain equipment, which involved extensive irregular expenditure.

Traditionally, the SA military has preferred the agile projection of force and mobile operations. Except for UN or AU missions, the SANDF usually relies on its own logistics during expeditionary operations. Although the SANDF has gained valuable experience in external operations and force projection in Africa, this has not translated into improved or refined operational logistics doctrine, but rather gave rise to an erosion of corporate memory and neglect of doctrine development in this field.

Since the establishment of the Joint Operations headquarters, the SANDF has not applied or refined its doctrine for expeditionary operations in terms of the appointment of operational commanders and specialist staff to plan and control logistics properly. In recent expeditionary operations, the SANDF has not deployed its second to fourth line of logistic support or sufficient medical or air support. This has resulted in repeated logistic challenges and disruptions for troops on the frontlines, especially during high-intensive intervention operations.

The current SA defence budget is making it impossible to sustain SANDF forces in expeditionary operations properly. As the defence budget decreased, the reserve stocks of the SANDF have dwindled to the point where the needs of expeditionary operations cannot be met, which imposes emergency procurement for new operations. This state of affairs requires a serious rethinking of the viability of political ambitions to continue deploying an underfunded SANDF with deep logistic challenges.

The culture of the SANDF top leadership to avoid austerity and enjoy luxury benefits, while deployed troops struggle with insufficient logistic support, low vehicle serviceability, and inappropriate equipment, has a negative influence on the morale of SANDF personnel and impetus to improve the logistics systems of the SANDF. This leadership behaviour makes it difficult for the SANDF to be innovative in order to be better prepared for future expeditionary operations.

Endnotes

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Decoding South African National Defence Force Logistics: Innovative Joint Logistics and Supply Chain Solutions

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Abstract

The study on which this article is based, examined the challenges of providing interdependent and joint sustainment capabilities to joint and expeditionary forces operating in the African battle space. It is argued that reforms to the prevailing sustainment concept are needed to address these challenges, focussing on operationalising interdependent and joint sustainment capabilities with a responsive logistical infrastructure, simultaneous deployment, employment and sustainment capabilities, and a single, integrated, responsive end-to-end distribution system. The article commences by reflecting a conceptual framework, defining logistics, providing a historical reflection on logistics in the South African military, and examining the nature of the African battle space. It considers the influence of the Border War, the post-apartheid evolution of the South African National Defence Force, and its involvement in peace support operations. The unique and complex demands of the African battle space are also highlighted. Ultimately, two strategic options for optimising joint sustainment and supply chain management in the South African National Defence Force are suggested: centralised functional authority with decentralised execution, or complete decentralisation of logistics functions. Phased quick wins to enhance operational autonomy, efficiency and interoperability, including developing first-line capabilities, standardising commodities, and implementing an integrated, automated and digitised supply chain management system, are proposed. The strategy integrates lean supply chain principles, performance-based logistics, and velocity management to ensure long-term sustainability and effectiveness.

Keywords: Military Sustainment; Military Logistics; Military Supply Chain Management; Integrated, Automated and Digitised Supply Chain Management; Lean Supply Chain; Performance-Based Logistics; Logistic Management Development Concepts and Velocity Management

Introduction

The challenges in the African battle space (ABS)[1] require military forces with joint and expeditionary capabilities. Forces will however require interdependent and joint sustainment capabilities to support the full spectrum of military operations at the strategic, operational and tactical level of war, consistent with joint operational concepts.[2] Furthermore, integrating joint, inter-agency, interdepartmental and multinational capabilities (JI2M)[3] with interdependent and joint sustainment capabilities in multi-domain operations remains a challenge. This needs to be addressed in order to enhance

the efficiency and effectiveness of military operations. The need for interdependent and joint sustainment capabilities to sustain joint and expeditionary forces in the ABS guided the current study. The research focussed on identifying the necessary reforms to establish interdependent and joint sustainment capabilities, supported by a unified, responsive end-to-end distribution system that enables simultaneous deployment, employment, and sustainment through robust logistical infrastructure.

This main argument of the current study addressed the sustainment challenges of joint and expeditionary forces in the ABS, and suggested reforms to the prevailing sustainment concept. The article is structured to illustrate the development of the argument, commencing with a conceptual framework by defining logistics, providing a historical reflection and elaborating on the nature of the ABS. It includes the involvement in peace support operations (PSOs) and factors that impede the development of logistics capacity. The article thus:

- Sets the scene for the proposed future approach;
- Discusses the concept of military supply chain management (MSCM);
- Sets the scene with the "as-is" scenario, operational level logistical intelligence, performance-based logistics (PBL), and the defence industry;
- Optimises joint sustainment and supply chain management in the South African National Defence Force (SANDF); and
- Ends with suggested quick wins for joint logistics.

Theoretical and Conceptual Framework

The terms "logistics" and "logistics systems" are often used, but the literature agrees that no definition can satisfy all perspectives. This section offers theoretical perspectives and explains how the current research used these terms. The term "logistics", which is linked with administration, is a crucial component of military operational orders. It originates from the Greek adjective *logistikos*, meaning 'skilled in calculating'.[4] The term dates back to the Roman and Byzantine empires, where a military administrative official was known as a *logista*.[5] It was however Baron Antoine-Henri de Jomini[6] who first applied the term 'logistics' to military administration in his *Précis de l'art de la guerre ou nouveau tableau analytique des principales combinaisons de la stratégie, de la grande tactique et de la politique militaire.*[i] He emphasised the critical role of logistics in military operations, elevating it to a central component of his theory of war. Jomini defined logistics as 'the art of moving armies',[7] encompassing all activities related to transportation, supply, accommodation and sustainment of armed forces. He thus integrated strategy, grand tactics, logistics, engineering and tactics to form a holistic approach that redefined logistics as a science of generals and general staff, moving beyond its traditional association with administrative tasks. Jomini's insights laid the foundation for modern military thought

[i] AH de Jomini, *The Art of War* (Philadelphia: J B Lippincott & Co, 1862), 69. Translated from the French by Captain GH Mendell, Corps of Topographical Engineers, US Army and Lieutenant WP Craighill, Corps of Engineers, US Army.

on logistics as a vital element in achieving operational success.

In the SANDF context, logistical systems have been influenced by the British[8] and the United States of America (USA)[9] military logistical systems. Logistics in a military setting is often referred to as combat service support (CSS). Logistical appreciations frequently include highly uncertain conditions, i.e. enemy or threat assessment, transport nodes, medical infrastructure, and religious restrictions, requiring South African (SA) logistical staff officers and commanders to make informed decisions based on assessments of strategy, finance, intelligence, personnel management, PSO and international relations by liaising with their respective counterparts in organisations, such as the Southern African Development Community (SADC), African Union (AU) and the United Nations (UN).

Kruys (2008)[10] indicates that the definition of logistics used by the US Department of Defense is similar to that in the *South African Military Dictionary*, emphasising the planning and execution of force movement and maintenance. This includes *matériel* management, personnel movement, facility management and service acquisition. This is reflected in the SANDF staff system, itself adopted from the US military general staff system in the 1970s. The US military general staff system is composed of multiple distinct staff sections, each with specific roles that support the commander and the overall mission.[11] The general staff system includes a logistical staff division responsible for supply, maintenance, transportation, construction, evacuation and hospitalisation tasks. This division plays a key role in equipment acquisition, maintenance, and disposal at national military headquarters, alongside other staff divisions, such as operations and finance. This structure highlights the integral role of logistics in supporting military operations, underscoring its importance in strategic planning and execution.[12]

The South African Border War, also known as the "Namibian War of Independence" and sometimes referred to as the "Angolan Bush War", comprised a complex and asymmetric conflict from 26 August 1966 to 21 March 1990. It involved the South African Defence Force (SADF) and the People's Liberation Army of Namibia (PLAN), the armed wing of the South West African People's Organisation (SWAPO), with operations stretching across northern Namibia (then South West Africa), southern Angola and into Zambia. This conflict was deeply intertwined with the Angolan Civil War, creating a multifaceted scenario that blurred the lines between conventional warfare and insurgency.[13]

Historically, the Border War served as a catalyst for significant changes in military logistics. It necessitated a shift from traditional to unconventional logistic support systems, as forces were deployed over vast distances without the benefit of established doctrine. The nature of the conflict itself defied traditional definitions of war.[14] While not fitting the classic mould of conventional state-on-state war, it was characterised by a prolonged insurgency in South West Africa (later Namibia) and periodic involvement in the Angolan Civil War. These two conflicts were inextricably linked, which made it challenging to distinguish between them. This nuanced understanding highlighted the complexity and adaptability required by military forces during the conflict as they navigated internal insurgency and external engagements in neighbouring countries.

The Cold War was instrumental in promoting Marxist ideology and expanding Soviet influence across Africa. According to Daniel,[15] the collapse of the Soviet Union in 1989 marked a pivotal moment in global politics, culminating in the end of the Cold War and the cessation of Soviet operations in Africa.[16] Closer to home, this shift led to the end of SADF deployments in Namibia, and the independence of Namibia on 21 March 1990.[17] This period also paved the way for the South African transition to democracy, culminating in its first democratic elections on 27 April 1994.[18] After the Border War, the reorganisation of the SANDF by Deloitte & Touche in the late 1990s was based on a business model that led to the dismantling of the domestic command system that allowed for logistical prepositioning.[19] The new system eroded the generic support functions of the SANDF, changing it to a centralised acquisition and procurement system.[20]

On 27 April 1994, the SANDF emerged as the successor to the apartheid-era military, reflecting the transition of the country towards democracy.[21] According to Neethling,[22] the role of the SANDF evolved significantly, with PSO deployments extending beyond regional borders to countries, such as Burundi and the Democratic Republic of the Congo (DRC). This expansion highlighted the growing commitment by the SANDF to international peacekeeping efforts.

In the post-Cold War era, African states have become increasingly involved in PSOs. Whether regional peacekeeping efforts are driven by self-interest to prevent conflict from spreading to their homelands or to strengthen regional relationships, is open for debate.[23] The UN Under-Secretary-General for Peace Operations commended South Africa for its significant contributions to UN peacekeeping missions since 1999, particularly in the DRC. South Africa ranks as the fifteenth most significant contributor to UN peacekeeping forces globally and the sixth largest contributor of women peacekeepers. Additionally, South Africa endorses the UN Action for Peacekeeping initiative for more effective and safer missions.[24] According to Udoaka,[25] despite African countries being substantial troop contributors to UN and African-led operations, most African countries remain heavily reliant on external partners for mobilisation and logistical sustainment. This dependency persists despite decades of international assistance and the evident desire among African leaders to develop their own logistical capabilities.

Esterhuyse and Jordaan[26] conclude that these long-range PSO deployments posed significant logistical challenges. The need to project force over vast distances made it increasingly difficult and costly to maintain strategic, operational, and tactical support reserves on the ground. This issue highlighted the complexities of providing adequate logistical support to military forces engaged in distant operations. The experiences of the SANDF in these deployments emphasised the importance of adapting military logistics to meet the demands of modern PSO missions.

The approach to force projection adopted by modern militaries has significantly enhanced the connection between the supply chain of a force and its home base. This development makes it feasible to implement contracted logistical support for military operations

– domestically and in the countries where operations are conducted – to the extent practicable and without surrendering own sovereignty and capabilities.[27]

The ABS presents unique challenges due to its vast size, low force densities and extensive distances, which complicate rapid responses to evolving situations. This environment poses significant protection challenges for logistic columns and movement. Furthermore, a focus on high-mobility or high-tempo operations necessitates logistical support that is equally flexible, prompt and quick in execution despite the hurdles posed by vast distances and limited transport networks.[28]

Several key factors have hindered the development of robust logistics capabilities on the African continent. Udoaka[29] states that a primary obstacle is the lack of political will to invest in military logistics as an integral part of the total military system. For too long, governments have failed to prioritise these investments, partly due to the challenge of developing a compelling narrative to justify the expenditure. It is often easier to secure funding for new equipment purchases than for building standardised systems, procedures and institutions that can support military forces effectively, efficiently and transparently.

The Stockholm International Peace Research Institute[30] concluded that significant impediments are the prevalence of corruption and a lack of military professionalism. In environments where cronyism and nepotism are widespread, single-source contracts awarded through personal connections are standard. These contracts frequently result in overpayments and subpar outcomes. Corruption not only affects the procurement of equipment and weapons but also affects the pay of frontline units. By diverting funds away from logistical improvements, corruption erodes the willingness of donors and taxpayers to support military initiatives.

Furthermore, the scarcity of reliable infrastructure across much of Africa poses a significant challenge. The continent lacks adequate roads, railways, airports, seaports, telecommunications, electricity, water and sanitation facilities. Road transportation, which accounts for about 90 per cent of intra-continental transport between urban areas, is hampered by poor road conditions and delays at border posts. This unreliable ground support impedes responsive logistics for private and public entities as well as security forces. Consequently, when military logistics depends on such infrastructure, the availability of essential *matériel* for force commanders is jeopardised, ultimately threatening mission success.[31]

The defence analyst, Helmoed-Römer Heitman,[32] warned in 2014 that deploying SANDF forces across Africa poses significant logistical challenges, primarily in terms of supply and support. While South Africa maintains good diplomatic relations with many African countries, the lack of reliable road and rail infrastructure in these regions necessitates the development of alternative solutions. Consequently, both aircraft and ships play a crucial role in supporting these forces, often traversing international airspace and waters to deliver essential supplies and personnel. By developing logistics capacity further,[33] the effectiveness and reach of these vital operations can be significantly enhanced.

The magnitude of this logistical task should not be underestimated. The reliance on air and sea transport highlights the complexity and scale of operations necessary to maintain a robust and sustained military presence in these regions. The absence of robust ground transportation networks means that air support is not only a preference but paramount, underlining the importance of strategic airlift capabilities in sustaining these missions. This reliance on air power emphasises the critical role of aviation in ensuring the success, sustainment and safety of SANDF deployments in Africa.

Although the African geography and infrastructural limitations – such as underdeveloped and congested ports, poor intermodal transport connectivity, and security and regulatory issues, including piracy, smuggling, and corruption – pose significant challenges to shipborne sustainment, these obstacles do not diminish the critical operational need for strategic sealift capability. Moreover, strategic sealift capabilities serve as a vital force multiplier, enabling the projection of military power and the swift transportation of heavy equipment and relief materials across vast distances where other transportation modes are insufficient or unavailable. Addressing African port and transport challenges through infrastructure development and improved security measures is therefore crucial, but it does not negate the indispensable role of strategic sealift in supporting the security and operational needs of the continent.[34]

The defence force is challenged to maintain operational deployments successfully.[35] While the media occasionally highlights poor logistical support, the military has adapted its logistical system to meet operational needs. Effective military logistics relies on a deep understanding of supply and movement factors, and the SANDF has gained valuable experience supporting peace mission deployments in Africa. Additionally, retired Brigadier General (Brig. Gen.) George Kruys[36] emphasised that the SA logistical culture and planning systems have been critical in supporting PSO deployments, even under severe resource constraints. This reflects the experience and strategic focus of the SANDF on logistics as a core component of operational success. Contrary to the view expressed in 2008, Brig. Gen. (ret.) Coetzee,[37] Col (ret.) Serfontein[38] and Eeben Barlow[39] expressed the view that the SADC deployment in the DRC tarnished the reputation of the defence force regarding expeditionary logistics. The mission was not fully appreciated in terms of the threat, as the enemy was underestimated; consequently, the contingency plans were not thoroughly assessed or tested. It may be argued that the entire deployment was an exercise in false optimism and that the capacity of the SANDF either to reinforce or to withdraw was inadequate.[40]

It is however surprising that the logistical procedures of the SANDF have not been well documented, given the extensive experience of the military in peace operations since 1999. Despite sustaining external operations for an extended period and over protracted distances, the overall logistical system and command and control structures are not functioning optimally. This is partly due to the restructuring of the military in the 1990s, which was based on business principles not well suited to a military environment.[41] Key issues include the lack of inter-corps training in the Army, which Vision 2020 and 2045 of the SA Army aimed to address, as well as an overly complex logistical system

with significant deficiencies.[42] Furthermore, Esterhuyse and Jordaan[43] highlight that the logistical challenges of the SANDF stem from centralisation, a disconnect between operational doctrine and logistics, and inadequate contingency planning. These issues have hindered the optimisation of logistics for expeditionary operations in Africa.

Notably, the South African Department of Defence (DOD)[44] has openly acknowledged its logistical weaknesses, highlighting maintenance and repair risks, personnel skills, and experience gaps. Moreover, many military facilities and logistical infrastructure are in poor condition, failing to meet essential health and safety standards. This transparency highlights the need for systemic improvements to enhance the logistical capabilities of the military and lays the groundwork for a proposed futuristic approach – an approach that requires an urgent investigation into adequate levels of stock and reserves.[45]

To strengthen the theoretical foundation, the SA Military Strategy 2055,[46] as strategic roadmap, contextualises the established military logistics frameworks. The conceptual framework integrates principles from the North Atlantic Treaty Organization (NATO) Joint Logistics Support Group (JLSG),[47] which prioritises interoperability and agile resource allocation in multinational operations, and the Supply Chain Operations Reference (SCOR) Model[48] – a globally recognised standard for optimising end-to-end supply chain performance. These are further aligned with integrated defence logistics frameworks, such as those employed by the US Department of Defense[49] and the Indian Defence Logistics Agency,[50] which emphasise centralised coordination and lifecycle sustainment. Within this structure, lean logistics is positioned as a driver of waste reduction and process efficiency. Performance-based logistics (PBL) is used as a contractual mechanism to align stakeholder incentives with long-term operational outcomes. Velocity management (VM) is justified as a systematic tool for balancing cost-effectiveness with mission-critical requirements. Together, these concepts address specific SANDF challenges by fostering joint interoperability through standardised processes, enhancing scalability via the modular design of the SCOR model, and advancing sustainability due to VM focussing on lifecycle resource optimisation. This theoretical alignment ensures the relevance of the roadmap to both contemporary military logistics discourse and practical implementation. Together, these theories form an integrated conceptual framework for modern military logistics, supporting joint interoperability, operational efficiency and sustainability. For South Africa to project military power is essentially the projection of hard power.[51] This article outlines the requirements for projecting hard power from a logistics perspective.

Setting the Scene for the Proposed Future Approach

The North Atlantic Treaty Organization (NATO) supports the view that military logistics is the backbone of combat operations. It is crucial to move forces to hotspots, provide for their needs during deployment, and ensure their safe return as tensions subside.[52] This complex process is pivotal in Africa, particularly in countries where the SANDF operates. The defence force will require a substantial and flexible logistics capability to meet future challenges in the coming decades.[53] This capability must differ significantly from past models, as current and future military needs demand forces with a smaller logistics

footprint – often referred to as 'more teeth, less tail'.[54,55] The logistics supply chain must be agile and capable of rapid deployment to meet these evolving needs.[56]

Enhanced logistics processes, such as integrating digital tools, automation and data analysis, can significantly boost the SANDF combat capability. These advancements can provide real-time information[57] on supply availability, enable quick equipment replenishment, and offer strategic advantages over adversaries.[58] The successful implementation of these changes is essential. It will profoundly affect the people, business processes and technology infrastructure of the SANDF, its allies and military-related industry partners. These proposed enhancements are however all based on the premise that the SANDF will be adequately sourced with the required capabilities.[59]

Military logistics is inherently expensive due to the cost of moving personnel and *matériel*. Additionally, uncertainty about future requirements affects readiness, leading military planners to budget for stockpiles, war reserve materials, and reserve transportation capacity.[60] These reserves enable combat commanders to respond swiftly to unexpected events that might otherwise overwhelm standard logistics support.[61] This intelligence deficit prevents logisticians from contributing to the tempo, momentum, and sustainability of combat operations. Ultimately, logisticians should be informed of all intelligence matters and therefore be able to advise commanders on whether an operation is feasible or not. Bridging the intelligence deficit will make it possible for logisticians to anticipate the needs and the delivery to forces.[62]

The SANDF is significantly transforming its supply chain management, aligning its requirements with the 2015 Defence Review.[63] This strategic realignment aims to enhance the ability of the military to respond effectively to its supply chain needs.[64] The goal is to create a military supply chain that is more effective, efficient, economical, robust and cost-effective than in its current state.[65]

In various sectors, including financial markets, currency trading, supply chain management, and manufacturing, hedges against uncertainty are commonly employed. Military readiness, as a hedge against uncertain threats, parallels the broader concept of risk management through preparation and resource allocation. The general principle of stockpiling supplies to mitigate uncertainty aligns with operational risk management practices.[66] Historically, risk management in military logistics relied on rules of thumb, where logisticians would stockpile supplies based on predetermined guidelines for commodities, such as munitions, fuel and spare parts. Until recently, these methods were the best available due to the data-intensive and computationally demanding nature of sophisticated planning tools.[67]

Introduction to the Military Supply Chain Management

Supply chain management (SCM) is a pivotal practice developed in the private sector over the past two decades, marking a significant shift away from traditional, fragmented logistics practices and systems. The older systems often focussed solely on the movement

and storage of goods, lacking the integrated approach that SCM provides. Supply chain management represents a systemic, strategic coordination of traditional business functions and tactics across entities within a supply chain, aimed at enhancing long-term performance for individual entities and the entire supply chain.[68]

Supply chain management involves substantial process changes that can significantly improve military logistics support. For instance, the SANDF implementing SCM would include transitioning from a mass model of logistics, which relies on stockpiling large quantities of supplies, to a lean, agile and sustainable delivery system.[69] In essence, SCM is the transition from a "just-in-case" (JIC) model to a "just-in-time" (JIT) model for logistics. This new approach would focus on soldiers' needs while maintaining contingency reserves.[70] Specifically, SCM in the defence force would require reforms, such as adopting a JIT[71] inventory system instead of holding extensive inventories, which is only possible with a fully functioning military industry and quality-approved supplier base.[72]

The JIT system will minimise storage costs, and ensure supplies can be delivered as needed, although this must be balanced with the military need for reliability and contingency reserves.[73] Lacroix[74] suggests that implementing advanced technologies, such as predictive analytics and real-time tracking, will enhance supply chain visibility and responsiveness. Additionally, there is a need to streamline the procurement process from traditional procurement methods to more agile and responsive systems that can quickly adapt to evolving operational needs.[75] Furthermore, the SANDF should also consider other key changes, such as:

- Enhancing supply chain visibility by real-time tracking and monitoring of supplies to ensure timely delivery and reduce logistical bottlenecks;
- Fostering collaborative partnerships by building strong relationships with suppliers and other stakeholders to provide reliable and efficient supply chains; and
- Developing flexible logistics capabilities by creating logistics systems that can quickly adapt to different operational scenarios, from peacekeeping to combat operations.[76]

While the JIT concept cannot be fully implemented and certain strategic resources need to be kept at an immediate readiness level, such readiness can be justified by considering multi-role application of these items, for example in the support of other departments during natural disasters.[77]

Implementing SCM in the SANDF is driven by several factors, including globalisation and the need for faster, and more reliable delivery systems. As customers, including military personnel, demand products that are delivered quickly and on time and in good condition, the SANDF must integrate commercial best practices with modern technologies while respecting the unique logistical challenges faced by the military.[78] The integration

of commercial best practices with modern technologies arises from the need to deliver supplies quickly, reliably, and in optimal condition, as required by soldiers. Adopting commercial best practices enhances operational efficiency, resilience, and technological advancement, which are essential for supporting modern missions, while addressing the unique logistical challenges faced by the military. Furthermore, exploiting commercial innovations, such as advanced tracking systems and data-driven supply chain management, enable the military to maintain readiness, reduce costs, and respond rapidly to dynamic operational requirements, all while ensuring that solutions are tailored to the distinctive demands of military environments.[79]

Setting the Scene with the "As-is" Scenario

Effectively realising manoeuvre warfare concepts and enhancing the effectiveness, efficiency and economy of joint forces, is crucial to integrate modern supply chain principles.[80] The prevailing trend in many modern defence forces is towards lighter, more mobile expeditionary forces, often called the "teeth" of military operations.[81]

This evolution in military force composition will inevitably influence the size, nature, capabilities, and capacity of the supply chain system, often metaphorically referred to as the "tail". Modernising the supply chain is essential for supporting these agile forces by ensuring the timely and efficient delivery of supplies and equipment. This involves employing digital technologies, enhancing logistics resilience, and fostering collaborative relationships with suppliers to maintain operational effectiveness.[82] By integrating these elements, military forces can optimise their logistics to support manoeuvre warfare effectively, ensuring that the "tail" supports the "teeth" in achieving strategic objectives. Although the focus of the current study was on small and agile forces, the realities in Africa dictate that most operations degenerate into semi-permanent deployments with their own unique logistics requirements and wide dispersal of forces.[83] This, however, does not negate the importance of an accurate appreciation of threats and a coherent, realistic campaign strategy.[84] Ultimately, intelligence drives strategy, which in turn determines the allocation of resources and the actions taken to achieve organisational objectives, just as the terrain and enemy influence doctrine.[85]

Operational Level Logistics Intelligence

The effective integration of logistics intelligence into operational planning remains a critical determinant of success in sustaining modern military campaigns. At the operational level of war, logistics planners require specialised intelligence frameworks that extend beyond conventional operational intelligence to address multifaceted theatre-specific variables. Such analysis establishes a doctrinal foundation for operational logistics intelligence, identifies its core requirements, and demonstrates its practical application through a contemporary lens.[86] Moore (1990) defines operational logistics intelligence as the aggregation and analysis of data necessary to plan force deployment, sustainment base establishment, and resource allocation during campaigns in a theatre of operations.[87] Unlike tactical logistics, which focusses on immediate supply chain execution, operational logistics intelligence synthesises five operational considerations depicted in Table 1 below.

Operational considerations	Specific requirements
Theatre infrastructure capacity	Ports, transportation networks and storage facilities
Host-nation support dynamics	Economic output, labour skills and cultural constraints
Environmental constraints	Topography, climate and endemic diseases
Adversary logistics systems	Supply routes, fuel depots and repair capabilities
Sustainability thresholds	Minimum environmental standards, and scalable resource models

Table 1: Operational logistics intelligence synthesises operational considerations[88]

Good logistic reconnaissance will identify significant shortfalls and influence planning. Readiness is improved through foresight and maximum preparation.[89] The Commander's Critical Intelligence Requirements (CCIR) for sustainment planning logistics must prioritise the critical intelligence requirements reflected in Table 2 below with equal urgency to operational military intelligence.

Intelligence category	Operational Impact
Indigenous economic capacity	Determines local contracting potential for fuel and food
Transportation node viability	Influences convoy routing and bridge reinforcement needs
Medical infrastructure mapping	Guides casualty evacuation network design
Cultural or religious restrictions	Affects supply distribution schedules and methods
Enemy or threat assessment	Creating vulnerabilities and risks, while degrading logistical networks. Enemy interference necessitates anticipation and adaptation of sustainment plans, while maximising preparation and foresight

Table 2: The intelligence category for the required operational impact[90]

Even under the most austere conditions, there are minimum standards for protecting the environment.[91] As the operation stabilises, and resources become more available, the ability to comply with protective standards will increase in steps, resulting in an overall increase in environmental stewardship. A scalable approach to environmental considerations is crucial in developing flexible courses of action that promote environmental sustainability while maintaining minimum environmental standards.[92]

Operational logistics intelligence constitutes both an analytical discipline and a force multiplier. The systematic implementation of operational logistics enables proactive risk mitigation across the deployment–sustainment continuum, from forecasting host-nation fuel shortages to pre-positioning disease vector control teams. As the complexities of expeditionary forces increase, integrating real-time environmental sensors and

artificial intelligence (AI)-driven logistics simulations will further close the capability gaps identified. This evolution underscores Moore's assertion that logistics intelligence frameworks require continuous doctrinal refinement to keep pace with emerging operational realities.[93]

Performance-Based Logistics and the Defence Industry

Performance-based logistics (PBL) is an outcomes-based product support strategy that plans and delivers an integrated, affordable performance solution that optimises operational capability and readiness, while reducing operating and support (O&S) costs. When dealing with industry, product support outcomes are acquired through performance-based arrangements that deliver military requirements and incentivise product support providers to reduce costs through innovation.[94]

Performance-based logistics shifts the focus to outcomes where the SANDF contracts suppliers to deliver agreed-upon results (such as maintaining equipment at a certain operational level or ensuring a rapid repair turnaround) instead of paying for individual parts, repairs, or services. This aligns incentives by encouraging suppliers to meet or exceed performance targets, often through long-term contracts.[95] Their compensation is tied to these outcomes, motivating them to innovate, improve reliability, and minimise downtime. Furthermore, PBL optimises system readiness by focussing on system availability and reliability, thus ensuring that critical equipment is ready for use when needed, improving mission effectiveness.[96] Performance-based logistics also reduces costs and risks by aiming to lower total ownership and maintenance costs by encouraging suppliers to find efficiencies and prevent failures, rather than simply reacting to defects. Finally, PBL encourages collaboration, fostering long-term, collaborative relationships between suppliers and customers that share risks and rewards, rather than the transactional nature of traditional logistics contracts.[97]

Performance-based logistics offers significant benefits by enhancing operational readiness and availability through a focus on measurable performance outcomes, rather than providing transactional support. This approach reduces life cycle and maintenance costs by incentivising suppliers to optimise maintenance schedules, extend asset lifespan, and minimise downtime.[98] Performance-based logistics enhances supply chain efficiency by integrating logistics planning and exploiting data-driven decision-making and predictive analytics to streamline inventory management and distribution. Additionally, PBL fosters increased collaboration and innovation by aligning supplier and customer interests through long-term contracts and performance incentives, encouraging continuous improvement and the adoption of innovative sustainment solutions.[99] These advantages collectively ensure mission-critical assets remain operational and cost-effective, ultimately delivering superior value and reliability to organisations.[100]

Performance-based logistics faces several significant pitfalls and challenges despite its benefits. Funding restrictions and inflexibility often constrain the ability of programme managers to manage operations effectively due to rigid appropriation rules and limited

control over resources. Cultural and organisational resistance is common, as traditional transactional logistics mindsets and bureaucratic "stovepipes" hinder adoption. This is compounded by short leadership tenures that disrupt continuity.[101] Statutory and regulatory barriers, including specific service policies and acquisition rules, limit the flexibility needed for effective PBL contracts. Many failures stem from a lack of awareness and insufficient training in terms of PBL concepts among personnel. Complex contracting and business planning pose difficulties in defining clear performance metrics, roles, and risk assessments.[102] Suppliers may struggle to transition from cost-plus models to performance-driven approaches, as they often lack the necessary incentives or infrastructure to invest in reliability improvements. Performance-based logistics is not suitable for all systems, especially legacy ones nearing retirement or those that are unsupported by either the organic or commercial sectors. Additionally, the absence of a culture that fosters continuous improvement undermines sustained performance gains. Finally, establishing integrated, accurate performance metrics and ensuring timely availability of data remain challenging, affecting contract management and outcome measurement.[103]

Performance-based logistics presents a transformative opportunity for the SANDF to enhance operational readiness while addressing fiscal constraints.[104] Performance-based logistics is theoretically based on outcomes-oriented contracting and systems lifecycle management. It shifts the focus from transactional procurement to performance outcomes, incentivising suppliers and contractors to meet specific reliability, availability, and maintainability targets over the long term. Performance-based logistics integrates principles from total cost of ownership and systems engineering theories, emphasising risk-sharing, collaboration, and continuous improvement to optimise weapon system support, products, services and sustainment. This approach aligns supplier incentives with military operational goals, fostering accountability and cost-effectiveness.[105] By adopting outcomes-driven supply chain models and fostering strategic alliances with the defence industry, South Africa can mitigate external dependencies and strengthen its position in the ABS. There is strong potential for the continued growth and sustainability of the SA defence industry.[106] With increased understanding by and support from the government, especially regarding the strategic value of intellectual property (IP), the SANDF can enhance its partnerships with international allies. By embracing collaboration and modernising IP management, South Africa can unlock new opportunities that will strengthen the global competitiveness of its industry and ensure long-term success. This approach will significantly improve the prospects for both the SANDF and the broader defence sector.[107] The approach will also align with global defence trends while addressing region-specific challenges.[108] Operational sovereignty in Africa and cost-effective readiness are strategic imperatives for the adoption of PBL.[109]

The unique operational requirements of the SANDF in asymmetric African conflicts necessitate tailored logistical solutions.[110] The emphasis by PBL on system-level sustainment enables force projection capabilities critical for PSO. Unlike conventional off-the-shelf procurement strategies,[111] which risk equipment incompatibility and supply chain vulnerabilities during contingencies, PBL contracts[112] bind original equipment manufacturers (OEMs)[113] to availability guarantees, promoting operational sovereignty

in the African context.[114] Contracts with OEMs situated in foreign countries can however not be fully depended upon, as reliance on external suppliers introduces additional risks to equipment availability and operational continuity, especially during crisis scenarios when international supply chains may be disrupted.[115] Fully acknowledging that crisis response and peace enforcement operations place different demands on logistics support is vital. The former requires short-notice, prompt, and swift initial execution followed by sustained follow-up; the latter involves extensive use of all supply types and increased risk to logistic elements.[116] The SANDF budget constraints demand:

- Innovative solutions to maintain platform availability rates for core combat systems;[117]
- Reduced inventory carrying costs through just-enough (JE) and JIT logistics;[118] and
- Lifecycle cost savings via predictive maintenance analytics.[119]

Cost-effective readiness necessitates defence industry participation (DIP), which require placing certain minimum orders on the defence industry to ensure their sustainability as viable businesses, thereby maintaining a stable and capable local industrial base essential for ongoing support and supply.[120] A phased collaboration framework could yield dual benefits for both civil and military sectors, as depicted in Table 3 below.

Partnership tier	Military benefit	Industrial benefit
Tier 1: Critical munitions	Guaranteed domestic production capacity for artillery shells, infantry small arms ammunition	Stable demand for local defence contractors
Tier 2: High-rate consumables	Onshore manufacturing of aircraft parts, vehicle and weapon spares	Technology transfer to aerospace SMEs*
Tier 3: Systems integration	Indigenous C⁴ISR** system upgrades	Development of sovereign encryption standards

*Note: * SMEs = small and medium-sized enterprises; ** C⁴ISR = command, control, communications, computers, intelligence, surveillance, and reconnaissance*

Table 3: The dual civil–military benefits in the three participation tiers[121]

Table 3 depicted three defence industry participation tiers pertaining respectively to critical munitions, high-rate consumables and systems integration – with reference to the benefits in the military and industrial–civilian spheres.[122] The table highlighted the military benefits of maintaining domestic production capacity of munitions, parts, and local C⁴ISR system upgrades, while supporting the local industry with a sustainable demand for defence contractors, providing technology transfers, and developing sovereign encryption standards. This model aligns with the DIP[123] principles and skilled manufacturing jobs in defence industrial parks.[124] Reinvesting PBL-derived savings into next-generation capabilities creates a virtuous cycle by reducing sustainment costs through condition-

based maintenance and the economic multiplier effect from local defence manufacturing clusters. The approach counters budget sequestration risks by directly linking efficiency gains to capability investments rather than treasury clawbacks.[125]

These measures would position South Africa as the continental leader in mission-tailored logistics while reducing foreign currency exposure from arms imports. The SANDF adoption of PBL represents both a strategic necessity and an economic opportunity. By anchoring logistical partnerships in operational outcomes rather than transactional procurement, South Africa can achieve sustainable military readiness while stimulating high-tech industrial growth.[126] This dual-use approach ensures the force remains combat-effective in the ABS without compromising fiscal responsibility. Strategic partnerships between the military, the defence industry, and public sector industries will have a direct effect on SA society, politically, socially, and economically. These partnerships will indirectly strengthen the international role and position of the SANDF. Additionally, the partnerships will contribute to deterrence against potential adversaries and promote a more stable African continent overall.[127]

Logistic Management Development and Concepts

The following logistics management concepts should be developed progressively to establish the baseline for the SANDF SCM framework.

Velocity management (VM) – emphasises enhancing the speed and accuracy of material and information flow from providers to users.[128] Velocity management (VM) draws on decision theory and value engineering, focussing on maximising the functional value of logistics and defence systems about their cost. Velocity management provides a structured methodology to evaluate trade-offs between price, performance, and risk, ensuring resources are allocated to deliver the most significant mission value. In military contexts, VM supports lifecycle sustainability by balancing immediate operational needs with long-term maintenance and upgrade considerations, thereby enhancing the overall effectiveness and efficiency of defence logistics.[129] The optimal approach combines JIT and JIC[130] principles to deliver JE, tailored to the realities of the ABS and the SA industrial base.[131] Furthermore, a lighter logistical footprint should be developed where standardised equipment with higher quality, improved serviceability, and better reliability are essential.[132] These systems require less maintenance, consume fewer resources, and feature self-reporting diagnostics.[133] Supply support activities will be minimised by reducing demand and improving reliability and maintainability. The in-theatre logistics footprint must be reduced through structural, physical and procurement agility. A lighter logistical footprint embraces the concept of "lean logistics", which involves interconnected initiatives aimed at minimising the logistical footprint of the SANDF while reducing infrastructure. This approach enhances combat capability and sustains warfighting operations.[134] Lean logistics is grounded in the lean management theory, focussing on maximising value by minimising waste and enhancing process flow.[135] In military logistics, lean logistics principles emphasise reducing non-value-adding activities, such as excess inventory, delays, and redundant handling, thereby improving responsiveness

and efficiency in supply chains that must operate under complex, resource-constrained conditions. This approach aligns with the military need for agility and readiness, promoting streamlined workflows, visual controls, and workforce flexibility to meet mission-critical demands efficiently.[136]

Another aspect that should be addressed to improve logistic management development is *total asset visibility (TAV)*. Total asset visibility or TAV entails effective control and coordination of support, which requires commanders to have comprehensive visibility of in-theatre assets, stocks, supplies and services.[137] Technologies, such as barcoding, radio-frequency response tags, miniature global positioning systems (GPSs) and position-reporting transmitters should be implemented to ensure real-time asset visibility. By improving TAV, logistical needs can be anticipated.[138] Anticipatory logistics employs technologies as well as information systems and procedures to predict and prioritise requirements, ensuring logistics readiness before the battle begins. Decision support software will optimise asset utilisation.[139] Real-time data on quantities, locations, and asset conditions will enable automated replenishment requests or support reassignment during operations. This system ensures end-to-end tracking of materials from pick-up to delivery via automatic reporting mechanisms.[140] Caution should however be taken against interception that can compromise operational security and communications jamming that could render these non-functional, and countermeasures should be part of the system.[141] A possible solution is digital ledger technologies ("blockchain") that enhances PBL by providing a secure, transparent, and efficient digital infrastructure. Blockchain supports real-time performance tracking, automates contract execution via smart contracts, prevents fraud, and fosters collaboration among supply chain partners. Collectively, these capabilities improve the reliability and cost-effectiveness of logistics operations under PBL models, enabling better outcomes and accountability.[142]

Expeditionary logistics is a concept that should be implemented to enhance logistics management development. Expeditionary logistics refers to flexible sustainment provided by task-organised elements tailored to manoeuvre units with multi-echelon support in a single package.[143] This approach eliminates conventional constraints tied to equipment specifications or organisational structures. It represents a transformative effort to enhance logistics effectiveness while reducing costs.[144] Expeditionary logistics cuts across traditional silos, streamlining processes and replacing outdated systems.[145]

Logistics engineering ensures essential infrastructure is maintained to sustain the components of deployed land, air, and naval forces effectively. This includes maintaining or improving logistic routes, camps, engineer services (e.g. power or water supply) and general engineering support.[146] Equipment support (ES) encompasses preparing equipment for battle as well as recovering and repairing damaged or unserviceable equipment. Equipment support staff are critical in monitoring key equipment serviceability within formations to maintain combat power.[147]

Civilian resources enable commanders to establish relationships with civil organisations, non-governmental organisations (NGOs), international bodies and local populations

through civil–military cooperation (CIMIC), facilitating mission completion.[148] Management information systems (MISs) should culminate in a joint command, control and consultation information exchange data model (JC^{3}IEDM). Networked interchange is increasingly integral to electronic commerce.[149] This involves computer-to-computer exchange of business documents, such as forecasts, planning schedules, contracts, shipping details, invoices and payments. Integrated communications networks will provide real-time common sustainment pictures (CSPs) for supporters and commanders at all levels.[150] Developing an integrated joint management system will support joint sustainment concepts while enabling interoperability with external systems, such as the UN, AU or SADC, through programmes such as the multinational interoperability programme (MIP).[151]

Options for Optimising Joint Sustainment and Supply Chain Management in the SANDF

In alignment with the current operational intent and the future requirements of the SANDF, the joint sustainment, supply chain, and logistics management support framework necessary to sustain the required force design effectively presents two options.[152]

Option 1: Centralised functional authority with decentralised execution

The inherent logistical capabilities of the individual Services and Divisions within the SANDF remain intact.[153] Functional authority and overarching logistics control are however centralised within the Logistics Division of the SANDF. The execution of logistics functions, however, remains vested within the respective Services and Divisions in the SANDF. As the functional authority, the Logistics Division would assume responsibility at the military strategic level for oversight, process management, supply chain and lifecycle management, systems design and architecture, accounting and asset management, and general logistics training. This centralised functional model seeks to enhance logistical efficiency, standardise policies and procedures, and ensure strategic alignment across all military components while allowing for decentralised execution tailored to operational needs. The advantages and disadvantages of Option 1 are summarised in Table 4 below.

Advantages	Disadvantages
Promotes a joint approach to logistics	Potential duplication of processes and structures
Ensures centralised control of logistics policies and processes	Reduced flexibility and slower response times in local decision-making, affecting customer service
Facilitates economies of scale and reduces overhead costs	Increased bureaucracy due to additional hierarchical layers
Enhances coordination and centralised control	Potential duplication of processes and structures
Allows for greater specialisation within logistics functions	Reduced flexibility and slower response times in local decision-making, affecting customer service

Table 4: Retaining current inherent capabilities within the Logistics Division, Services and Divisions

Option 2: Full decentralisation of the logistic functions

All logistics functions should be fully decentralised to the respective Services and Divisions, with the Logistics Division serving only as the governing body responsible for policy development, determining strategic reserve levels[154] and procedural oversight on behalf of the Chief of the SANDF. Each Service and Division would independently design and execute its logistical operations. The problem is that all operations are conducted under the auspices of the Joint Operations Division, which lacks inherent logistics capabilities and must rely on the Services. The Services however now see themselves solely as force providers and therefore do not fund operational requirements.[155] The key elements of this approach include enhanced logistics competencies, service-specific procurement entities, implementation of the integrated, automatised, digitised (IAD) system, and advanced procurement training. This option aims to enhance logistical responsiveness and adaptability by empowering Services and Divisions to control their logistics functions completely.[156] At the same time, the Logistics Division retains strategic oversight to ensure alignment with broader SANDF policies and objectives. The advantages and disadvantages of Option 2 are summarised in Table 5, below.

Advantages	**Disadvantages**
More excellent responsiveness to local operational needs	Risk of fragmented decision-making across different Services and Divisions
Enhanced customer service due to localised control	It is challenging to maintain strict financial oversight and budgetary control
	Increased difficulty in ensuring uniform military logistics practices and policies, potentially leading to inconsistencies across Services and Divisions within the SANDF

Table 5: Full decentralisation (design and execution to Services and Divisions)

Figure 1 below summarises both options for optimising joint sustainment and supply chain management in the SANDF, as discussed previously.

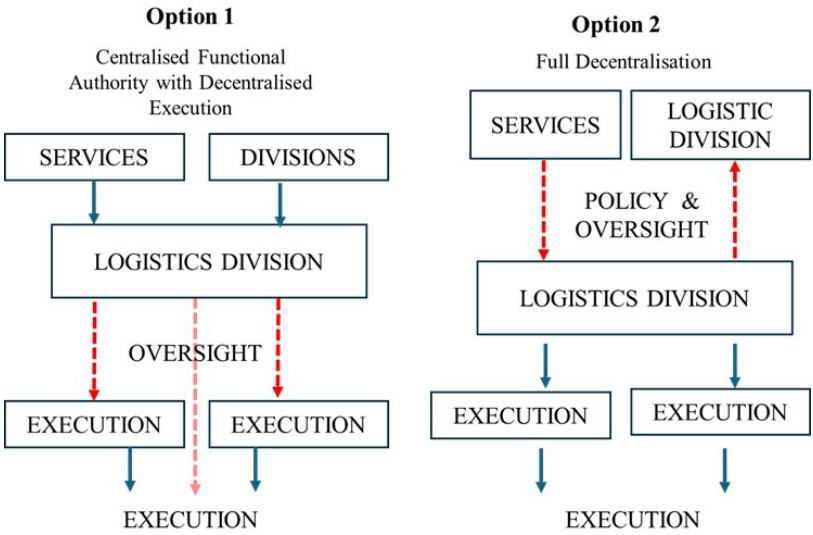

Figure 1: Comparison of logistics management models

A phased approach to logistics development is essential to ensure the logistical effectiveness of the SANDF and long-term sustainability. This approach to implementation focusses on achieving quick wins through short-term, medium-term, and long-term objectives, each aimed at enhancing operational autonomy, efficiency, and interoperability.

Joint Logistics Quick Wins

A phased approach should be followed in terms of the short, medium, long and extended long term to effect joint logistics quick wins.[157] A phased approach positively influences joint logistics quick wins by enabling structured, manageable implementation that delivers immediate, tangible benefits while building momentum for more complex initiatives. This approach breaks down logistics improvements into clear phases with specific objectives, allowing focussed resource allocation and easy progress tracking. Quick wins – small, achievable improvements with rapid effect – can be identified and prioritised within each phase to demonstrate value early, build stakeholder confidence, and secure ongoing support.[158] In joint logistics, where integration across services and agencies is critical, a phased approach helps optimise readiness and operational support by focussing on achievable improvements that enhance supply chain reliability, visibility, and efficiency. By implementing quick wins in phases, such as automating key processes or improving data visibility, joint logistics can reduce inefficiencies and improve responsiveness without overwhelming resources or requiring large upfront investments. Applying a phased approach to joint logistics yields quick wins that deliver immediate, practical results while optimising resources by focussing on high-impact areas. Early successes

build stakeholder confidence and momentum, enabling the smooth implementation of subsequent phases. Continuous monitoring allows for flexibility in adjustments, ultimately enhancing operational readiness through incremental improvements.[159]

Short-Term Objectives

In the immediate term, strengthening first-line logistics capabilities is crucial to reducing dependency on higher-tier logistical structures and enabling greater operational self-sufficiency. A fully capacitated first-line logistics capability must be developed to enhance operational autonomy, comprising A[160] (A1 & A2), B,[161] and F[162] echelons[163]. The defunct maintenance units and base workshops of the SANDF are an example of the uncertainty in the system as to who is responsible for operational support.[164] Operational maintenance units and base workshops will reduce reliance on second- and third-line logistical structures and systems, ensuring greater self-sufficiency in line with SANDF doctrine. Implementing lean supply chain systems, incorporating PBL and VM principles, is essential to achieving efficiency and effectiveness in determining the potential strategic level reserves.[165]

Medium-Term Objectives

Building upon initial short-term improvements, the medium-term focus is reinforcing reserve logistics capacity and enhancing second-line logistics to ensure greater sustainability and resilience. A fully capacitated first-line reserve capability must be established – aligned with the requirement, personnel, organisation, sustainment, training, equipment, doctrine, facilities, information, leadership, technology, budget (RePOSTEDFILTB) planning framework and SANDF doctrine. This will enhance the ability of forces to operate independently, minimising reliance on second- and third-line logistics. Additionally, prioritising an investigation into strengthening the second-line logistics capability is crucial to ensuring sustainable and resilient support structures. The continued integration of lean supply chain systems, incorporating PBL and VM principles, will be fundamental to this process.

Standardising commodities across military systems is essential for long-term logistical efficiency and interoperability, reducing complexity and improving coordination within national and multinational operational frameworks. The standardisation of commodities must be prioritised to establish a standard interface across all military systems. Utilising aviation fuel across aircraft, naval vessels, ground vehicles, and other power packs would, for instance, enhance interoperability within the SANDF. Furthermore, standardisation would facilitate seamless cooperation with external partners, such as the UN, the AU, and the SADC. This approach would also reduce the logistical footprint of the military, streamline sustainment operations, and simplify supply chain requirements. The continued application of lean sustainment and supply chain systems, incorporating PBL and VM principles, remains essential for efficiency and sustainability.

Extended Long-Term Objectives

Benefitting from technological advancements, the extended long-term strategy envisions an IAD Supply Chain Management System to optimise logistical efficiency and resource management across all military domains. A fully IAD supply chain must be developed to enhance logistical efficiency and operational effectiveness. This system should incorporate intelligent, automated accounting and other information and communication technology (ICT) solutions, ensuring real-time tracking and resource management. Enterprise resource planning (ERP) is a software system that helps organisations streamline their core business processes – including finance, human resource (HR), manufacturing, supply chain, sales, and procurement – with a unified view of activity, and provides a single source of truth.[166] The IAD system must be designed with a modular interface, ensuring compatibility and seamless integration across the landward, air, seaborne and medical forces. As with all sustainment strategies, adopting lean supply chain systems, underpinned by PBL and VM principles, will be fundamental to optimising long-term logistics management.[167] The short, medium and long term of the RePOSTEDFILTB network are summarised in Figure 2 below.

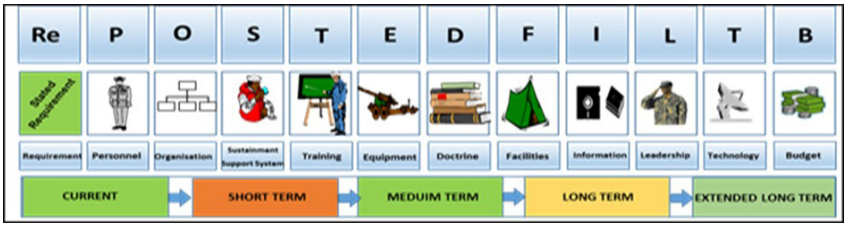

Figure 2: RePOSTEDFILTB framework over the current, short, medium, and extended long term[168]

A phased logistical capability "road map" is graphically depicted in Figure 3, indicating the milestones that should be reached in the short, medium, long, and extended long term.

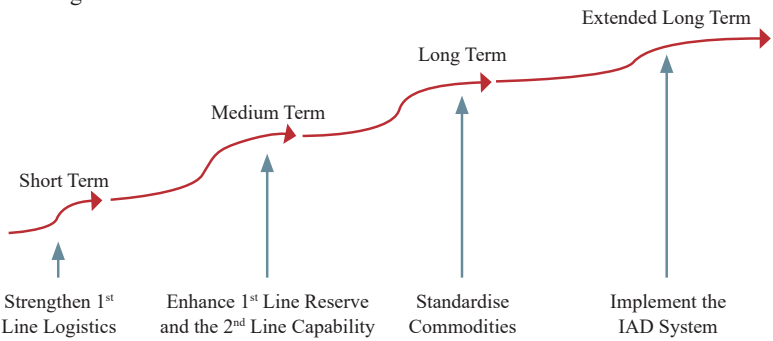

Figure 3: Phased logistical capability roadmap[169]

Figure 4 below illustrates a consolidated integrated, automatised, digitised SCM system.

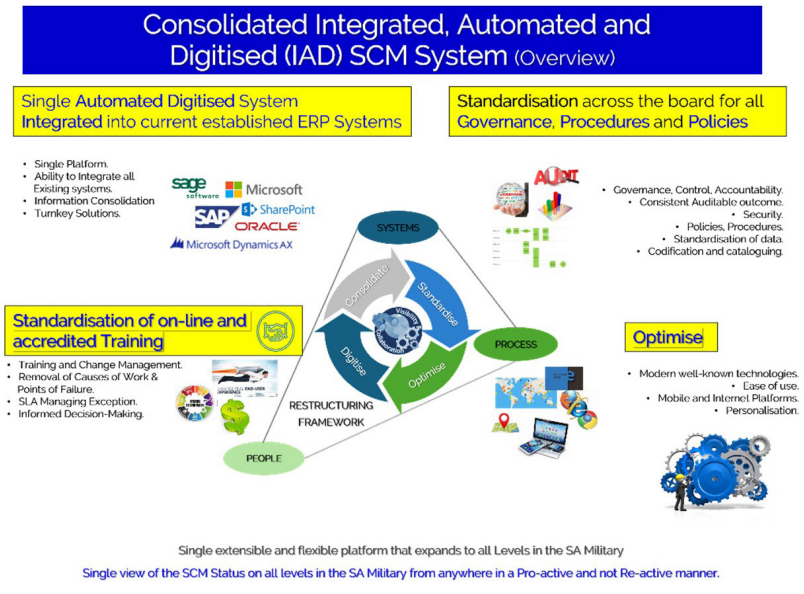

Figure 4: Consolidated integrated, automated digitised SCM system[170]

Governance and tendering (procurement) guidelines are crucial for joint logistics quick wins as extended long-term objectives because they ensure transparency, accountability, and compliance with established standards across all partners involved. Clear governance frameworks and standardised procurement procedures help mitigate risks, promote fair competition, and optimise resource use, which are essential for sustaining efficiency and trust in joint logistics operations. Moreover, well-defined tendering guidelines facilitate collaboration, enable consistent decision-making, and support scalable, sustainable improvements over time.[171]

Conclusion

Sustaining joint and expeditionary forces in the African battle space (ABS) presents a complex web of challenges, ranging from vast distances and unreliable infrastructure to political and institutional obstacles. While the South African National Defence Force (SANDF) has demonstrated commendable adaptability in supporting peacekeeping deployments, its logistical system is hampered by historical restructuring decisions, centralisation, and a disconnect between doctrine and practical application. It has been acknowledged within SANDF circles that these weaknesses emphasise the urgency for systemic reform. Addressing these challenges requires a multi-faceted approach, including increased political will to invest in military logistics, robust measures to combat

corruption, and strategic improvements to infrastructure. Furthermore, optimisation of logistical command and control structures, inter-corps training, and contingency planning will be critical. By embracing a forward-looking approach that integrates military supply chain management (MSCM) principles, fosters joint, inter-agency, interdepartmental and multinational capabilities (JI2M) capabilities, and prioritises interdependent and joint sustainment. The SANDF can thereby enhance its ability to project force effectively, support operations across the full spectrum of military operations, and ultimately ensure mission success in the demanding environment of the ABS. The future of effective military operations in Africa hinges on transforming logistical challenges into strategic advantages.

Optimising joint sustainment and SCM within the SANDF requires a strategic and phased approach, guided by the dual options of centralised authority with decentralised execution or complete decentralisation. Both options offer distinct advantages and challenges, each tailored to address the operational needs and future requirements of the force. The phased objectives outlined in this strategy – from short-term quick wins to long-term technological advancements – focus on strengthening operational autonomy, enhancing efficiency, and ensuring the sustainability of logistics capabilities across all military domains. By pursuing these objectives, the defence force will not only enhance its logistical capabilities but also ensure that it remains agile, efficient, and sustainable in meeting the demands of both current and future operations. Incorporating lean supply chain principles and PBL and improving logistical management development by applying concepts such as VM, TAV, expeditionary logistics and logistics engineering will be the foundation for achieving these goals, ensuring logistics management is aligned with modern operational requirements. Ultimately, these strategic initiatives will enhance the ability of the SANDF to operate autonomously, efficiently, and harmoniously with multinational partners, solidifying its role in expeditionary operations. Finally, the decision-making framework should empower logistic capacity and contingency planning with a right of veto in decision-making whether to approve an operation or not, as Maj. Gen. Lawrence Smith, who served as the Deputy Chief of the SA Army from 2015 to 2018, rightly points out, to ensure operational approval is both feasible and resilient.[172]

Endnotes

[*] Colonel (Col.) Roy Marais (ret.) is a defence logistics expert whose work focusses on the critical intersection of logistics and military operations, particularly in the complex landscape of the ABS. His insights, drawn from practical experience and academic research, contribute significantly to understanding the challenges and potential reforms necessary for effective joint and expeditionary force sustainment. Marais's analysis emphasises the need for integrated, responsive, forward-thinking logistical strategies to ensure mission success in demanding operational environments. Marais holds a National Diploma in Procurement Management from the Pretoria Technicon and a BTech in Strategic Logistic Management from Technicon South Africa.

[*] Col. Wouther de Bruin was appointed Senior Staff Officer: Special Operations at Joint Operations Division. He has a keen interest in logistics at the operational level of war. Although he is not a trained logistician, he realises the importance of logistics for sustained operations. His academic credentials further enhance his military expertise: he holds an MMil (Security and Africa Studies) and a BMil (Natural Sciences) from Stellenbosch University, as well as a Postgraduate Diploma in Defence and Security Management from the University of the Witwatersrand. He completed university certificate courses in management – general, senior, project and logistics at the University of Pretoria.

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South African Navy Expeditionary Operations in the Southern Ocean

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Abstract

The South African maritime relation with the Southern Ocean dates back to the earliest voyages of discovery. Cape Town provided a logistical staging point for mariners on their expeditions further south where a number of isolated islands are situated in one of the most inhospitable and stormy oceans in the world. The strategic importance of the Prince Edward Islands was considered after the Second World War, and the Union Defence Force was tasked to annex the two uninhabited islands. The equipment and expertise of the South African Naval Forces provided the most effective way to reach the desolate islands in the Southern Ocean. The Navy continued to provide a regular service to the weather stations on Marion and Gough Island, until the Department of Transport acquired its first dedicated polar research and supply ship. The Navy however continued to undertake mercy dashes south, to uplift critically sick patients or to conduct search and rescue operations. Developments in maritime aviation provided the South African Air Force with new capabilities to support the Navy in such operations. Larger vessels, such as the hydrographic survey vessel SAS *Protea* (from 1972) and the logistical supply vessel SAS *Drakensberg* (from 1987), were well suited to conduct operations independently, and made several voyages south. From 1993, the capable supply vessel SAS *Outeniqua* made eight round-trip voyages to Antarctica to assist the construction of the new SANAE IV base. The frequency of Navy operations to the Southern Ocean and Antarctica diminished significantly during the last 20 years, in part due to the addition of dedicated vessels operated by the Department of Agriculture, Forestry and Fisheries and the Department of Environmental Affairs.

Keywords: South African Navy; South African Air Force; Southern Ocean; Expeditionary Operations; Marion Island; Antarctica

Introduction

To celebrate its seventy-fifth birthday in 1997, the South African Navy (SAN) published a commemorative coffee table book, titled *A Navy for Three Oceans*.[1] This suggestive title and arguments underlined the importance to recognise the wider area of responsibility of the Navy. South Africans easily recognise the "two oceans" – the Atlantic Ocean, to the west and the Indian Ocean on the eastern seaboard – but the "third ocean" to the south, is mostly disregarded.

Historically, South African (SA) military strategic viewpoints and policy have strongly orientated itself landward, a continental alignment with a focus to the north. As Abel Esterhuyse points out, 'the Air Force and Navy had to align themselves with the nature and outcome of [such] doctrinal processes'.[2] As a result, there has been a strategic neglect of maritime matters, notwithstanding a vast SA coastline of approximately 1 500 nautical miles (2 800 km) and an exclusive economic zone (EEZ), which extends 200 nautical miles (370 km) out to sea. This EEZ contains two islands, Prince Edward Island and Marion Island, located in the "third ocean" – the Southern Ocean. Such "sea-blindness" has consequences, which have led to a general lack of jurisdiction and enforcement capacity to secure the safety in SA littoral waters.[3]

In the study on which this article reports, the expeditionary capabilities of the SAN and its predecessor the South African Naval Forces (SANF) were examined through a historical lens with a singular focus on operations in the Southern Ocean. This "third ocean" has been selected as a focus area, to highlight the operations of the Navy at 'considerable distances from home, over a considerable length of time'[4] – essentially the mark of expeditionary operations. The period spans almost seventy years of such operations to the south, from the first annexation of Marion Island in December 1947, to the last known Navy operation into the Southern Ocean, which was a submarine patrol off the Prince Edward Island group in April 2016. The development of the long-range maritime patrol and search and rescue capabilities of the South African Air Force (SAAF) as well as its shipboard helicopter operations in support of the Navy was significant.

From an academic point of view, Navy and Air Force maritime operations in this specific area of operations have received scant attention, and the current study therefore endeavoured to contribute in this regard. South African naval historiography shows a varied range of coverage, themes and focus, with distinct leanings towards the Second World War (1939–1945) narrative and certain popular aspects of the so-called Border War era (1966–1989). South African post-Second World War naval operations in the Southern Ocean are discussed in the general works of naval historians, André Wessels, Allan du Toit and Thean Potgieter, but not to great depth or based on specific analysis.[5] An engaging first-hand account by John Marsh (a journalist) who covered the annexation of the Prince Edward Islands in 1947 and 1948 provided an early publication.[6] Since then, only short articles have been published on this operation and subsequent operations in the Southern Ocean. On the other hand, the scientific and environmental aspects of SA involvement in the Southern Ocean, and more specifically Antarctica, are better served by the academia of natural sciences. In such works, SA naval involvement and collaboration received coverage, but again, not always to great depth.[7]

South African naval activities in the Southern Ocean – the "annexation of an island", "search and rescue of marooned men", and "expeditions to Antarctica" – often made headlines, due to the sensational nature of such operations. As a result, a wealth of secondary sources (newspaper and magazine articles) are available, while primary sources (official documentation created for each operation) can be found at the Department of

Defence Archives, the South African National Archives, the South African Naval Museum, and The National Archives (United Kingdom).

The author does not attempt to provide a detailed account of each expeditionary operation conducted, although the available primary and secondary sources suggest that this "ocean of information" is ready to be trawled. This article therefore provides the results of a baseline analysis of the Navy and maritime Air Force capabilities in this area of operations through the years.

The Cinderella Service: An Expeditionary Navy?

The concept of expeditionary operations refers to 'military operations undertaken in foreign countries, usually overseas and often at considerable distance from home' and may include 'small actions with discrete objectives, such as the capture of an island or [the] destruction of an enemy facility'.[8] Expeditionary operations can involve land, air and sea forces, and today it is most often conducted in joint operations, where all three forces [and other agencies] are combined.[9]

The SAN has always been a small navy and at its operational zenith would have been ranked as a coastal defence navy with an occasional regional projection (expeditionary) capability. It therefore ranked number four in the Todd & Lindberg classification system of 2015. The occasional expeditionary operation to the Southern Ocean (the focus of this article) confirms this status.[10]

Today, the *South African Defence Review* of 2014 aims to configure the Navy as a 'versatile littoral Navy with a credible deep-ocean [blue-water] capability'[11] – therefore also within the Todd & Lindberg ranking of number four. One can however argue that current constraints would rather place it at a lower ranking level of 6 or 7. These current capability constraints will be discussed toward the end of this article. One can therefore not compare the expeditionary warfare capabilities (past and present) of the SAN with those of other "big-ship navies", where expeditionary warfare 'in its most modern and sophisticated applications involves the [sustained] projection of power across the oceans'.[12]

Historically, the role and responsibilities of the Navy have changed and evolved over the course of its existence. A dynamic and ever-changing strategic and political landscape influenced its development, the size of its fleet, the type of naval vessels at its disposal, and ultimately, the nature of its operations.[13]

The development of an own independent maritime defence organisation, even after 1912 when the Union Defence Force (UDF) was established, was always slow. The formation of a South African Naval Service (SANS) followed ten years later in 1922, but it consisted of only three ships – a hydrographic survey vessel and two minesweeping trawlers. A crippling global economic depression (1933–1934) resulted in the demise of the organisation, to the point where all three ships had to be returned to the Royal Navy. Even worse, during the inter-war years, senior UDF leadership showed a distinct lack of

interest in having a navy at all. Compared to other dominion navies and navies of similar lineage, the SANS organisation therefore remained small and insignificant.[14]

This lack of growth of the embryonic Navy during the 1920s and 1930s is an important aspect to consider within the theme of this article. It is argued that the size and the nature of its fleet inhibited the SANS to conduct expeditionary operations, any 'considerable distance from home'.[15] By comparison, other dominion navies, such as Australia, Canada and even New Zealand, acquired sizeable warships, such as cruisers and destroyers, during the inter-war years. At the outbreak of the Second World War, the Royal Australian Navy numbered 5 440 personnel, with six cruisers and five destroyers, while the Navy of New Zealand numbered about 1 340 personnel with two cruisers. The SANS had only two officers and three ratings with no warships on strength!

The outbreak of the Second World War (September 1939) necessitated the establishment of a Seaward Defence Force (SDF), which in 1942 amalgamated with the Royal Navy Volunteer Reserve to form the SANF. Wartime mobilisation led to a vast and speedy expansion of the naval forces, and by the end of the war, 1 436 officers and 8 896 ratings had served. No fewer than 88 vessels were in service, which notably included three frigates, 45 minesweepers and 20 anti-submarine vessels. Apart from the three frigates, only commissioned towards the end of the war, the SANF wartime fleet mainly consisted of commercial fishing vessels requisitioned for war service, also referred to as the "little ships".[16]

Notwithstanding the vast expansion (in numbers), the SDF and subsequently the SANF were not ideally equipped to conduct expeditionary warfare operations. The handful of larger vessels, imminently more suitable for expeditionary operations, were two salvage vessels, two boom defence vessels, and a controlled minelayer, but they were essentially auxiliary support vessels, for coastal and harbour work. The "small-ship navy" trend persisted throughout the war, and no larger warships, such as battleships or cruisers, were added to the SANF. Dominion navies, such as Canada and Australia, however added aircraft carriers to their inventory shortly after the war and other comparative navies, such as Argentina and Chile, were equipped with battleships and cruisers.[17]

The SANF was deemed a small ocean-going navy, specifically created for the defence of ports of the Union of South Africa and its coastline, while its "big-brother", the Royal Navy, with several cruisers and frigates on station, continued to maintain the deep-water responsibility from its South Atlantic Station in Simon's Town. It must be mentioned that at least 786 SA naval officers and 2 151 ratings were seconded and served with distinction on ships of the Royal Navy during the Second World War.[18] Despite these limitations, the SANF managed to undertake an important operation at a considerable distance away from its home ports during the Second World War. The South African Anti-Submarine Group and the South African Minesweeping Group formed an important part of the British Mediterranean Fleet, and the SANF ultimately provided four anti-submarine vessels, eight minesweepers and one salvage vessel, HMSAS *Gamtoos* in this theatre of operations.[19]

During the post-war era, the premise of the Navy evolved around the Simon's Town Agreement of the mid-1950s, which inferred that the reason for the existence of the Navy was to act as the custodian of the Cape Sea Route on behalf of its Western allies amidst the perceived Cold War threat. South African Navy force structures of the 1960s and 1970s were determined by the Simon's Town Agreement between Britain and South Africa. The agreement focussed on the transfer of the naval base in 1957 and procurement of new equipment – most notably, three President-class (Type 12) frigates, one Type 15-frigate, eight Avro Shackleton maritime patrol aircraft, sixteen Blackburn Buccaneer maritime strike aircraft, and ten Westland Wasp maritime helicopters from 1957 to 1965.[20]

During the late 1970s, the role of the Navy changed again, from that of the 'defender of the Cape sea route'[21] to one that focussed on coastal national defence, and had to contribute to the national strategy, particularly in relation to the Border War (1966–1989). It is held that this conflict, which occurred mostly in Namibia (then South West Africa) and Angola, counted against the SAN during which time the defence budget was directed to the landward Army and Air Force operations, a debilitating factor that placed the Navy under considerable strain.[22] At the same time, the planned modernisation of the Navy suffered due to arms embargoes, preventing it from acquiring new corvettes and submarines to maintain some semblance of a blue-water capability. As a result, vessels less suited to SA sea conditions formed the backbone of the surface warfare capability of the Navy for most of the 1980s and 1990s. Four larger auxiliary support vessels, the fleet replenishment vessel SAS *Tafelberg* (1967), the hydrographic survey vessel SAS *Protea* (1972), the logistic support vessels SAS *Drakensberg* (1987) and SAS *Outeniqua* (1993) were utilised for the occasional expeditionary operations.

The Southern Ocean

The strategic location of the Cape of Good Hope has provided an ideal gateway for explorers, whalers and sealers to the Southern Ocean and Antarctica. A number of small and isolated islands are spread along the way, situated in one of the most renowned stormy seas in the world known as the "Roaring Forties", between the southern latitudes of 40º and 50º where strong westerly winds and turbulent seas are most prevalent. Even stronger conditions, which occur further south, are hailed the "Furious Fifties" and the "Screaming Sixties". An old sailor's expression 'below 40 degrees south, there is no law; below 50 degrees, there is no God'[23] underscores the fierce reputation of this ocean.

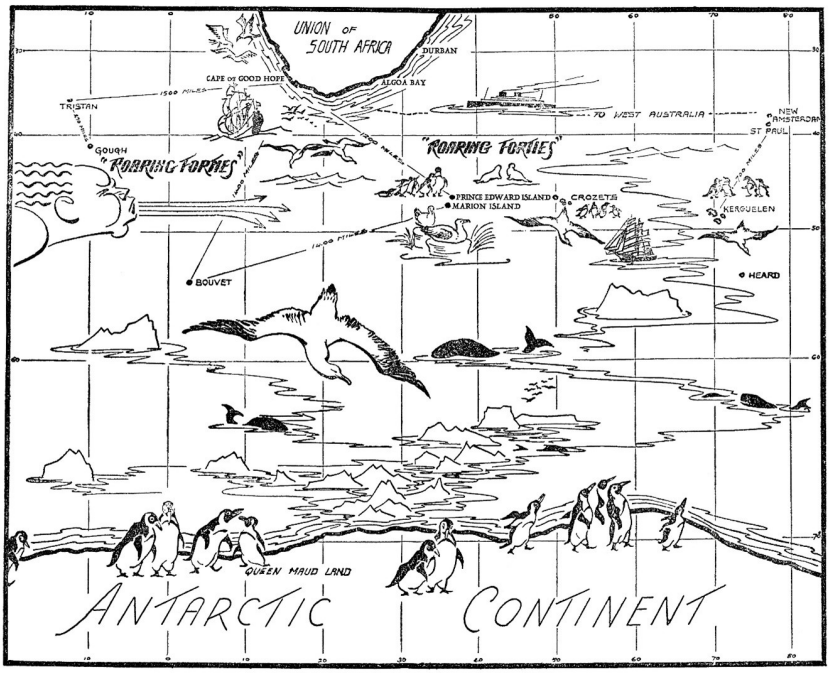

Figure 1: The area of operations – the Southern Ocean and the "Roaring Forties", showing the remote islands and Antarctica.[24]

The Prince Edward Islands

Two small islands in the sub-Antarctic Indian Ocean, Marion Island and Prince Edward Island, are located about 955 nautical miles (1 769 km) south-east of Port Elizabeth (now called Gqeberha). They were discovered by chance in 1663 by a navigator of the Dutch East India Company, Barentzoon Lam. It was not until 100 years later that the two islands were revisited, this time by the French naval officer Marion du Fresne. Later, in 1776, Captain James Cook named the islands the Prince Edward Islands, after the fourth son of the British King.[25]

Bouvet Island

Also referred to as "Bouvetøya", this is an uninhabited sub-Antarctic high island and a dependency of Norway in the South Atlantic Ocean. It is the most remote island in the world, approximately 1 400 nautical miles (2 600 km) south-southwest of the Cape Town and approximately 917 nautical miles (1 700 km) north of Antarctica.[26]

Tristan da Cunha Islands

This is a group of volcanic islands in the South Atlantic, which comprises:

- the occupied island Tristan da Cunha, the wildlife reserves of Gough Island (see below) and Inaccessible Island; and
- the smaller uninhabited Nightingale Islands.

The main island of Tristan with its 250 permanent inhabitants are situated 1 313 nautical miles (2 432 km) west of Cape Town, 1 166 nautical miles (2 161 km) south of Saint Helena Island and 1 872 nautical miles (3 486 km) northeast of the Falkland Islands.[27]

Gough Island

Gough is a rugged volcanic island in the South Atlantic Ocean. It is a dependency of Tristan da Cunha and part of the British overseas territory of Saint Helena, Ascension and Tristan da Cunha. Gough Island is about 215 nautical miles (400 km) south-east of Tristan da Cunha, 1 457 nautical miles (2 700 km) west from Cape Town and over 1 727 nautical miles (3 200 km) from the nearest point of South America. The South African Weather Service (SAWS) has been operating a weather station on the island since 1956.[28]

Antarctica

The permanent presence of South Africa in Antarctica dates back to 1959, when the first South African National Antarctic Expedition (SANAE) established a scientific base at a former Norwegian station in Queen Maud Land, a region claimed by Norway as an independent territory. South Africa signed the Antarctic Treaty, with eleven other countries on 1 December 1959, to establish Antarctica as a continent dedicated to peace and scientific cooperation. The first SA expedition departed early in December 1959 on the Norwegian ship, the *Polarbjørn*, to take over the Norwegian Station. The stations SANAE I, SANAE II and SANAE III were subsequently built on the Fimbul Ice Shelf near the Blåskimen Island. The current base, SANAE IV, is located at Vesleskarvet in Queen Maud Land, Antarctica. Overwintering teams consist of scientists and support personnel from South Africa, totalling about 10 members, although the base itself often hosts summer teams of up to 100 people from various countries.[29]

The South African National Antarctic Programme (SANAP) is an SA government programme for research in the Antarctic and sub-Antarctic. This includes the Antarctic research station (SANAE IV), and one station each on Gough Island and Marion Island. The stations are managed and administered by the Directorate: Antarctic and Islands of the Department of Environmental Affairs (DEA) and the SAWS.[30]

Operation Snoektown: The Annexation of the Prince Edward Islands

The end of the Second World War in 1945 resulted in rapid changes of the global military balance. The attention of the Union of South Africa was directed to the strategic importance of the Prince Edward Island group, two small islands in the Southern Ocean, consisting of Marion Island and Prince Edward Island. It was feared that Marion Island could potentially serve as a base for the deployment of guided ballistic missile systems, which was a perceived threat during the angst in the face of a possible nuclear holocaust. The British government advised the SA government to carry out an occupation of the islands in order to forestall any outside powers from realising such a possibility.[31]

The SANF received the instruction on 19 December 1947, and decided to send the Loch-class frigate SAS *Transvaal* to annex the islands for South Africa. The frigate under the command of Lt Cdr John Fairbairn departed Cape Town on 21 December 1947 in the company of the SA coaster SS *Gamtoos* on a secret expedition, which was dubbed "Operation Snoektown". Lt Cdr Fairbairn and his landing party first set foot on Marion Island on 29 December 1947 and raised the SA flag. The annexation was repeated in a more formal manner on 24 January 1948 when another frigate, HMSAS *Natal*, landed a second party on Prince Edward Island. The formal proclamation was read out by Lt Cdr Drydon Dymond and he declared, 'the effective occupation and administration of the said Islands, by His Majesty's Government in the Union of South Africa'.[32]

The addition of the last unoccupied territories of the world represented a rare expansion of SA territory. Polarisation between East and West and a growing Cold War angst informed the concern that the islands may be taken and exploited by an adversary. At the time, this was a valid consideration, but perhaps a strategic overestimation, given the technological limits of the supposed threat, namely Russian guided ballistic missile systems. The SAWS had identified Marion Island, as well as Gough Island in the South Atlantic, as potential sites for the establishment of meteorological stations before the Second World War. The strategic importance of the Prince Edward Islands was therefore overemphasised, and only of secondary concern to its eventual meteorological and scientific significance of later years.[33]

The 1947–1948 annexation of the islands was an ambitious operation for the recently established SANF. It demanded most of the SANDF assets, and all three of the available Loch-class frigates and one of the two new Algerine minesweepers made the arduous expeditions to the islands during the first year of the annexation in order to establish a permanent outpost there. The frigates could not carry the 300 tons of cargo needed to set up permanent structures on Marion Island, and the coaster, the SS *Gamtoos*, which had served the SANF so well during the Second World War, and another cargo vessel, *Norse Captain,* had to be chartered to transport heavy stores and army engineers to the island.[34] The SANF continued to provide annual passages to the islands after 1948 to service the weather stations on both Marion Island and Gough Island. On more than one occasion, assistance was provided at short notice (see Figure 3). This dependency on the Navy

became less frequent when the Department of Transport acquired its first, dedicated, polar research and supply vessel, the *RSA* in 1961.[35]

The Right Ships for the Task

The availability of a cargo vessel was an important factor in the success of Operation Snoektown. SS *Gamtoos* was one of only a few large vessels available to the SANF – a crucial requirement for such an important expeditionary operation. SS *Gamtoos* had already served the SANF well in the Mediterranean during the Second World War as a salvage vessel. *Gamtoos* was built in 1935, for the coastal trade between Durban and Cape Town with a displacement of 900 tons – it was 192 feet (58,5 metres) long with a 31 feet (9,4 metres) beam. The maximum speed of the vessel was only nine knots with a coal consumption of about 10 tons per day and bunker capacity of 235 tons, which provided a slow passage, but good endurance. It had a freshwater tank capacity of about 20 tons, but 150 tons could be carried additionally. To carry cargo, the *Gamtoos* was fitted with one large hold and two hatches, fitted with additional watertight bulkheads, therefore making two holds. The forward hold was fitted out with additional accommodation, a workshop and storerooms. The vessel was fitted with a magazine and refrigerator at the aft end. Two derricks (gantries) with a capacity to lift three tons with two winches operated over the first hatch, while the second hold was fitted with a 10-ton derrick, and two winches, to handle heavier lifts. This hold was able to load 300 to 400 tons of cargo if required.[36]

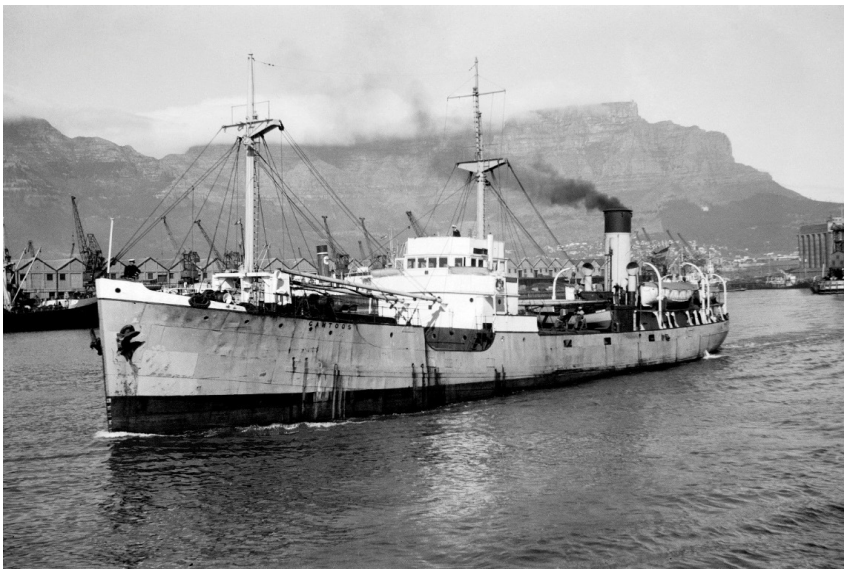

Figure 2: The coaster SS Gamtoos proved vital in the expeditionary Operation Snoektown.[37]

From 1948, the SAN continued annual passages to the islands to service the weather stations on both Marion Island and Gough Island during which the teams were rotated and relieved. Apart from the scheduled annual passage, the SAN provided assistance on other expeditionary operations as can be seen below:

Date	Ship	Details of operation
Aug 1948	HMSAS *Bloemfontein*	First relief voyage to Marion Island
Feb 1949	HMSAS *Transvaal*	Towed the disabled steamer *Pequena* from Tristan da Cunha
Dec 1952	SAS *Protea (iii)*	Mercy dash to Marion Island (medical emergency)
Jan 1955	SAS *Transvaal*	Radar assisted survey of Bouvet Island
Jan 1956	SAS *Transvaal*	Radar assisted survey of Gough Island
Mar 1957	SAS *Vrystaat*	Mercy dash to Marion Island (medical emergency)
Oct 1961	SAS *Transvaal*	Evacuation of Tristan da Cunha following volcanic eruption
Jan 1962	SAS *Transvaal*	Survey of Tristan da Cunha Island following volcanic eruption
Sept 1963	SAS *Transvaal*	Air & sea rescue in support of first USAF[38] overflight of South Pole

Table 1: South African Naval Forces and Navy operations into the Southern Ocean 1947–1963.[39]

The first South African National Antarctic Expedition (SANAE) was formed in 1959 and the first South African Expedition sailed from Cape Town to Antarctica in the chartered Danish vessel *Polarbjorn* to take over a Norwegian base, which subsequently became the SANAE 1 base. In 1961, the second SANAE team again chartered a Danish vessel, the *Polarhev*, but the dependency of the Department of Transport on the SA Navy (and chartered vessels) became less frequent with the acquisition of its first dedicated polar research and supply ship in 1961. The new vessel, which was built in Osaka Japan, was named the *RSA*, and sailed from Cape Town on its first voyage to Antarctica, Gough Island and Marion Island on 5 January 1962. The vessel was under the command of ice pilot, Cdr Jack Netterberg, who was seconded from the Navy to the Department of Transport for this expedition.[40] After a total of seventeen years of service, which included seventeen round trips between Cape Town and Antarctica, the *RSA* was withdrawn from service in 1978 and replaced by the new 5 000-ton Japanese-built Antarctic supply and research vessel, the SA *Agulhas*.[41]

The SAN continued to provide assistance when needed, increasingly so with the support of the SAAF (see section below). An example of such a joint operation occurred when radio contact was lost with the weather station on Marion Island on 26 June 1966. The Air Force dispatched a Shackleton maritime patrol aircraft from Cape Town three days later

to investigate and re-establish contact, and to drop the necessary emergency equipment. A fire had destroyed the radio room and almost all the living quarters at the weather station, and the Navy frigate SAS *President Kruger* was consequently dispatched to the island on 29 June 1966 to provide further assistance.[42]

Another frigate, SAS *Simon van der Stel* was involved in a much-publicised search and rescue operation at the end of June 1969 when two members of the weather station on Gough Island were reported missing. With its two Wasp shipboard helicopters and the Royal Fleet Auxiliary tanker RFA *Ennerdale* in support, a lengthy search and rescue operation was launched, more than 1 400 nautical miles (2 600 km) from Cape Town. The bodies of the two men were eventually located.[43] Gough Island was again the destination when the Navy was requested at the end of June 1972, to extract a seriously ill member of the SA weather team from the island. On this occasion, the frigate SAS *President Steyn* was dispatched, but the weather was so unfavourable at the island that its Wasp helicopter could not fly, and a small *Gemini* inflatable boat had to be launched to bring the patient to the ship.[44]

There is no doubt that these operations in the harsh conditions of the Southern Ocean honed the boat handling and seamanship skills of officers and men and tested the flying skills of air crews. In many cases, operational doctrines had to be developed to suit the unique conditions that prevailed. These types of humanitarian search and rescue operations created much public interest and made the headlines, much to the benefit of the public image of the Navy and the Air Force. The Navy later instituted a Sword of Peace to recognise such deeds of valour and humanitarian efforts.[45]

Replenishment at Sea: Extending the Reach

In 1967, the SAN commissioned a former Danish built oil tanker the *Annam* into service. Named SAS *Tafelberg*, it was the largest ship ever commissioned by the SAN at 557,7 feet (170 metres) long, with a full displacement of 25 300 tons. This provided new capabilities previously not available, and made it possible to supply other ships at sea with fuel, stores and fresh water, enabling them to operate over long distances, independent of other ships or foreign ports.[46] Prior to the arrival of SAS *Tafelberg*, the only other ship capable of carrying sizeable amounts of stores and victuals was the coaster *Gamtoos* (see previous section).

The absence of a SAN replenishment or supply vessel over the preceding twenty-year period (1946–1966) should be explained. The continued presence of the Royal Navy in SA waters contributed in this regard, by virtue of both its naval base in Simon's Town (up to 1957) and regular maritime exercises. The Royal Navy deployed its replenishment oilers during the annual maritime exercises held in Cape waters; the SAN thus benefitted greatly, with its own destroyers and frigates often on the receiving end of replenishment at sea (RAS) evolutions.[47] Although this all took place in the course of training exercises, the application of the RAS evolutions became important during subsequent operations, as was the case in June 1969 when the RFA *Ennerdale* replenished the destroyer SAS *Simon van der Stel* off Gough Island.[48]

The second consideration for the reluctance to employ a dedicated fleet replenishment vessel was the favourable geo-strategic position of the 1940s and 1950s. The availability of foreign but friendly ports along both the African west and east coasts eliminated any need for RAS operations. Amidst the changing political situation and gradual political isolation of apartheid South Africa during the 1960s and 1970s, the availability of a dedicated fleet replenishment vessel became increasingly critical.[49] Operations in the Southern Ocean were less affected by the changing geo-strategic position, but the "extension of the reach" was nevertheless an important capability and backup, where the range of a ship could easily be affected by worsening sea conditions or mechanical breakdown.

During her busy 25-year service career, SAS *Tafelberg* made surprisingly few voyages into the Southern Ocean and Antarctic region, even though she had been built with an ice-strengthened bow. A special request by the DEA did however take the *Tafelberg* to Marion Island in May 1990 with two Alouette III helicopters and members of the Special Forces Regiment on board. The purpose of this unusual operation was of an environmental nature – to cull the feral cat population on the island![50]

Closing the Distance: Maritime Aviation Developments

Significant technological aviation advancements overlapped the first decade of naval expeditions into the Southern Ocean. The delivery of new maritime patrol aircraft to the Air Force and the development of shipboard helicopter operations during the 1950s and 1960s were important. In this regard, a high level of interoperability existed between the Air Force and the Navy, which optimised operational effectiveness in the Southern Ocean.

The responsibility to patrol and protect the extensive SA coastal and EEZ areas had been (and remains) a joint task of the SAN and the Air Force. To meet this requirement effectively, the Air Force established an area command, known as 2 Group in 1950, which became Maritime Group in 1958 and then Maritime Air Command in 1969, initially based at Youngsfield near Cape Town, and then at Silvermine since 1973. A number of Air Force squadrons were assigned to the command and were located at the coastal airbases in Durban, Port Elizabeth, Cape Town and Langebaanweg.[51]

At the time of the annexation of Marion Island and Prince Edward Islands by the Navy in 1947 and 1948, the Maritime Group utilised the Short Sunderland flying boat for long-range maritime patrols of the SA coastline. The Sunderland saw service from April 1945 with 35 Squadron and was based at Congella in Durban. It was a capable aircraft (perhaps better known for its anti-submarine feats during the Second World War), but lacked the range to fly to the Prince Edward Islands and back. It could land on water at the island, refuel and make the return flight to the Union, but the typically unfavourable weather conditions, rough seas and high wave action made a water landing at the island a risky proposition and highly unlikely.[52]

An improvement that brought the Southern Ocean and more specifically Marion Island "closer to the Union" was the delivery of eight Avro Shackleton MR.3 aircraft to the Air Force from May 1957 to February 1958, to replace the Sunderlands. The new maritime patrol aircraft were allotted to 35 Squadron in Cape Town, a move that coincided with the relocation of the Navy from Durban to Simon's Town in 1957. The new capabilities of the squadron were put to the test barely a year later when a Shackleton made the first flight to Marion Island. The purpose of the mission was to provide exposure to the flight crews in the planning of long-range flights over water. The aircraft departed the (then) DF Malan Airport at 01:08 on 22 March 1958, reached Marion Island at 07:40, and remained in a holding pattern at 800 feet for almost 30 minutes. Radio contact was established with the weather station, and vertical and oblique photos were taken of the two islands. The Shackleton landed at Ysterplaat Air Force Base at 16:10 that afternoon, logging a total flight time of 15,04 hours in which 2 426 miles (3 904 km) were covered. The flight was planned to coincide with the visit of the hydrographic survey vessel SAS *Natal* to the island, which at the time, would be halfway en route, to act as a rescue and radio picket ship. A second training flight to Marion Island was undertaken just a week later, on 28 March 1958.[53]

Figure 3: The Shackleton flights of March 1958 provided the first aerial photographs of Prince Edward Island and Marion Island to the world.[54]

The first operational tasking of the Shackleton to Marion Island came on 5 July 1960, following a request from the Department of Transport to assist with the transportation of vital spares for machinery necessary to sustain operations on the island. The spares, together with official and personal mail for the staff were packed in nine supply-dropping canisters and loaded into the bomb bay of a Shackleton. The long flight to the island

provided navigational challenges, but was otherwise of a routine nature, this time with the frigate SAS *Good Hope* en route on picket duties. As expected, however, the weather conditions at Marion Island were not ideal, and the commander of the flight later reported that, on approach and having to descend to a lower level, conditions became extremely turbulent with the large Shackleton bouncing around 'like a leaf in the storm'.[55] The nine canisters were nevertheless released over the dropping zone and retrieved by the personnel of the weather station – all of the important spares and supplies intact. The Shackleton landed safely in Cape Town after another long flight of almost 16 hours.[56]

It was now possible to reach the island within 15 to 16 hours by aircraft, as opposed to the four or five-day passage by ship through the Southern Ocean. While fixed-wing aircraft could not transfer personnel to and from the island, it could drop cargo and equipment by air. This capability was again well demonstrated when a fire broke out at the weather station on Marion Island on 26 June 1966, and radio contact was lost with its inhabitants. A Shackleton was dispatched from Cape Town three days later to investigate, re-establish contact, and drop the necessary emergency equipment. The Navy frigate SAS *President Kruger* reached the island a week later.[57]

The development of the so-called "turboprop" – gas turbine engine, which superseded piston engine aircraft (such as the Shackleton) offered even more advances. The Air Force took delivery of seven Lockheed C-130B Hercules transport aircraft in 1963 that were allotted to 28 Squadron at Air Force Base Waterkloof (inland) near Pretoria.[58] The C-130 had a greater range and a higher cruise speed, and could carry and deliver a bigger payload than the Shackleton, and could fly above bad weather en route to the islands, because it was pressurised. From the mid-1960s, the C-130 was therefore often selected and favoured above the Shackleton for such missions. One of the most significant missions was an emergency supply drop of spare parts for a defective crane at Gough Island on 16 November 1971. The C-130 flew a 3 260-mile (5 246 km) round trip from Cape Town to the island and back.[59]

The third and last Air Force fixed-wing aircraft type to be utilised in operations to the Southern Ocean was the Boeing 707 of 60 Squadron. Five of this type was introduced into Air Force service from 1986, primarily for in-flight refuelling, transport and special missions, such as electronic warfare (EW) and intelligence gathering (ELINT). The Boeing 707 was originally built as a transatlantic–transcontinental airliner with a range in excess of 6 000 miles (9 600 km) and four turbojet engines, which ensured high-altitude cruise performance.[60] From September 1988, a number of long-range navigational training sorties were flown, to Marion Island (nine), Tristan da Cunha and Gough Island (three) as well as Bouvet Island (once). Many of the operations of the squadron were of a covert nature, and long-distance flights were often described (in the flight authorisation books) as "navigation" or "training" flights, but other sorties were more specific. A flight was made to Antarctica on 10 September 1988, which (at the time) was the longest operational flight ever made by an SAAF Boeing 707. Urgently needed medical supplies had to be air-dropped at the SANAE base, and the flight totalled 11 hours and 30 minutes, covering a distance of 5 319 miles (8 560 km).[61]

The illegal fishing of the highly sought-after Patagonian Toothfish off the Prince Edward Islands prompted the DEA to request the Air Force to investigate such activities. A Boeing 707 was tasked to fly to Marion Island in 1996 and was able to track four fishing vessels in or approaching the SA territorial waters around the islands – a protected no-fishing zone. Radio signals and messages were intercepted and recorded, while Air Force photographers captured the perpetrators on camera, which were later presented as evidence to authorities.[62]

Flying distance:	**Maximum range:**			
Cape Town – Marion Island – Cape Town	**Short Sunderland GR5 (1945)**	**Avro Shackleton MR.3 (1957)**	**Lockheed C-130B (1963)**	**Boeing 707-320C (1986)**
2 236–2 609 miles 3 600–4 200 km	2 671–2 982 miles 4 300–4 800 km	4 214 miles 6 782 km	4 848 miles 7 803 km	6 000 miles 9 600 km

Table 2: The introduction of new aircraft provided improvements in range to conduct safe round-trip (non-stop) flights from Cape Town to Marion Island.[63]

The Shackleton aircraft of 35 Squadron were phased out of service in 1985, and never replaced with a suitable long-range maritime patrol aircraft. Instead, the older Douglas C-47 Dakota and an upgraded version, the C-47TP (Turbo-Dak) were configured for maritime patrol work. Operating procedures of 35 Squadron however limited the effective range of the Turbo-Dak over water to only to 200 nautical miles (370 km) from the coast.[64] In November 2007, the Boeing 707s of 60 Squadron were withdrawn from service. To replace the type, an initial order was placed for eight Airbus A-400M transport aircraft (with long-range search and rescue capability), but the order was cancelled in November 2009, due to escalating costs.[65] The C-130B Hercules transport fleet, so often utilised for long-range search and rescue missions, have remained in service for 62 years; however, a lack of serviceable aircraft seriously hampers mission availability today. At the time of writing, the Air Force is without a dedicated maritime patrol aircraft.[66]

Helicopters on South African Navy ships

Until 1964, the SAN had no ships equipped to land or carry helicopters. The Air Force had acquired its first helicopters, the Sikorsky S-51 in 1948, and the larger Sikorsky S-55, in 1956. The need for a helicopter in naval expeditionary operations to the south became apparent following the January 1955 Navy expedition to Bouvet Island. The frigate SAS *Transvaal* had taken a team of the Department of Transport to investigate the prospects of establishing a meteorological station on the island. In his subsequent report, the Officer Commanding of Coastal Command highlighted the requirement for a helicopter, 'to assist the [next] expedition to reach the ice plateau [on the higher part] of the island'.[67] This request was supported by the Navy (Naval Chief of Staff), but ultimately not approved by the Air Force (Air Chief of Staff).[68] Although not stated, this was supposedly because the Air Force had only one S-51 helicopter in service at the time (it had lost two others in accidents) and the only Navy vessel that could possibly embark this (single) helicopter

was SAS *Good Hope*. The former frigate was converted to a dispatch vessel in 1954 and had a large reception deck fitted aft, which could be utilised as a quasi- "flight deck". The lack of enclosed stowage or hangar facilities for prolonged helicopter operations in the stormy Southern Ocean negated any further consideration. It was only two years later, in the calmer waters of Saldanha Bay, that the first helicopter deck-landing took place when an S-55 landed on the quarterdeck of the *Good Hope*.[69]

No further progress was made until 1964 when the Westland Wasp helicopter was taken into service by the Air Force. The British-built Wasp was a dedicated maritime helicopter built specifically to operate from the deck of a frigate. As part of the Simon's Town Agreement, an initial order was placed for ten helicopters, which were delivered between 1964 and 1966.[70]

To operate the Wasp helicopter, the SAN converted its two W-class destroyers to Type 16 fast anti-submarine frigate standard, with flight deck and hangar. These conversions, carried out locally between 1962 and 1966 coincided with the delivery of three new Type 12 (President-class) frigates, also part of the Simon's Town Agreement. These frigates were also progressively modified to the same standard, with the addition of a flight deck and hangar to carry the Wasp.[71] The unique abilities of a helicopter – to hover in flight, to land in confined spaces, and to hoist and carry cargo and personnel in a vertical manner – made them indispensable in expeditionary and search and rescue operations to the south.[72] The Wasp was not confined to operations off frigates alone, but was also suitable utilised when the hydrographic survey vessel SAS *Protea* entered service in 1972 (see section below).

Figure 4: A Westland Wasp helicopter from 22 Squadron on Marion Island in 1974. It flew from the hydrographic survey vessel SAS Protea to transfer personnel and cargo, amongst others, a number of field huts to allow scientists to conduct research in far-flung parts of the island.[73]

Apart from the Wasp, no fewer than four other helicopter types have operated from SAN ships through the years.

The Alouette III

The SAAF first took delivery of the French-built Aérospatiale Alouette III type in 1962. Alouette IIIs were added to 22 Squadron at Air Force Base Ysterplaat in 1978 to complement the Wasp helicopters already in service. The maritime Alouette III was easily distinguished by the emergency flotation gear and bright orange colour scheme they carried.[74]

The expeditionary capabilities of the Navy were enhanced considerably when maritime helicopters, such as the Wasp and Alouette III, were added to the various ships discussed in this section. The landing of stores and personnel on islands, such as Marion and Gough, were extremely hazardous. Prior to the introduction of helicopters, this required the use of smaller motor launches and whalers. Lives were lost in such operations, as was the case when Petty Officer (PO) JG Bold of SAS *Transvaal* drowned at Marion Island when the motor cutter and whaler of the frigate both capsized in a landing attempt on 10 April 1956.[75] The use of helicopters limited this risk while adding additional capabilities, effectively extending the range of the ship in search and rescue and vertical replenishment operations.

The SAS Tafelberg Conversion: The SAN "Helicopter Carrier"

The fleet replenishment vessel SAS *Tafelberg* was taken into service by the Navy in 1967 (see section above). In 1975, a small helicopter deck (without a hangar) was added to the stern of the ship, aft of the funnel. This made it possible to land the Wasp helicopter. The *Tafelberg* however underwent a major conversion in 1983–1984, which modified the vessel to a combat support ship. A large helicopter flight deck and big hangars were added aft, which made it possible to accommodate the largest helicopter in SAAF service, the French Aérospatiale Super Frelon, then in service with 30 Squadron at Air Force Base Ysterplaat. The Super Frelon and Puma helicopters from 30 Squadron, and the much smaller Wasp could now be operated together. This comprehensive conversion was carried out locally by the dockyard in Simon's Town, and provided SAS *Tafelberg* with a new lease of life and new capabilities.[76]

Puma and Oryx Helicopters

The locally built combat support vessel SAS *Drakensberg*, commissioned into service in 1987, was a large and versatile vessel of 12 500 tons equipped with a helicopter flight deck with two hangars that could accommodate two Super Frelon or Puma helicopters. The French Aérospatiale Puma entered SAAF service in 1972, and the type was added to 30 Squadron at Air Force Base Ysterplaat in 1980. For maritime duties, the Pumas at 30 Squadron were fitted with emergency flotation gear on the sponsons and nose. The Pumas accompanied *Drakensberg* on many significant expeditionary operations, especially at the dawn of the democracy in the early 1990s. This included a flag-showing cruise to Taiwan, crossing the Indian Ocean with two strike craft in 1990, a humanitarian relief operation to Turkey, transiting the Suez Canal in 1991 and representing South Africa at

the fiftieth commemoration of the Battle of the Atlantic in 1993.[77] The squadron was also responsible for Antarctic support missions, flying two Puma J models, owned by the DEA off the SA *Agulhas*. When 30 Squadron was disbanded at the end of 1991, the Pumas were transferred to 22 Squadron to replace the Wasps in the maritime role.[78]

From 1986, Atlas Aviation (now Denel Aviation) developed and produced an upgraded and remanufactured version of the Puma, known as the Oryx. The Oryx entered SAAF service in 1991, and was added to 22 Squadron by 1992 where it started flying operations from the SAS *Drakensberg*. In 1993, the Arctic supply vessel SAS *Outeniqua* was added to the fleet, and during 1994, it underwent a refit in which the flight deck and hangar were modified to allow the ship to operate two Oryx helicopters. To replace the Puma J models that were still operated on behalf of the DEA, two Oryx helicopters were modified and upgraded to continue the Antarctic service from the SA *Agulhas*. Designated the "Atlas Oryx M2", they were painted in a red and white 'coast guard' colour scheme, and entered service in 1997.[79]

Today, the Oryx helicopters of 22 Squadron continue to fly off SAS *Drakensberg* while the Super Lynx helicopters, which entered service in 2007, primarily operate from the Valour-class frigates. The new Project *Hotel* hydrographic survey vessel, under construction in Durban (see section below) at the time of writing, will be able to accommodate a Super Lynx helicopter.[80]

The SAN Workhorses: SAS Protea and SAS Drakensberg

In 1972, the SAN commissioned the new Hecla-class hydrographic survey vessel, SAS *Protea*. The "White Lady", as she was affectionately known, provided new capabilities that met the requirements for these hazardous southward journeys. The high standard of accommodation and facilities on *Protea* allowed for extended operations to the hostile and isolated Southern Ocean islands and Antarctica. Up to seven scientists could be accommodated on board while the hull design of the ship allowed for navigation in light ice.[81]

Early in 1978, *Protea* made its first voyage to Antarctica for the Department of Sea Fisheries in an international krill research project. This voyage included the rounding of Cape Horn via the Magellan Strait, the first SA naval vessel ever to do so. In line with her designated hydrographic function, SAS *Protea* was tasked in February 1987 to survey the approaches to Marion Island and to land an environmental impact study group on the island to consider the construction of an airfield there. One of the last passages south of the "White Lady" was in January 1994 under command of Captain (Capt.) Derek Law to Grunehogna 108 nautical miles (200 km) south of SANAE) Antarctica and Bouvet Island. In the process, Ensign Anne Myers became the first SAN female to cross the Polar Circle.[82]

For almost 34 years (1978–2012) the research and supply vessel, SA *Agulhas*, of the DEA was used on the route between Cape Town and the islands of the Southern Ocean and Antarctica, but the SAN was often called upon to assist when the vessel was not

available due to defects or repairs. Such interdepartmental partnerships have been a feature of the SANAP. The Department of Public Works (DPW) tasked with construction and maintenance of structures on Marion Island and at SANAE, while the Navy and Air Force provided the DEA with transport support to and from the islands and the to and from the Antarctic. To support this involvement, the 1998 *Defence Review* emphasised, 'the Navy and Air Force commitment [and support] was mainly a result of the country's membership of the [Antarctica] Treaty'.[83]

As mentioned previously, the combat support vessel SAS *Drakensberg*, commissioned into SA naval service in 1987, was the largest vessel ever designed and built in South Africa at the time. *Drakensberg* was designed to carry 5 500 tons of fuel and 750 tons of dry stores and ammunition while four on-board desalination plants could produce 70 000 litres of fresh water daily. The flight deck and hangar aft could accommodate two Puma or Oryx helicopters, while another landing spot forward enabled helicopter operations to take place both forward and aft simultaneously.[84] These capabilities proved useful and, as with SAS *Protea* in 1972, the new acquisition was well suited for extended operations to the Southern Ocean.

As early as 26 February 1988, SAS *Drakensberg* sailed south, rounded Cape Horn en route to Chile, and did so again on 5 April 1988 on the return voyage. In January 1991, *Drakensberg* rendezvoused with SA *Agulhas* at Bouvet Island in an operation code-named "Boval". This involved the transfer of crucial supplies of fuel, victuals and a Puma helicopter to the *Agulhas* in order to extend her stay in the Antarctic. The operation also allowed for the repair and recovery of a SANAE Puma helicopter stranded in Antarctica.[85]

Just a year later (February 1992) *Drakensberg* again came to the assistance of SA *Agulhas,* which had suffered a broken rudder in the pack ice of the Antarctic. The SAS *Drakensberg* became the first SA Naval vessel to proceed further south than 54 degrees south latitude when she reached the stricken *Agulhas* for the long tow back to Cape Town. With the damaged vessel undergoing repairs in Cape Town, the *Drakensberg* undertook the resupply of the Marion Island Base in March 1992.[86]

An Ice-Breaker: SAS *Outeniqua*

The long-serving fleet replenishment vessel of the SA Navy, SAS *Tafelberg*, was decommissioned in November 1992. Initially, no provision was made to replace SAS *Tafelberg*, but a fortuitous discovery by the Naval Command Council in 1992 that funds were available, led to the procurement of the *Juvent*, a Ukraine-built polar supply vessel, the following year. The 21 000-ton vessel was originally built in 1991 for the Soviet Navy to support its military bases in the Arctic, but was never taken into service due to the collapse of the Soviet Union.[87]

The *Juvent* was commissioned by the SAN as the SAS *Outeniqua*, in Simon's Town under the command of Capt. Jan Vorster on 8 June 1993. The vessel of 544,6 feet (166 metres) displaced 21 025 tons (full load displacement) and its ability to break ice was an

important advance for the SAN. The capacity to ship freight and outsized cargo was just as impressive with four heavy lift cranes, a very large internal cargo space for as many as 64 large vehicles and a roll-on, roll-off (ro-ro) capability that eased the loading and unloading procedure considerably. A helicopter flight deck was located aft, and two Puma and later Oryx helicopters could be housed inside the hangar.[88]

To test the crane lifting capabilities of the SAS *Outeniqua*, an exercise was conducted in Simon's Town in September 1995. Army heavy equipment, which consisted of an *Olifant* main battle tank (58 tons), a *G6* self-propelled howitzer (46 tons), and a *Rooikat* armoured reconnaissance vehicle (31 tons) were successfully loaded utilising all four of the cranes on the ship. Each lift took about an hour, due to the weights and operating modes of the cranes. The equipment was stowed in the tween decks of the *Outeniqua* and then lifted out of the ship again.[89]

Almost six years later, from 6 to 21 March 2001, Exercise Sealift was conducted in the harbour of Port Elizabeth under the direction of Chief of Joint Operations. It was conceded at the time that, if the SANDF was to supply a peacekeeping force and required to transport heavy vehicles, it had to be done by sea in lieu of an Air Force heavy lift capability. A total of 76 vehicles (more than the previously estimated number) and a variety of support equipment, representing a typical motorised combat team were loaded. The ship with all its staff and equipment then spent a few days at sea with the load before returning to the harbour to be unloaded.[90] These exercises displayed the importance of testing equipment and joint training for possible expeditionary operations.

The SAS *Outeniqua* was employed on numerous humanitarian missions, which included the expeditionary operations to the Southern Ocean and Antarctica, described below.

	SS *Gamtoos*	**SAS *Outeniqua***
Years in service	1942–1946 & 1947–1948	1993–2004
Length	58,52 m	166,3 m
Beam	9,37 m	22,6 m
Gross tonnage	794 tons	21 025 tons
Nett tonnage	377 tons (cargo)	8 590 tons (cargo)
Machinery	Triple-expansion reciprocating engine	MAN Burmeister & Wain diesel
Horse power	700 horsepower	13 200 kW
Speed	9 knots	16 knots
Range	3 000 nautical miles (5 556 km) at 8 knots	8 000 nautical miles (14 816 km) at 15 knots
Complement	8 officer & 47 ratings	17 officers & 109 ratings

Table 3: An illustration of two different capabilities available to the South African Naval Forces (1947–1948) and the South African Navy (1993–2004).

The first voyage south for the SAS *Outeniqua* was on 24 November 1994 with Capt. Jan Vorster in command (he previously commanded SAS *Tafelberg*), in the company of the SA *Agulhas* to transport building material and construction workers for the construction of the new SANAE IV base. The SAS *Outeniqua* became the first SA naval ship to break through Antarctic ice.[91]

Captain Tony Absalom was appointed Officer Commanding of the ship on 1 January 1995, and the *Outeniqua* departed Simon's Town shortly thereafter (12 January 1995) in support of the Department of Environmental Affairs and Tourism (DEAT) to assist in the construction of the new SANAE IV base at Vesleskarvet. The operation, dubbed "Southern Lights", was of a varied nature, as it carried 22 members of the SAAF aircrew relief team as well as eleven Navy women (Swans) on the trip. Gough Island, Zavadovskiy and Southern Thule were also visited to erect automatic weather stations there. The SAS *Outeniqua* was back in Simon's Town on 1 February 1995.[92]

During the following summer, the *Outeniqua* was at it again. The first of two deployments occurred in November and December 1995, when *Outeniqua*, still under command of Capt. Tony Absalom, accompanied SA *Agulhas* with additional personnel and equipment for the advancing SANAE IV base. On 7 February 1996, SAS *Outeniqua* left Simon's Town on her fourth voyage south, and this time stopped at Bouvet Island to replace weather station equipment en route to Antarctica.[93]

Almost all of the expeditionary operations to the Southern Ocean and Antarctica were now handed over to the capable *Outeniqua*, but the SAS *Drakensberg* (Capt. Robert Myers) also deployed south from 26 September to 7 October 1996 to transport personnel and equipment to the islands of Tristan da Cunha and Gough on behalf of the DEAT.[94]

The third Antarctic summer for the *Outeniqua* started on 2 November 1996 (Capt. Tony Absalom) when she again departed for the SANAE IV base, now nearing completion. In the company of SA *Agulhas*, unusual heavy ice delayed the progress, but it was still possible to convey some members of the relief team to the base by helicopter. On 1 January 1997, Capt. Ernst Lochner was appointed Officer Commanding of *Outeniqua,* and from the end of February to middle March 1997, the ship visited Antarctica to uplift a multi-national team of scientists at the Swedish base, Wasa.[95]

The 1997–1998 summer season again saw *Outeniqua* complete two voyages. On 4 December 1997, the ship left Simon's Town on her penultimate visit to Antarctica, again in the company of SA *Agulhas*. The Swedish base at Rampen Bukta was visited as well as the Muskeg Bukta bay, close to the new SANAE IV base. From there, *Outeniqua* sailed for South Thule Island and Zavodvski to service the automatic weather stations, and to lay approximately eighteen drifting weather buoys on the return voyage. The *Outeniqua* returned to Cape Town on 15 January 1998.[96]

Figure 5: The polar supply vessel and ice-breaker SAS Outeniqua supported the Department of Environmental Affairs and Tourism in Antarctica to complete the construction of the SANAE IV base.[97]

For the second leg of the annual deployment, *Outeniqua* (Capt. Ernst Lochner) picked up personnel and equipment at the Swedish base, Wasa. En route to Antarctica, two weather buoys were laid as part of the ongoing naval support to the Chief Director Meteorology. Five officers from foreign navies (Gabon, Belgium, Mozambique, Angola, and Brazil) had also joined the ship for the trip, on invitation from the Chief of the Navy. The SAS *Outeniqua* rendezvoused with the SA *Agulhas* near Rampen Bukta where cargo operations were completed before the SAN supply vessel returned to Cape Town on 4 March 1998.[98]

With the SANAE IV base completed and functioning properly, the work for *Outeniqua* diminished significantly. Under command of Capt. Glen Knox, who had assumed command of *Outeniqua* on 1 January 2000, the vessel made an emergency dash to Marion Island on 30 July 2001, to pick up two sick members at the weather station. The fully equipped medical facility on board and the ability to launch and recover helicopters made *Outeniqua* the obvious choice for this mission. Marion Island was reached on 3 August, and the ship returned to Simon's Town on 9 August 2001.[99]

The last sojourn south of the SAS *Outeniqua* was to Gough Island on 27 February 2003 to transport an emergency technical team to repair a defective generator on the island. Under the command of Capt. Charl Coetzee, Operation Cold Cut was successful completed, and *Outeniqua* was safely home again on 11 March 2003.[100]

The SAS *Outeniqua* was decommissioned on 30 July 2004 after a relatively short service span of eleven years, which included eight round trips to Antarctica. The arrival of the four new Valour-class frigates and three Type 209 submarines between 2003 and 2004 inevitably meant that personnel and financial resources had to be redirected toward the new projects. It was unfortunate that SAS *Outeniqua* with her unique capabilities had to go, but with the limited financial and human resources at the disposal of the Navy, not much else could be done at the time.[101]

Not Suited and Underutilised: Strike Craft and Frigates

The decommissioning of the last President-class frigate in 1985 left the SAN with the relatively small Minister-class strike craft (450 tons) as its major surface combatant. The Israeli-designed boats, designed for Mediterranean Sea conditions, rendered sterling service, but were not ideally suited to the rough local sea conditions, let alone the Southern Ocean. The strike craft SAS *Kobie Coetsee* however made a daring (and very rough) passage to Gough Island in February 1993 to fetch an ill member of the weather team. This mercy dash brought the SAS *Kobie Coetsee* to a very southern latitude for which it earned the SA Navy Sword of Peace for 1993 in recognition of this unique achievement.[102]

The commissioning of four Valour-class frigates (3 700 tons) from 2006 onward addressed this insufficiency, and provided the SAN with decent-sized warships of larger displacement and length. To this end, the Valour-class frigate, SAS *Isandlwana* (commanded by Capt. Mike Boucher) was called on to assist the crew of the Taiwanese fishing trawler *Lai Ching* that had sunk near the island of Tristan da Cunha. *Isandlwana* departed Simon's Town on 3 May 2011, and medical supplies were transported by means of the Lynx helicopter from the frigate after which eleven survivors were rescued. The SAS *Isandlwana* was back in Simon's Town on 11 May 2011.[103]

To date, this operation has been the only "mercy dash" by a Valour-class frigate to the Southern Ocean. The South Atlantic had been crossed on two occasions for Exercises Atlasur VI (November 2006) and Atlasur X (August 2014), but these were planned and scheduled operations, which took the frigates on a more northerly route; thus, avoiding the harsh weather and sea conditions encountered further south.[104] The Valour-class frigates have proved to be well-constructed and seaworthy ships, but in some aspects, they were more complex and fragile than the Loch-class frigates of the 1950s, especially when subjected to harsh conditions. The Navy therefore opted to stick to the primary mission profile of the Valour-class frigates, which is essentially surface warfare.[105]

The patrol capability of the Valour-class frigates has nevertheless been well demonstrated in other (more benign) areas of responsibility, such as the anti-piracy Operation Copper in the Mozambique Channel. The first deployment of a frigate commenced in February 2011, following the hijacking of a Mozambican fishing vessel by Somali pirates in the northern part of the channel.[106] Operation Copper deployments have continued, although with less frequency in recent years, while the Navy preferred to utilise the smaller and more economical Warrior-class offshore patrol vessels based in Durban.[107]

Stealthy Capabilities: Submarines go South

Following the withdrawal of the SAS *Outeniqua*, the SAN sojourns to the south became less frequent, but new ways were found to go south. The delivery of three new Type 209 submarines between 2006 and 2008 heralded the return of a significant capability. The new submarines offered improvements over their predecessors (the last of the Daphne-class submarines was decommissioned in November 2003) in terms of range and endurance.[108]

The SAS *Charlotte Maxeke* under command of Commander Roland Shortt left Simon's Town on 22 May 2008 to conduct the first submarine patrol off the Prince Edward Island group. The submarine with its crew of thirty-two made a discreet transit from Simon's Town to Marion Island, covered a distance of more than 2 300 nautical miles (4 259 km) and gained intelligence and evidence of illegal fishing on a number of vessels. This information, in turn, was referred to Marine and Coastal Management.[109]

As part of Operation Corona, the Submarine Squadron was tasked by Joint Operations Headquarters to prepare a submarine to conduct a patrol of the Prince Edward Island Group during April 2016. The aim was to detect and identify any illegal fishing and to observe the means and methods employed. SAS '*Manthatisi* set sail on 11 April 2016 for a three-week patrol under the command of Cdr Russel Beattie. The patrol was classified as "discrete", and the submarine remained dived for the duration of the patrol with the exception of a few hours on the surface. Her transit down south saw little activity, and then only outside the fringes of the SA exclusive fishing waters. Sea conditions were very rough and snorting routines[110] at periscope depth were 'to put it mildly', uncomfortable.[111]

Once in the area of operation, SAS '*Manthatisi* vigorously patrolled the waters surrounding the Prince Edward Island group but, apart from observing SA *Agulhas*, no other shipping was detected. On completion of the patrol of the area designated for surveillance, SAS '*Manthatisi* surfaced in trying icy sea conditions, hailed the Marion Island research and weather station, and exchanged pleasantries with the staff from approximately a mile (1,6 km) off the coastline. The return transit to Simon's Town was also relatively uneventful with only merchant vessels detected crossing the Agulhas Bank. Fog and rain accompanied the submarine for most of the voyage back as well as severe sea conditions. The SAS '*Manthatisi* returned to its home port in Simon's Town on the morning of 29 April 2016 having travelled 2 742 nautical miles (5 078 km).[112]

The DAFF and DEA Assume More Responsibility

Between 2004 and 2005, the Department of Agriculture, Forestry and Fisheries (DAFF) commissioned three Damen-designed inshore environmental patrol vessels: the *Lillian Ngoyi*, *Ruth First* and *Victoria Mxenge* together with one Damen offshore environmental protection vessel of 269 feet (82 metres), the *Sarah Baartman*. This vessel was to be employed as a fisheries protection vessel and was designed to be capable of patrolling the area around Marion Island and Prince Edward Island. The *Sarah Baartman* was commissioned for DAFF on 10 January 2005, and undertook her first patrol of the Southern Ocean and Marion Island shortly thereafter.[113]

In 2012, the DEA took delivery of a new icebreaking polar supply and research ship, named the SA *Agulhas II* to replace the SA *Agulhas* that had been in service since 1978. Unlike her predecessor, the *Agulhas II* was designed from the outset to carry out both scientific research and to supply the SA research stations in the Antarctic, a task for which the SAS *Outeniqua* was often employed. The modern vessel was built in Rauma Finland, displaces 13 687 tons, and is classified as a Polar Class 5 vessel. It boasts an impressive array of facilities and capabilities, and must rank as the most capable and suitable vessel to sail to the Southern Ocean islands and Antarctica to date.[114]

Future Prospects of Naval Operations South

The *South African Defence Review* of 2014 regards the Prince Edward Islands in the Southern Ocean a part of the SA strategic defence considerations. Antarctica is not mentioned specifically but support of the SAN by other government departments, such as the Department of Transport and the Department of Environmental Affairs is implied.[115] Furthermore, the latest *Defence Review* includes the requirement for a blue-water navy and expeditionary capability.[116]

Today, the non-availability of serviceable platforms cast serious doubts over the ability of the SAN to provide any form of additional logistical support in the Southern Ocean. The large supply vessel, SAS *Drakensberg,* has not sailed since April 2020, while only one of the four Valour-class frigates and none of three Type 209 submarines of the SAN are currently (2025) operational. A shrinking defence budget, which negatively affects the maintenance and scheduled upgrades of SAN ships and submarines, remains a real concern in this regard.[117] As a result, the SAN is no longer in a position to provide search and rescue or "mercy dashes" beyond its EEZ or into the Southern Ocean. This situation is compounded by the current lack of a dedicated maritime patrol aircraft, which could have supplemented this capability. The outdated C-47TP aircraft of 35 Squadron were finally phased out of service in 2025, leaving the country without any maritime air patrol capacity.[118]

The SAS *Protea,* which had sailed south on so many occasions, reached its fiftieth year in service in 2022, and has been earmarked as a training vessel, and therefore unlikely to undertake any further expeditionary operations again.[119] The construction of a new-generation hydrographic survey ship to replace the *Protea* is currently underway at Sandock Austral Shipyard in Durban, but the project is lagging behind schedule by about three years.[120] The 95-metre ship design selected for Project *Hotel* is based on a version of Vard Marine VARD 9 105 science vessel design, an evolution from the hydrographic survey vessels HMS *Echo* and HMS *Enterprise,* which were in service with the Royal Navy until 2023. The ship will have a secondary offshore patrol vessel role and equipment fit and, most importantly, an ice-strengthened hull, meaning that it will be able to operate during summer and autumn in thin first-year ice, which might include old ice inclusions. The ship will have a diesel-electric power plant with a capacity of about 12.24 MW, giving a maximum speed of 18 knots, with a range of 10 000 nautical miles (18 520 km) and an endurance of 44 days, and will carry a crew of 120.[121]

Project *Hotel* also includes two fully integrated inshore survey motorboats, and the upgrade of the current shore-based hydrographic office infrastructure at Silvermine. The survey of Marion Island and Prince Edward Island, as well as other islands in the Southern Ocean, should therefore receive renewed attention and enable the SAN, as a member state of the International Maritime Organisation, to continue producing nautical charts, survey and oceanographic related data, complying with standards stipulated by the International Hydrographic Organisation.

Figure 6: An artist's impression of the new hydrographic survey vessel of the SAN, currently being built in Durban as part of Project Hotel. A pennant number A187 has been allocated, while the ship will be named SAS Nelson Mandela. An ice-strengthened bow and the ability to carry a Westland Lynx helicopter will make it suitable to carry out expeditionary operations in the Southern Ocean.[122]

Conclusion

The study on which this article reported, considered the ability of the South African Navy (SAN) to conduct expeditionary operations, through a historical lens and with particular emphasis on one area of operations – the Southern Ocean and Antarctica. The historical character of the Navy had to be examined first, as it greatly influenced the growth and capabilities of the Navy through the years. It was argued that the nature of the SAN fleet, i.e. the size and number vessels at its disposal, greatly influenced its capacity to conduct expeditionary operations.

Even so, the equipment and expertise that were at its disposal still provided the (only) most effective way for government to reach the isolated and desolate islands in the Southern Ocean. It was only with the arrival of dedicated ice-strengthened polar research and

supply vessels, operated by the responsible government departments that the role of the Navy changed. The addition of the *RSA* in 1961 and the SA *Agulhas* in 1978 consigned the responsibilities of the Navy to the more occasional mercy dashes, to pick up critically sick patients, or to conduct search and rescue operations.

The SAAF acquired the Avro Shackleton maritime patrol aircraft in 1957 and the Westland Wasp helicopter from 1964 as part of the Simon's Town Agreement. Such technological advancements enabled the Air Force to support naval operations in the Southern Ocean. Other helicopter types, such as the Puma and Oryx, were fully integrated into shipboard operations of the Navy and the Department of Environmental Affairs (DEA).

The South African National Antarctic Programme (SANAP) and the DEA continued to cooperate with the Navy in joint operations. The hydrographic survey vessel SAS *Protea* (from 1972) and SAS *Drakensberg* (from 1987) were well suited to provide assistance when called upon, and made several voyages south. From 1993, the dedicated Antarctic supply vessel and ice-breaker, SAS *Outeniqua* was fruitfully employed for the SANAP and more specifically to assist with the completion of the new SANAE IV base. In its eleven years of service, the SAS *Outeniqua* made eight round-trip voyages to the Antarctic, but also provided the Navy with other unique capabilities in other operations.

Between 2003 and 2008, the SAN was re-equipped with four Valour-class frigates and three Type 209 submarines, but in contrast to the 1950s, these new vessels (especially the frigates) were sparingly utilised in operations to the south. Fortunately, this was offset by the addition of the offshore environmental protection vessel, *Sarah Baartman* in 2005 (operated by the Department of Agriculture, Forestry and Fisheries [DAFF]) and the modern polar supply and research ship SA *Agulhas* II in 2012 (operated by DEA) which compensated for the absence of the Navy.

The frequency of the visits by the SAN to the Southern Ocean and Antarctica has therefore decreased significantly during the last twenty years. Congruently the serviceability and available of the "ready ships" of the Navy have been drastically reduced during the last ten years to a point where only one of four frigates and one of three submarines are serviceable, mainly due to a shrinking defence budget and subsequent long overdue maintenance schedules. This alarming situation casts serious doubts over the ability and capacity of the Navy to conduct any form of expeditionary operation at present. The Air Force experiences the same difficulties. The lack of a dedicated long-range Maritime Patrol Aircraft has compromised the ability to monitor and protect the South African maritime resources and to perform long-range search and rescue missions effectively.

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Lessons Learnt During the South African Early Deployment in International Peacekeeping Operations

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Abstract

Since the establishment of democracy in South Africa in 1994, it was only a matter of time before South Africa and the South African National Defence Force would participate in international peace missions. When this occurred in 1999, the defence force, particularly the staff at the Joint Operations Division, was largely unprepared for such a deployment, requiring personnel to adapt rapidly – amidst institutional changes as part of democratic reforms, and the restructuring of command and logistical frameworks. The deployment in support of the United Nations mission in the Democratic Republic of Congo presented numerous challenges that had to be addressed for a successful outcome. The study on which the article is based, examined these challenges and the planning measures of the Joint Operations Division staff employed to overcome them. These strategies were recorded and used for future deployments. The study focussed on the personal experience of the author while serving as a member of the Joint Operations Division staff.

Keywords: United Nations; South African National Defence Force; Joint Operations Division; Peacekeeping Operations; United Nations Manual on Policy and Procedures for the Reimbursement of Contingent-Owned Equipment; Challenges and Logistics

Introduction

In 1999, the South African National Defence Force (SANDF) was tasked to participate in international peace missions, which necessitated that the SANDF had to be acquainted with new doctrine and procedures, and learn new lessons. These included the mandate of the mission (concept, tasks and structure in terms of Chapter VI or VII of the United Nations Charter), memorandum of understanding (wet or dry lease of commodities) (see later in this article), United Nations (UN) logistics support to missions, letters of assist (LOA), UN standards, UN Manual on Policy and Procedures for the Reimbursement of Contingent Owned Equipment (COE Manual), and deployment arrangements. It was particularly the staff at the Joint Operations Division (J Ops Div) that was at the forefront of the learning cycle. While many members of the SANDF had attended peacekeeping courses, there was no central point where the knowledge was available. The peacekeeping expertise and assistance provided by Norway with regard to the competition and negotiation of the UN memorandum of understanding (MOU) was extremely helpful. The SANDF was not alone in facing new challenges in preparing for participation in international peacekeeping operations. In an article 'Sierra-Leone – Lessons Learnt by the Nigerian Army' by Brig.

Gen. KTJ Minimah provides details of the lessons learnt by the Nigerian Army during its deployment to Sierra Leone.[1]

The study on which this article is based, aimed to explore the lessons that had to be learnt and the challenges experienced by the SANDF during the initial participation in international peace missions, and focussed on the period 1999 to 2003. The article primarily focusses on the author's personal experience as a member of the J Ops Div staff during this period.

Background

After the Second World War (1939–1945) and the Korean War (1950–1953), the South African Defence Force (SADF), like several other armed forces with roots in the British system, remained largely a conventional force. In 1966, the SADF became involved in the Border War, also known as the Bush War, which took place along the border between what was then South West Africa (now Namibia) and Angola. While the war was primarily a counterinsurgency (COIN) conflict, several conventional operations occurred during its course.[2] The sustainment of deployed forces was primarily managed by the maintenance unit stationed at Rundu in northern South West Africa. This unit was supported by local industry in, South West Africa while additional logistical support from South Africa was provided via air, road, and rail transport. The Border War ended in 1989.

Following the conflict, military units returned to their home bases with battle-worn equipment. Some of these units were retrained and re-equipped for urban operations to address the increasing unrest in various parts of South Africa, particularly during the late 1980s.[3] Minor new equipment was introduced to these units.

On 27 April 1994, South Africa held its first democratic elections. In political circles, there were high expectations and assumptions that long-term peace had come to Southern Africa. The newly established SANDF primarily focussed on integrating the nine statutory and non-statutory forces into a unified military structure.[4] During this period, the SANDF prioritised the successful integration of these forces and the training of new personnel rather than external operations. In some respects, the SANDF was downsized, including the decommissioning of critical logistics platforms, such as the C-160 Transall aircraft.[5] Despite these changes, the fundamental structure of the SANDF remained that of a conventional force.

The advent of democracy in South Africa placed the country in a perceived position as a patron for the peoples of Africa, particularly for the people of the Southern Africa Development Community (SADC). In this regard, and due to international expectations, significant pressure mounted on South Africa to establish its presence in the international and regional arena.[6] Moreover, following the successful negotiated democratic transition from apartheid, the Mandela administration had significant credibility to become involved in conflict management in Africa.

After the new dispensation in South Africa in 1994, it was only a matter of time before the country was requested to participate in international peacekeeping missions, such as those led by the UN. The SANDF had to undergo a steep learning curve to transition from counterinsurgency operations to international peacekeeping operations,[7] such as those conducted by the UN.

The notion of a "millennium of peace" was shattered in September 1998 when unrest in Lesotho necessitated the deployment of the SANDF alongside the Botswana Defence Force (BDF) under Operation Boleas.[8] The Joint SADC Task Force had to deploy on very short notice, with little or no mission readiness training. The Task Force Commander received his orders on 16 September 1998, with the intervention set to commence at 05:00 on 17 September 1998.[9] Although this intervention in Lesotho was the baptism of fire in peace operations for the SANDF, it was not a UN peacekeeping operation. The study reported on here thus focussed on lessons learnt regarding UN peacekeeping operations.

The Establishment of the Joint Operations Division

Initially, the newly established SANDF was structured along the lines of the old SADF, particularly in terms of its command structure.[10] The Chief of Joint Operations (CJ Ops) was established on 1 April 1998 at the military-strategic level, where all operations were planned and directives issued. Additionally, five Regional Joint Task Forces (RJTFs) – North, East, South, West, and Central – were established as decentralised regional headquarters in South Africa to conduct internal operations.[11]

The incipient Joint Operations Division (J Ops Div) comprised two Chief Directorates. The Chief Director of Operations Development (CD Ops Dev) was responsible for contingency planning and doctrine development, while the Chief Director of Operations (CD Ops) oversaw operations, force preparation, and training. The logistics section reported to the Director of Operations (D Ops), under the CD Ops. At this stage, the J Ops Div structure proved effective, since forces were primarily deployed for internal purposes, mainly border control. The five RJTFs were staffed with operational and logistical personnel, and largely fulfilled the role of an operational headquarters.[12]

The Evolution of UN Peacekeeping Operations

While the term "peacekeeping" does not appear in the UN Charter, Marrack Goulding, United Nations Under-Secretary General for Political Affairs characterised peacekeeping as

> Field operations, established by the United Nations, with the consent of the parties concerned, to help control and resolve conflicts between them, under United Nations Command and Control, at the expense collectively of the member states, and with military and other personnel and equipment provided voluntarily by them acting impartially between the parties and using force to the minimum extend necessary.[13]

Soon after 1947, peacekeeping became a pragmatic instrument to manage conflict in a divided world where major players in the international system nevertheless sometimes shared a common interest in containing regional conflicts, preventing them from escalating into wider confrontation.[14]

Between 1945 and 1987, UN peacekeeping operations primarily aimed to uphold ceasefires, stabilise situations on the ground, and create conditions conducive to resolving political and diplomatic conflict resolution. These missions typically involved military observers and lightly armed troops tasked with monitoring agreements, reporting violations, and fostering confidence between parties, with deployment dependent on the consent of those involved.[15] A notable example was the UN Operation in the Congo (ONUC), established in 1960 after the mutiny of the Congolese armed forces, which initially provided military assistance to the Congolese government until local forces could assume responsibility. Subsequent mandate changes authorised the use of force to prevent civil war and expel mercenaries from Katanga, marking the first use of combat aircraft in UN history.[16] Despite its enforcement-like actions, no evidence suggests ONUC operated under a formal UN Charter Chapter VII mandate, raising the question of whether this was an oversight.

Between 1988 and 1996, UN peacekeepers faced severe violence and widespread human rights abuses, most notably during the 1994 Rwandan civil war,[17] alongside escalating humanitarian crises that displaced large populations and drew increased involvement from non-governmental and volunteer organisations. While most missions remained focussed on observing and verifying peace agreements, a limited number were mandated under Chapter VII of the UN Charter to address situations involving intra-state rather than inter-state conflicts,[18] with only two missions in this period relating to the latter. Four operations were authorised under Chapter VII during this time:

- The Unified Task Force (UNITAF) in Somalia (December 1992);
- Operation Turquoise in Rwanda (June 1994);
- The UN Mission in Haiti (UNMIH) in July 1994; and
- The North Atlantic Treaty Organisation-led Implementation Force (IFOR) in Yugoslavia in December 1995.[19]

Up to 1997, most UN peacekeeping operations were deployed under Chapter VI[20] of the UN Charter, focussing on verifying, monitoring, and observing peace agreements. While some post-1997 missions retained this role, the majority were authorised under Chapter VII to carry out specific tasks, including the use of force under defined conditions.[21] Following the 2000 Brahimi Report, which evaluated the capacity of the UN for effective peace operations and recommended improvements, there was a marked increase in such mandates, with half of the 20 missions authorised since 1997 falling under Chapter VII. In the next section, key concepts and documents to enable UN peacekeeping operations are discussed.

Important Documents and Concepts for UN Peacekeeping Operations

The mandate of a UN mission is the document of the UN Security Council that authorises the specific mission. This document provides the strength and structure of the force, the mandate of the mission, the specific chapter of the UN under which it acts, and the funding of the mission. It is of paramount importance that the content of the mandate is clearly understood at all levels, from technical to strategic, as it could have an influence on the deployed forces of the specific troop-contributing country (TCC), especially if the forces are deployed under a Chapter VII mandate.

The UN MOU is the legal document between the government of the TCC and the UN, confirming the responsibilities of the parties, including reimbursement to the TCC. Such an MOU comprises the following sections:[22]

- **The main document**: Approved by the General Assembly (GA), any amendments require GA approval. This section contains information on the mission; the stakeholders to the agreement; definitions; documents constituting the MOU; purpose; application; contributions by government; reimbursement and support from the UN; general and specific conditions (environmental condition factor, intensity of operations factor, hostile or forced abandon factor, and incremental transportation factor); claims by third parties; recovery; supplementary arrangements; amendments; settlement of disputes; and entry into force.
- **Appendix A – Personnel**: This part covers requirements, reimbursement, and general conditions for personnel.
- **Appendix B – Major equipment provided by the government (TCC)**: Addresses requirements and reimbursement rates, general conditions for major equipment, verification and control procedures, transportation, mission usage factors, loss and damage, and special case equipment.
- **Appendix C – Self-sustainment provided by the government (TCC)**: Refers to requirements and reimbursements, general conditions for self-sustainment, verification and control procedures, transportation, mission usage factors, and loss and damage.
- The other appendices included the performance standards for major equipment (appendix D), performance standards for self-sustainment (appendix E), definitions (appendix F) and guidelines for TCC's (appendix F). The latter is usually distributed separately.

The deployment of major equipment in support of UN peacekeeping follows two primary models:

- **Dry lease**: A contingent-owned equipment (COE) reimbursement system in which the troop or police contributor provides equipment for the mission, while the UN assumes responsibility (or may arrange for a third party) for its

maintenance. Under the dry lease, costs associated with categories of deployed minor equipment are reimbursed. Dry lease equipment may be operated either by the equipment-owning country or another country. The contractual relationship is between the UN and the equipment-owning country and/or the UN and the equipment-operating country.[23]

- **Wet lease**: A COE reimbursement system in which the troop or police contributor provides, maintains, and supports the deployed major equipment, along with associated minor equipment. The contributor is entitled to reimbursement for providing this support.[24]

Additionally, a TCC may deploy unique equipment, referring to any special equipment or consumables not covered under standard self-sustainment rates. Such items are managed on a bilateral, special-case basis between the troop contributor and the UN.[25]

During UN peace operations, TCCs are also reimbursed for self-sustainment, as determined following agreement on certain aspects:[26]

- Negotiations between the UN and troop or police contributors determine the capabilities to be provided by the UN and the contingent. The UN identifies and requests self-sustainment capabilities that it cannot provide. Troop or police contributors however retain the right to offer certain self-sustainment services, which are considered during the Memorandum of Understanding (MOU) negotiations. The UN ensures that all self-sustainment services provided by a contributor meet minimum operational capabilities, are compatible with those of other troop or police contributors where necessary, and incur costs comparable to what the UN would otherwise pay.
- Only those services explicitly agreed upon in the MOU as provided by the troop or police contributor are reimbursable every month, at rates specified in Chapter 8 of the COE Manual, and based on actual troop strength, up to the personnel ceiling set in the MOU.
- If a contingent uses major equipment for self-sustainment support, it is not entitled to major equipment reimbursement but only to self-sustainment reimbursement. In cases where a troop or police contributor provides services, such as communications, medical, or engineering support at force level as force assets, they may however be entitled to major equipment reimbursement. In contrast, the same services at unit level would be classified as "minor equipment" and would fall under self-sustainment reimbursement. Such distinctions are generally negotiated and recorded in Annexes B (major equipment) and C (self-sustainment) of an MOU, where applicable.

Communication between the UNDPKO and the SANDF

In August 1999, Colonel (Col.) Johan van der Walt from the J Ops Div joined a small delegation on a visit to the UN Department of Peacekeeping Operations (UNDPKO) in New York, hosted by the South African Permanent Mission at the UN. The visit aimed

to improve understanding of UN peacekeeping processes due to limited South Africa (SA) knowledge in this area. Meetings with high-ranking officials highlighted the UN Security Council control over peace mission mandates and emphasised the importance of non-member states engaging with countries on the Security Council. Additionally, the visit underscored the significance of interaction with the UN Secretariat.[27]

The National Office for the Coordination of Peace Missions (NOCPM) gained momentum following the visit to the UNDPKO. An interim SA interdepartmental forum, the Peace Mission Coordinating Centre (PMC), was established in June 1999 to coordinate South African assistance to missions in the DRC. Despite initial challenges, the NOCPM was expected to become the official coordinating body, replacing the Joint Peace Operation Coordinating Centre (JPOCC) as outlined in the 1999 White Paper on South African Participation in International Peace Missions (hereinafter referred to as "the White Paper").[28] The NOCPM mission included facilitating, coordinating, and executing peace missions, with objectives, such as strategic analysis, liaison with international organisations, and ensuring compliance with international law. The NOCPM had to include representatives from various departments, although funding and staffing remained challenges. The SANDF created interim structures known as 'operational teams' to assist the NOCPM and address immediate needs; however, a permanent team of experts was necessary for effective coordination in peace missions.[29] To the best knowledge of the author, this never materialised.

During the author's attendance at the COE Manual Review in 2001, he met the staff of the South African Permanent Mission to the United Nations, and was introduced to several personnel at the UNDPKO. It is important to note that, at the time, no military attaché was deployed at the Permanent Mission to the UN. Instead, a civilian staff member was responsible for attending all UNDPKO meetings. As a result, communication from the UNDPKO was relayed via the Permanent Mission directly to CJ Ops. This created challenges, as all information received had to be conveyed to the NOCPM representative at the Department of Foreign Affairs (DFA), which created delays. This usually took place during monthly meetings.

Funding for Peacekeeping Operations

South African participation in peace missions requires parliamentary approval for funding, though the role of the legislature is limited to individuals directly employed by the UN or seconded by relevant departments. Parliamentary acceptance of the White Paper serves as sufficient authorisation for departments to fund such participation, provided that participation aligns with their annual budgets. Bridging finance is necessary for UN operations to cover initial costs and delays in UN reimbursements. For non-UN operations, alternative funding mechanisms, such as collateral or third-country contributions, should be explored. In principle, the DFA had to lead in securing funds, with the Department of Finance authorising expenditure upon instruction from the President or Deputy President, while the Departments of Defence and Safety and Security (at the time) were responsible for budgeting pre-deployment and six-month post-deployment costs.[30]

During the planning phase for a peace mission, the various divisions within the SANDF and the Department of Defence (e.g. finance, personnel and logistics), as well as the services (Army, Air Force, Navy, and Military Health Services) are involved. The Personnel Division determines e.g. the various allowances that will be paid to the deployed personnel, and the Logistics Division determines the logistic support, while the various Services determine their requirements.

Once the budget is approved, it is allocated to J Ops Div to manage it. Should a service require items for a peace mission, it is responsible to do the basics of obtaining quotes. The latter is usually done using the Central Procurement Office. The service then submits a financial authority against the relevant serie code on the budget after which it is approved and the order is placed.

Preparation for Peacekeeping Operations

One of the earliest instances of SANDF engagement in peacekeeping operations was during the SADC peacekeeping exercise, Exercise Blue Hungwe, held in Zimbabwe in 1996. Subsequently, in 1999, South Africa hosted the SADC peacekeeping exercise, Exercise Blue Crane, at the Army Battle School near Lohatla. This exercise included elements from Namibia (which transported limited equipment to South Africa by rail), Botswana, Swaziland (now Eswatini), Tanzania, Zambia, and Zimbabwe.[31]

Since 1994, several SANDF members have attended peacekeeping courses at various international institutions, such as:

- The Lester B Pearson Canadian International Peacekeeping Training Centre in Cornwallis, Canada; and
- The SADC Regional Peacekeeping Training Centre in Harare, Zimbabwe; as well as others.

Upon returning to their respective units, their acquired knowledge was however not centralised or utilised for doctrine development.

Following Exercise Blue Crane, the staff of CJ Ops, with the assistance of the UNDPKO, conducted a course for military observers and staff officers to prepare personnel for rapid deployment in peacekeeping operations. This proved to be the correct decision, as the first request to deploy a staff officer came in August 1999 with the deployment to the United Nations Organisation Stabilisation Mission in the Democratic Republic of Congo (MONUC). This was followed by the request to deploy staff officers and military observers to the United Nations Mission in Eritrea and Ethiopia (UNMEE), and the Organisation of African Unity Mission in Eritrea and Ethiopia (OLMEE) in 2000 under Operation Espresso.[32]

In 1999, with the promulgation of White Paper on South African Participation in International Peace Missions, this White Paper became the national guiding document that dictates the participation of the SANDF in peace missions. According to the White Paper, South Africa will participate in peace missions that include peace support operations, preventative diplomacy, peacemaking, peacekeeping operations, peace enforcement, peace building, humanitarian assistance, and humanitarian intervention, each with its definition.[33] Within the context of the White Paper, the role of the military in peace missions involves the conduct of peace support operations, which include activities where the military operates in support of the political, diplomatic, and humanitarian objectives of the broader mission. These tasks comprise the separation of combatants, disarmament of irregular forces, demobilisation and transformation of regular and irregular forces into a unified army, assistance with reintegration into civil society, and assistance with elections for new governments.

With the reality of a possible deployment, the NOCPM, then part of the DFA, in cooperation with the Chief Policy and Planning (CPP) of the Defence Secretariat, decided late in 2000 to bring Major (Maj.) Barnjé Giské, a peacekeeping expert from Norway, to South Africa to assist with preparation for potential deployment. He spent two weeks with the author at J Ops Div in Pretoria. During this time, Maj. Giské shared his knowledge on the MOU that needed to be compiled between the UN and the Government of the Republic of South Africa for the upcoming deployment to the Democratic Republic of the Congo (DRC). This proved invaluable, and greatly assisted during the first negotiations with the UN. It is of paramount importance that everyone in the decision-making chain understands the contents of the MOU. This includes the conditions under which the personnel are deployed, the major equipment that will be deployed, as well as the self-sustainment for which the country will be responsible, and the reimbursement that the country will receive.[34] With regard to the reimbursement, CJ Ops had to annually submit a report in February to the National Treasury reflecting the reimbursement due and reimbursement received.

During January 2001, the author attended the review of the COE Manual at the UN Headquarters in New York. Here, he learnt about the various categories of major equipment and self-sustainment, which had to be included in the MOU between the government of South Africa and the UN. He further met with several members of the UN Department of Peacekeeping Operations, which proved invaluable for future communication with the UN.

Initial SANDF Deployment in Support of MONUC

In terms of UN Security Council Resolution 1291, dated 24 February 2000, the United Nations Organisation Mission in the Democratic Republic of Congo (known by its French acronym MONUC) was increased to 5 537 military personnel and up to 500 military observers. The mandate of the mission was the implementation and monitoring of the ceasefire, liaison with all parties, and facilitating humanitarian assistance.[35] The mission was deployed under Chapter VII of the UN –

> [A]nd may take the necessary action, in the areas of deployment of its infantry battalions and as it deems it within its capabilities, to protect United Nations and co-located JMC [Joint Monitoring Committee] personnel, facilities, installations and equipment, ensure the security and freedom of movement of its personnel, and protect civilians under imminent threat of physical violence.[36]

The latter was very important and the staff at the J Ops Div brought it to the attention of their superiors. Notwithstanding that the forces being deployed were not combat forces, the possible impact on them was brought to the attention of their superiors.

Following a request from the UN, the first SANDF member was deployed to Kinshasa on 7 September 1999 as the Capital Liaison Officer for MONUC. This marked the beginning of Operation Mistral, the contribution by the SANDF to the UN mission in the DRC (then MONUC).[37]

In a letter dated 9 May 2000, the UN requested that South Africa consider deploying several support elements for MONUC, including six movement control teams, four airfield crash and rescue teams, eight cargo handling teams, three logistics loading teams, four fuel-servicing units, two medical emergency teams, four water purification teams, and a meteorological service element.[38]

After completing feasibility studies, a team from the SANDF travelled to the United Nations Headquarters (UNHQ) in New York to discuss potential deployment by South Africa. Following the visit, the UN requested the deployment of the following support for MONUC:[39]

- Six air-cargo handling teams, each comprising eight members with the necessary equipment;
- Two airfield crash rescue and firefighting teams, each with seven members and associated equipment;
- An aeromedical evacuation team, consisting of two doctors and four operational medical practitioners; and
- A small headquarters and support element of 20 members.

The unit was designated the SA National Defence Force Specialist Contingent (SANDFSPECC). In preparation for deployment, a small team conducted a reconnaissance of the area.

Special cargo handling equipment, including a transfer bridge and two aircraft loading capabilities known as K-loaders,[40] had to be procured as part of the air-cargo handling teams. This equipment was not standard in the SANDF, so personnel received training at the South African Airways (SAA) training centre. No technical personnel were trained in the maintenance of this equipment however.

Following several delays in the deployment of SANDFSPECC, the UN requested in April 2001 that the Aero Medical Evacuation Teams of SANDFSPECC be urgently deployed to Kinshasa. The SANDF responded immediately, with the South African Air Force (SAAF) providing a Hercules C-130 aircraft. The team and elements of the Headquarters Unit (HQ Unit) deployed on 6 April 2001. At the time, the SANDF was unaware that it needed to request a Letter of Assist (LOA) from the UN to obtain reimbursement for the flight. Another lesson was learnt, and a post-flight request was submitted, and reimbursement received.

The UN deployed the remainder of the SANDFSPECC personnel and equipment in April and May 2001. Another challenge arose with the deployment of the transfer bridge to Kinshasa, which required a special flight using an Antonov 124 aircraft. Before this, photographs and detailed measurements of the transfer bridge had to be sent to the United Nations Logistics Base in Brindisi, Italy. The logistics base then constructed a special ramp that was used for loading and offloading the transfer bridge from the Antonov 124 aircraft.[41]

As the small teams were deployed to various locations, the SANDF was not required to provide accommodation. The teams stationed at the Iveco Base outside Kinshasa were supplied with Weatherhaven[42] accommodation. The Command Team also had Weatherhaven offices provided by MONUC. These teams initially received a special allowance of US$25.00 per day, which they used to purchase meals at the local restaurant within the base. This special allowance was suspended in early 2002 when the SANDF was requested to deploy catering personnel to staff the kitchen facility provided by MONUC at the Iveco Base.

Soon after the air-cargo handling teams had been deployed to outlying bases in Mbandaka, Goma, Kalemie, and Kisangani, a challenge arose regarding food rations. Some of these teams were deployed alongside other MONUC battalions, whose dietary requirements differed from those of the South Africans. Following negotiations with MONUC HQ, these teams were permitted to submit a separate food indent.[i] The SANDF was then required to provide stoves and fridges to enable the teams to prepare their meals.

To support the deployment, the SANDF instituted a biweekly flight operated by the SAAF using either a Boeing 707 or a Hercules C-130 aircraft. Initially, these flights were assigned UN flight numbers, which facilitated obtaining flight plans. Another challenge was that the flight with the Hercules C-130 from Air Force Base (AFB) Waterkloof to Kinshasa took between three and four hours. This led to a further challenge, as the aircraft did not have a toilet facility. This was overcome with the temporary installation of a chemical toilet in the cargo hold of the aircraft. Later during the deployment, the SA military attaché to the DRC became responsible for securing flight clearances.

[i] A food indent is a request for rations/food submitted by a unit and/or sub-unit.

Another challenge was that all SANDF-deployed vehicles were right-hand drive, suited to SA left-lane road conditions, whereas the DRC follows right-lane traffic rules. Drivers and co-drivers had to adapt to driving on the right-hand side, relying heavily on their co-drivers. Another challenge was that the local language was French. Once deployed, however, it became evident that Swahili was more commonly spoken among the local population than French, which provided a practical means of communication for SANDF troops who picked up basic Swahili relatively easily.

South Africa agreed to deploy under the Wet Lease in the DRC. The SANDF therefore had to deploy with its equipment and maintain it, resulting in reimbursement under the MOU. Thanks to the visit by Maj. Giské as well as the author's attendance of the COE Manual review early in 2000, the author and the staff at the J Ops Div could compile the first MOU with the UN per the UN standards, and briefed all involved. Once all had been briefed, a small team travelled to UNHQ between 2 and 7 April 2001 to negotiate the first-ever MOU between South Africa and the UN. At the first meeting, the team was informed that the air-cargo handling teams would no longer be required, as the UN had appointed a civilian company to manage air-cargo handling. Since South Africa had already spent a significant sum on procuring cargo-handling equipment, the team withdrew from the meeting. They were however later requested to return, and the air-cargo handling teams were ultimately deployed. The MOU was signed by the SA government and the UN.

The Initial SANDF Deployment to Burundi

The negotiations held in Arusha, pursuant to the Declaration by the Participants in the Burundi Peace Negotiations – signed on 21 June 1998 and involving all parties to the Burundi conflict ("the Declaration of 21 June 1998") – were conducted under the facilitation of the late Mwalimu Julius Kambarage Nyerere, and subsequently the late Nelson Rolihlahla Mandela, representing the states of the Great Lakes region and the international community. These discussions included consideration of the potential deployment of a military force, with particular emphasis on the provision of security for returning leaders classified as very important persons (VIPs).[43]

Over the period 25 September to 5 October 2001 Maj. General Jan Lusse and members of J Ops along with representatives of Ghana, Nigeria and Senegal, deliberated on the concept of the deployment of a military force in Burundi. After the defence ministers of the various countries involved in the peace process had accepted the proposed plan on 10 October 2001, the 43rd South African Brigade Headquarters (43 SA Bde HQ) was tasked with planning for the deployment, which had to be in place in Bujumbura to provide protection by 1 November 2001.[44]

Immediately, there was resistance from the South African Army regarding the serviceability of the major equipment and how it would be sustained over such a vast distance.[45] As the political decision had been made, the SANDF had to deploy, and vehicles had to be repaired.

The Operations Movement Centre, which was established at AFB Waterkloof, had to expand rapidly to manage the additional increase in the movement of personnel and equipment. The same applied to the Field Post Office, Immigration Office, and Movements.[46]

There was a lack of concise intelligence regarding the deployment area,[47] which contributed to the challenges for the higher echelons to get the contingent ready and deployable, in essence, a "rush job". The Directorate Force Preparation and Training (DFPT) of J Ops, was uncertain how to structure a mission readiness training (MRT) programme for the Burundi deployment and subsequent missions. The DFPT had to address the following questions that emerged:

- What should the training objectives be?
- How should the MRT block programme be structured, and with which kind of subjects?
- What should the end state be?[48]

It needs to be pointed out that the SANDF was not the first to experience these challenges, since the Nigerian Contingent (NIGCON) experienced similar challenges during its deployment to Sierra Leone, as part of the initial Economic Community of West African States (ECOWAS) peace support operation in 1997, and later with the United Nations Mission in Sierra Leone (UNAMSIL) in 1999.[49]

Another challenge at the time was how to get all the equipment to Burundi on such short notice. The largest airlift operation ever undertaken by the SANDF was about to take place. With the assistance of the SANDF Procurement Centre and Armscor, several strategic lift aircraft were chartered. These included an Antonov 124 (AN 124) and Ilyushin 76 (IL 76) aircraft.[50] Another challenge was getting all the personnel to Burundi, given the limited capability of the SAAF. An SAA Boeing 747 aircraft was chartered to airlift all the personnel to Bujumbura. The deployment was labelled the South African Protection and Support Detachment (SAPSD).

It is interesting to note that, as South Africa would initially deploy on its own, it sought international support and endorsement for the unilateral deployment. This was obtained from the UN via UN Security Council (UNSC) Resolution 1375, dated 20 October 2001, in which it –

> [E]ndorses the efforts of the Government of South Africa and other member states to support the implementation of the Arusha Agreement and strongly supports in this regard the establishment of an interim multinational security presence in Burundi, at the request of its government, to protect returning leaders and train an all-Burundi protection force.[51]

The South Africans were not welcomed with open arms by the Burundi Armed Forces (FAB). The FAB deployed some of its elements close to the South Africans near the international airport. It is not certain whether the FAB saw the South Africans as a security threat or whether they simply wanted to intimidate them.[52] The SANDF faced many challenges with logistic delays and errors with procurement:

> Much of the equipment supplied proved to be outdated and/or had reached the end of its life cycle. Only with tender love and care did the SAPSD manage to keep some of the equipment functioning. But valuable lessons were learnt and for the first time in a long time, the SANDF came into contact with the realities of a potential future battle area, albeit for peacekeeping operations.[53]

On the ground in Burundi, a dilapidated facility named the "Palace Base" was occupied by the VIP protectors and the headquarters staff. This facility had to be renovated by the personnel deployed. A headquarters facility across the road was rented. This facility was initially rented for US$17 000 for the first six months and escalated to US$30 000 subsequently. In addition to these costs, the municipal monthly services were in the vicinity of US$7 000 per month. As this deployment was not part of the annual defence budget, it had to be funded from the approved budget. Additional funding was provided later.[54]

The air and logistics support elements were deployed in tented accommodation at Bujumbura International Airport. These were the same tents used by the SADF during the Border War. As mentioned, there was no time for the engineers to prepare the area, and it was flooded with the seasonal rain in Bujumbura. Only then could the engineers prepare the ground to establish a proper tented town. The same applied to the landing zones for the helicopters.

For the first few weeks, the deployed personnel were on ration packs until the necessary facilities could be established at both bases. With the assistance of the deployed logistics elements, fresh rations were procured from local sources, the same used by the Burundi Armed Forces. Very soon, it became evident that the local supplies could not meet the requirements of the deployed forces. The quality of available local fresh food deteriorated and soon dried up, resulting in fresh rations having to be airlifted to Bujumbura.[55] This placed an additional burden on the SAAF.

While spare parts for all the Toyota vehicles deployed (e.g. soft-skin four-wheel-drive vehicles) could be sourced from the local Toyota dealer in Bujumbura, there were no spare parts available for any of the other deployed vehicles (e.g. SAMIL logistic vehicles). Spare parts for the latter had to be obtained from the SANDF logistic stores in South Africa.[56]

The deployment in Burundi now shared the biweekly sustainment flight operated by the SAAF with the deployment in the DRC. While it initially did not have a major influence on the Burundi deployment, it would soon change with the deployment of the larger force in the DRC. This resulted in more regular flights, some only in support of the mission in Burundi. As there was no SA military attaché in Burundi, the deployed headquarters had to facilitate the overflight and landing clearance.

Initially, the 43 SA Bde HQ acted as the rear headquarters for the deployment in the DRC. As the rear headquarters, it acted as the "operational headquarters" and was responsible for the day-to-day communication between the operational area and the 43 SA Bde HQ. With the deployment of the latter brigade to Burundi, this task was now transferred to the 46 SA Bde HQ, stationed in Johannesburg.

Storing second-line ammunition in Bujumbura soon became a problem in the high-humidity environment in Burundi. This was due to the strict SANDF regulations and considerations for the safety of the civilian population. The water-damaged ammunition had to be disposed of and replaced, which was costly.[57]

On 1 May 2003, the mission became an African Union mission, namely the African Union Mission in Burundi (AMIB), with a South African as the force commander, an SANDF contingent, and elements from Mozambique. During the AMIB deployment, harbour patrol boats (HPBs) from the South African Navy (SAN) were deployed by chartering IL-76 aircraft. The HPBs were used for patrols on Lake Tanganyika. They deployed with their own transportable logistic support unit (TLSU). On 1 June 2004, the mission in Burundi became a UN peacekeeping mission, known by its French acronym, ONUB (United Nations Operation in Burundi), again with a South African as force commander.

Peacekeeping Operations and Logistic Coordination Meetings

At the request of the J Ops Div, a weekly logistic coordination meeting was instituted soon after the deployment to Burundi. These meetings took place on Tuesday mornings in the J Ops Div conference room in Blenny, Pretoria. Various services and divisions attended, with the meetings initially chaired by the CD Ops, of the J Ops Div. All logistical challenges were discussed, and attempts to resolve them were considered. With the establishment of the Joint Operations Headquarters (J Op HQ) at Blenny in 2003, which worked directly with operations at operational level, the meetings continued under the chairmanship of the Director of Peace Support Operations of the J Op HQ, with attendance from the services and divisions remaining unchanged. Participation was later expanded with the second deployment to the DRC and Sudan, with deployed contingents joining via satellite links.

Second SANDF Deployment to the DRC

As part of phase three of MONUC, still under Mandate 1291 dated 24 February 2000, South Africa was requested in June 2002 to consider the deployment of:

- A task force (1 100 personnel);
- An aviation regiment (200 personnel, nine utility helicopters, and four attack helicopters);
- A support group (539 personnel, HQ Unit, engineer company, level-one medical facility, various engineers, a ferry unit, and a water purification platoon);
- An airfield support services unit (297 personnel); and
- A level-two hospital (50 personnel).[58]

A well-drilling unit was later added. After feasibility studies, South Africa offered to deploy the task force headquarters, the infantry battalion group, the engineer company, the headquarters support unit, the well drilling unit, and the ferry unit. These units would all be deployed in Kindu on the Congo River in the Eastern DRC.[59]

As the requested forces were combat forces, the possible impact of the Chapter VII deployment on the SANDF deployment was brought to the attention of the hierarchy by the J Ops Div staff. This included the possibility of injuries and/or casualties due to the actions taken under the Chapter VII mandate of MONUC, which included that it –

> [M]ay take the necessary action, in the areas of deployment of its infantry battalions and as it deems it within its capabilities, to protect United Nations and co-located JMC personnel, facilities, installations and equipment, ensure the security and freedom of movement of its personnel, and protect civilians under imminent threat of physical violence.[60]

Immediately, some challenges were identified. The most significant challenge was the generic composition of a UN infantry battalion compared to that of the SANDF. The standard SANDF infantry battalion comprises three rifle companies, whereas the UN battalion comprises four rifle companies. The South African Army (SA Army) decided to add a fourth rifle company from the Reserve Force units. This brought additional challenges, as these members had to be made combat-ready and trained to a level acceptable for deployment. As the SANDF did not have a well-drill unit as a standard formed unit, equipment had to be procured, and engineers trained. The deployment was less successful, and the unit was returned some 12 months after deployment.

Another challenge that arose during the negotiations of the MOU was that in the SANDF doctrine, every rifle company would deploy with its own armoured personnel carriers (APCs). The UN initially however only agreed to deploy APCs for one rifle company. Following lengthy discussions, it was agreed that APCs for two rifle companies would be included in the MOU. The APCs therefore had to be used by more than the two

companies. This influenced the reimbursement, as only APCs for two rifle companies were included in the MOU.

In an article by Maj. Gen Patrick Cammaert, former UN commander of the Eastern Division in the DRC, published in *Africa Security Review* by the South African Institute for Security Studies (ISS), he emphasised the importance of being well prepared for modern "robust" peacekeeping operations, and stated that peacekeepers should be trained for 'fighting in a war'.[61] This serves to illustrate the importance of being properly prepared before deploying into a peacekeeping operation. Being properly prepared is put in context by the fact that more than 50 per cent of all peacekeeping operations that have been mandated by the UNSC since 1999 have been mandated with UN Chapter VII tasks.[62]

For this MONUC deployment, the main equipment, weapons, and ammunition had to be taken out of long-term storage at the Mobilisation Centre (Mob Centre) (previously 7 Division Mobilisation Centre) at De Brug near Bloemfontein and made serviceable to meet the UN standards. This included painting all the vehicles for deployment – white. This process started in October 2002. This mobilisation necessitated that all technical personnel be deployed to the Mob Centre to ensure that the vehicles were made serviceable. Some of the spare parts required were not immediately available, while others were not available at all. Risks had to be accepted in various aspects, such as vehicles with oil leaks and an incomplete table of technical equipment (TOTE). After some delays, the UN inspectors inspected and cleared the vehicles for deployment.[63]

For the mission in the DRC, various other items had to be procured that were not available in the logistic system, with some personal equipment that were not part of the standard SANDF scale of issue. This included the procurement of Land Rover vehicles in various configurations.

As none of the staff of the DFPT of J Ops had worked with the UN before or had done any UN courses, it was uncertain which type of mission readiness training had to be prepared. This was further complicated due to the lack of guidelines for the expected outcome of the deployment. As the SA contingent would remain under operational command of the SANDF and come under operational control of the UN force commander, there were some uncertainties regarding what had to be reported to the SANDF and what to the UN.[64]

The UN-designated personnel and equipment from the SANDF deployed into the mission area by air, sea and road. Personnel were airlifted from Bloemfontein directly to Kindu in the eastern DRC. All the main equipment (e.g. vehicles, camping equipment and such) was moved by road from Bloemfontein to the Durban harbour from where it was transported by sea to Dar es Salaam. Aircraft of the UN then airlifted the equipment to Kindu. The personnel arrived well before the equipment. The personnel deployed to Kindu were initially accommodated in a large building in the city. Sustenance was provided through ration packs supplied by MONUC. By this time, the SANDF had adopted the new Weatherhaven-style accommodation, which was suitable for the environment in the DRC.[65]

By the time the equipment arrived in Kindu, the MONUC operational plan had been amended, requiring the main equipment to be redeployed to locations in North and South Kivu. The ferry unit, utilising part of a floating bridge, became a crucial component, as it was the only means of crossing the Congo River. Consequently, it was responsible for facilitating all UN traffic that required passage across the river.[66]

The SANDF task force took time to adapt to the MONUC bureaucracy and operational systems. Many control measures were over-implemented by field officers concerned about job security, and substantive component logistic functionaries who could only be described as risk-averse. Unfortunately, this led to several differences in the interpretation and implementation of standard procedures between the SANDF task force staff and MONUC officials until a mutual understanding was established. Sub-contractors, e.g. the Ukrainian MI-17 helicopter crews, took no risks, and if it were not for the robust support from the Indian Air Wing, many operations would not have taken place.[67]

Support from South Africa in terms of spare parts and other consumables (E-class items)[68] was slow, as was the case in Burundi, with many items simply out of stock. Managing logistic reserves, as required by the UN system – such as maintaining a seven-day supply of ration packs for the entire contingent – proved challenging. When ration packs with an expiry date within a few months were received, they either had to be consumed or written off. To consume them while maintaining the required consumable ration pack reserve, special permission had to be obtained from the Mission Chief Administrative Officer, whose primary concern was cost containment.

In defence of the UN, it should be noted that most of the personnel at the MONUC Kinshasa Mission HQ had never operated in a Chapter VII mission before and were unfamiliar with troops deploying into the field. In their view, all troops were expected to return to base for lunch and dinner.[69]

The deployed SANDF task force established a special team for UN wet lease inspections, which travelled throughout the theatre to assist in preparation. Once the inspection date was confirmed, the team visited all sections to ensure that major equipment and self-sustainment measures met UN specifications. This proactive approach ensured that the task force met the minimum requirements for the first year, securing reimbursement as per the MOU.[70]

The SANDF Deployment to Darfur

The SANDF Operation Cordite in Sudan began as part of the African Union (AU) Mission in Sudan (AMIS), with the SANDF initially deploying staff officers and military observers in July 2004.[71] In 2005, this deployment expanded to include an infantry protection company and an explosive ordnance disposal (EOD) unit. On 1 January 2008, the mission transitioned into a hybrid operation, the United Nations–African Union Mission in Darfur (UNAMID) with the mandate to protect civilians, facilitate delivery of humanitarian assistance, mediate between the parties on the basis of the Doha Document for Peace in Darfur, and support the mediation of community conflict.[72]

Similar challenges to those encountered in other missions arose. An additional complication was the requirement by the Sudanese government that overflight and landing approval requests be submitted at least one week in advance. This posed a significant logistical constraint, as urgent equipment could not be added to the cargo manifest[ii] on short notice. Close coordination was necessary among all parties involved in securing overflight approvals.

Analysis of the SANDF Participation in International Peacekeeping Operations

As mentioned earlier in this article, the SANDF had to learn several new lessons, concepts and doctrines. This was largely the responsibility of the staff at the J Ops Div. Fortunately, most of the staff were veterans from the Bush War with years of operational and logistics experience, which made the learning curve somewhat flatter. They were able to brief the various command levels on the impact of the various deployments. These staff members were also the first to present lectures at the Peace Mission Training Centre when it was established in 2007.

One of the biggest challenges the SANDF faced as it became involved in peacekeeping, was that none of these operations were budgeted for initially, and they had to be funded from the running budget of the SANDF. Later, funds were specifically allocated for peacekeeping operations and ring-fenced. This was first implemented for Operation Mistral during the deployment to the DRC. Furthermore, all reimbursements received from the UN were paid directly to the Treasury.

All lessons learned during the deployment of the SANDF task force to the DRC were recorded, enabling future deployments to be briefed during the mobilisation phase. The example set by the task force with the SANDF special team for UN Wet Lease Inspection however appears to have faded, as reimbursements received, dwindled in later deployments. To the best of the author's knowledge, this remains a significant issue, as deployed equipment is not maintained to the required standard as prescribed in the MOU.[73]

Initially, there was some uncertainty regarding the deployment of personnel who were HIV-positive, specifically, whether they were permitted to deploy or not. This ambiguity contributed to difficulties in filling all the posts for the deployment to Burundi and later the infantry battalion to the DRC. This was due to the stringent standards from both the UN and the SANDF. The UN clarified the matter in a discussion at the UN General Assembly.[74] The current position in the UN is:

> The UN does not exclude HIV-positive personnel from serving in a mission because of their HIV status. Department of Field Support (DFS) does require that all uniformed peacekeepers be offered voluntary confidential counselling and testing (VCCT) prior to deployment. This should not be interpreted as a requirement for

[ii] A cargo manifest is a list of all the cargo destined to be loaded on a specific aircraft.

> mandatory testing. That the VCCT has been made available and should be stated in the certificate of health.[75]

In the SANDF the uncertainty regarding HIV-positive personnel remained. Following challenges by various organisations, such as Section 27, South African Security Forces Union (SASFU) and AIDS Law Project (ALP) resulting in a court case in the Pretoria High Court in 2008, *DefenceWeb* reported on 29 April 2009 that the SANDF would shortly finalise new AIDS policy, which would allow personnel with HIV/AIDS to deploy on external missions.[76] This policy was finalised in late 2009.[77]

Several social challenges arose during peacekeeping deployments, as members were deployed for six months and received substantial allowances from the SANDF. Only a small portion was paid to deployed members in cash, while the remainder was deposited into their bank accounts alongside their salaries. Some members returned home to find their funds had been misused by e.g. their spouses. As experience improved, members received formal financial briefings on managing their allowances. The author understands that deployments now extend to 12 months. While the author could not yet verify it, it appears that the UN requirement is that TCCs should deploy for nine months.

Discipline was another challenge. Despite briefings by the Legal Section of J Ops, many deployed members encountered legal issues with both the SANDF and the UN. This primarily involved cases related to Sexual Exploitation and Abuse (SEA) in the MONUC and MONUSCO[iii] missions in the DRC. Such cases have been a continuous challenge for the SANDF. For example, according to an article in *DefenceWeb* on 7 August 2018, titled 'Six South Africans Implicated in the Latest UN SEA Report', members of the SA contingent deployed in support of MONUSCO were implicated in SEA-related incidents.[78]

The deployment of helicopters presented additional challenges. Helicopters were not deployed as major equipment under the MOU but rather through an LOA, requiring the TCC to submit monthly claims for flying hours. A key issue was defining when a flying hour commenced, with the UN interpretation being "when the wheels leave the tarmac".

Another challenge was claiming the expenditure of ammunition during operations conducted under the Chapter VII mandate. Determining the exact number of rounds fired during engagements proved particularly difficult.

As the medium-transport capabilities and serviceability of the SAAF reduced, the SANDF became progressively dependent on chartered flights to deploy forces on non-UN missions and sustain forces deployed on all peace missions. Overall, this would become increasingly expensive for the organisation, especially in terms of opportunity costs during crises.

Sustaining forces over vast distances remains a significant challenge, exacerbated by the financial constraints of UN peacekeeping structures. The UN makes provision for the

[iii] United Nations Organization Stabilization Mission in the Democratic Republic of the Congo.

deployment of additional personnel for the TCC to maintain the major equipment, but without reimbursement. This can be done under paragraph 8 of the MOU:[79]

> Any personnel above the strength authorized in this MOU are a national responsibility, and not subject to reimbursement or support by the United Nations. Such personnel may be deployed to the [United Nations peacekeeping operation], with prior approval of the United Nations if it is assessed by the troop/police contributor and the United Nations to be needed for national purposes, for example to operate the communications equipment for a national rear link. This personnel shall be part of the contingent, and as such enjoys the legal status of members of the [United Nations peacekeeping operation]. The troop/police contributor will not, however, receive any reimbursement in respect of this personnel and the United Nations will not accept any financial obligation or responsibility in connection with such personnel. Any support or services will be reclaimed from reimbursement due the troop/police contributor.

On 28 November 2007, the Peace Mission Training Centre (PMTC) was officially opened at the SA Army College in Thaba Tshwane, Pretoria. This centre provided a central hub for accessing and facilitating all aspects of peace missions. Initially, staff from J Ops conducted most of the training and lectures. Even after retirement, the author was requested to present lectures at the centre. Later, the British Peace Support Training Team (BPSTT) was deployed to the centre, sharing their experiences in peacekeeping with students. The overall work of the BPSTT (formerly known as the British Military Advisory and Training Team or BMATT) since 1994; however, came to an end in December 2017, including the involvement of the BPSTT in SANDF peacekeeping training at the PMTC.[80]

As previously noted, there was no centralised organisation for peacekeeping information. Consequently, the staff involved in the initial deployment had to develop procedures as the process evolved. Thanks to a visit by Maj. Giské, the author was able to brief staff at strategic and military-strategic level on the importance of the MOU. Col. Johan van der Walt and the author were key figures to whom others turned for guidance. They conducted numerous presentations at strategic, military-strategic, and operational level, and also visited political delegations. They led the peacekeeping module at the Joint Senior Command and Staff Course at the SA National War College, and frequently responded to parliamentary enquiries. The success of the initial deployments and peacekeeping missions was largely due to commitment and professional leadership at all levels.

As the SANDF gained experience in peacekeeping operations, there was a realisation that key personnel, including commanders and support personnel, required certain training and experience to perform optimally in such operations. It was, for example, recommended that personnel identified for possible UN peacekeeping deployments complete the following UN POTI[81] courses[82] (subject to confirmation of availability at the PMTC):

- Officers Commanding:
  - Introduction to the UN system
  - Principles of peace support operations
  - Commanding peacekeeping operations
  - Ethics in peacekeeping

- Support Personnel**:**
  - An introduction to the United Nations System: Orientation for serving on a United Nations field mission
  - Logistical support to United Nations peacekeeping
  - Operational logistical support of United Nations peacekeeping: Intermediate logistics
  - Advanced topics in United Nations logistics: The provisioning of troops and contingent-owned equipment (COE) and the method for reimbursement.

Future Participation of the SANDF in Peacekeeping Missions

The 1999 White Paper on South African Participation in International Peace Missions states:

> In terms of the mandate of the SANDF, participation in international peace missions is a secondary function. The "Growth-Core Force Design" recommended in the Defence Review "provides for participation in peace support operations at the level of up to one infantry battalion group".[83]

Unfortunately, this was not adhered to, as by 2003, three infantry battalion-sized deployments were engaged on peace missions. These were Operation Mistral in the DRC,[84] Operation Fibre in Burundi[85] and Operation Cordite in Sudan.[86] These deployments placed significant strain on logistical support for the deployed forces and affected reimbursement from the UN.[87]

In addition to these deployments of formed units, numerous other deployments of staff officers and military observers have occurred since 2000. These include Operation Espresso in Eritrea and Ethiopia (November 2000–August 2008),[88] Operation Amphibian in the DRC (August 2002–June 2004),[89] Operation Sunray in the DRC (June 2002–September 2002),[90] Operation Montego in Liberia (October 2003–January 2005),[91] Operation Pristine in Côte d'Ivoire (July 2005–December 2006),[92] Operation Curriculum in Burundi (January 2007–November 2009),[93] Operation Induli in Nepal (April 2007–July 2009),[94] and Operation Bongane in Northern Uganda and Southern Sudan (June 2007–July 2009).[95]

What, then, is the future of the SANDF participation in peace missions? It is recommended that the SANDF withdraws all formed units from current peace missions as a matter of

urgency. Instead, staff officers and military observers should be deployed to as many peacekeeping missions as feasible. Upon their return, they should report to the PMTC to document their experiences for future reference. The SANDF should revert to the original policy outlined in the 1999 White Paper, which envisages the deployment of a single, properly equipped infantry battalion with all elements of logistical support in place. This may necessitate the deployment of additional technical personnel to maintain the vehicles, ensuring optimal reimbursement from the UN.

Conclusion

The transformation of the SANDF into a pivotal contributor to international peacekeeping operations necessitated profound institutional adaptation following the South African democratic transition. This process involved integrating diverse military factions, restructuring command and logistical frameworks, and shifting focus from internal security to regional and UN peace missions. Despite early operational challenges, such as those encountered during Operation Boleas in Lesotho (1998), the SANDF progressively enhanced its capabilities, drawing critical lessons that continue to inform its modern peacekeeping strategies.

The increasing prominence of South Africa in international peacekeeping reflects its growing responsibility within global security frameworks from 1999 to 2003. The transition from a national defence force to a regional stabilising entity required diplomatic negotiations, doctrinal evolution, and refined logistical coordination. Initial difficulties in UN engagements were mitigated through policy development and equipment reimbursement negotiations, bolstering the operational readiness of the SANDF and positioning South Africa as a significant contributor to African peace support initiatives.

The early participation of the SANDF in international and regional peacekeeping operations between 1999 and 2003 represented a critical period of transition from training exercises to operational deployment. Engagements, such as Exercises Blue Hungwe and Blue Crane, alongside initial UN missions, exposed both opportunities and significant challenges, highlighting the necessity of rapid adaptation to new doctrines, UN procedures, and complex logistical and administrative requirements. The experiences of this formative period emphasise the importance of institutional learning, structured knowledge management, and international collaboration, with external guidance proving invaluable in bridging early expertise gaps.

These early missions also revealed structural and institutional limitations within the SA coordination mechanisms, including insufficient staffing, funding, and dedicated military representation in multilateral forums. The establishment of national frameworks, such as the NOCPM, demonstrated intent but lacked the sustainable capacity to engage with UN peacekeeping processes fully. Practical experiences with mission mandates, memoranda of understanding, and reimbursement mechanisms underscored the critical need for strategic coordination, doctrinal clarity, and informed negotiation. Collectively, these lessons laid the foundation for the evolving role of South Africa in peace missions,

demonstrating that operational preparedness must be matched by institutional capacity and effective multilateral engagement to achieve meaningful contributions to international security governance.

The financial and administrative arrangements underpinning participation by South Africa in peace missions reveal the complex interplay between political authority, departmental responsibility, and operational requirements. While parliamentary approval provides the overarching mandate, the practical execution of funding relies heavily on interdepartmental cooperation, particularly between the Department of International Relations and Cooperation (previously Department of Foreign Affairs), the Department of Finance, and the Department of Defence. The mechanisms for bridging finance and cost recovery highlight the inherent challenges of aligning national budgetary processes with the reimbursement structures of the United Nations. Furthermore, the layered involvement of SANDF divisions and services underscores the logistical and procedural demands of peacekeeping operations, where clarity of roles and efficient procurement practices are essential. These arrangements demonstrate that effective participation in peace missions depends not only on political will but also on robust financial planning, disciplined coordination, and institutional agility to meet both national obligations and international commitments.

Sustainment and logistics – or the lack of these – are often the cause of success or failure. While the SANDF did everything possible to ensure that the deployed forces were sustained, the lack of the knowledge of the UN system affected the initial deployment of the SANDF task force. The experiences of the SANDF task force within MONUC illustrate the complex interplay between bureaucratic procedures, logistical constraints, and operational effectiveness in peacekeeping missions. The initial difficulties in adapting to UN systems, compounded by risk-averse practices and inconsistent support chains, highlight the importance of streamlined processes, reliable supply networks, and clear communication between all actors. While challenges were evident, particularly in relation to logistics and sustainment, the eventual development of mutual understanding and the critical assistance from partners, such as the Indian Air Wing, demonstrate that cooperative engagement remains essential for the success of multinational peace operations.

With the SANDF choosing to deploy under the “wet lease” agreement, the maintenance of major equipment is a priority, not just to ensure that reimbursement is received, but also in order for the deployed forces to execute their given tasks. The deployment of additional personnel under paragraph 8 of the MOU should seriously be considered.

Through strong leadership and professionalism, the SANDF successfully navigated its initial involvement in UN and AU peacekeeping operations. The obstacles encountered, from logistical delays to institutional gaps, were addressed through adaptive strategies and international cooperation. By using these experiences, South Africa has established itself as a credible leader in African security, poised to enhance its contributions to continental and global peacekeeping frameworks.

Endnotes

* Captain (SAN) CH Ross (SA Navy Retired) joined the SA Navy in 1983 as a Logistic Officer. After various postings in the SA Navy, he completed the SA Army Senior Command and Staff Course in 1998, after which he was posted to the Joint Operations Division as Senior Staff Officer: Logistics for Maritime Operations in 1999. In 2001, Captain Ross attended the review of the Contingent-Owned Equipment (COE) Manual at the United Nations (UN) Headquarters in New York. Later the same year he was the only uniform member in the team that negotiated the first memorandum of understanding (MOU) with the UN in New York, after which he was appointed as Senior Staff Officer: Peace Support Operations (UN). During this posting, Captain Ross was a member of the team that negotiated all following MOUs with the UN. In 2007, he was awarded the Certificate of Training in United Nations Peace Support Operations by the UN Department of Peacekeeping. In 2008, he became the first member of the SANDF to be elected as a co-chairperson of one of the three working groups during the review of the COE manual.

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[68] E-class items are those items that are consumable or expendable, and that cannot be repaired when they become unusable for the purpose for which they have been acquired. These items are accounted for in accordance with the e-class accounting system. SANDF Stores Instruction; Volume A3: Unit Stores Accounting. Pamphlet 2: Unit Accounts and General Accounting Procedure.

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Adapting and Managing Logistics for Expeditionary Forces in Africa: A Private Military View

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Executive Outcomes

Abstract

The study on which this article is based, examined the approach adopted by the private military company, Executive Outcomes, to adapt, manage, and position its logistical requirements for sustainable offensive, defensive and containment operations in Africa. The logistical approach and doctrine of the pre-1994 South African Defence Force, despite its efficacy, was inadequate to ensure the force sustainment requirements of Executive Outcomes. Incorporating numerous lessons learned from the operations of the South African Defence Force in Angola, as well as engagements by Executive Outcomes in Angola (1993–1996), Sierra Leone (1995–1996), Uganda (1996), and Indonesia (1996), several adaptions were required to support and sustain operations in Africa, including the 72 Mobile Strike Force operations by the Nigerian Army against Boko Haram – a violent Islamist group – in 2014–2015. This deployment covered a distance of approximately 7 500 kilometres from the home base of Executive Outcomes in South Africa. The 72 Mobile Strike Force comprised both Nigerian Army members and private military contractors, and operated as an independent and self-contained unit. As the spearhead of the operations by the 7 Infantry Division of the Nigerian Army across Borno State, the approach of the strike force along with its logistics doctrine contained numerous lessons learned by Executive Outcomes in Angola and across other theatres of conflict and war.

Keywords: Force Sustainment, Logistical Requirements, Private Military Company, Intelligence, Offensive Operations, Defensive Operations, Containment Operations, Principles, Supply Chains

Introduction

United States (US) Army General Omar Bradley is attributed with the adage, 'Amateurs talk about strategy, professionals talk about logistics.'[1] In 1980, General (Gen.) Robert H Barrow (Commandant of the US Marine Corps)[2] noted, that 'Amateurs talk about tactics, but professionals study logistics.'[3]

These maxims were already well known – and applied – in the ancient world.[4] Logistics has been the lifeblood of strategic, operational, and tactical sustainment throughout centuries of conflict and war. Without adequate, well-managed and planned and sustainable logistical support, no successful military campaign or conquest would have been possible.

Sun Tzu discussed logistics and its criticality, 'Bring war material with you from home, but forage on the enemy. Thus the army will have enough for its needs.'[5] The logistical burden required to sustain the men and horses of Genghis Khan's hordes – who were often expected to forage for themselves – was considerable. One hundred thousand (100 000) men and 23 000 horses required substantial amounts of food, forage and water.[6] Baron De Jomini advised, 'The art of war, as generally considered, consists of five purely military branches, – viz.: Strategy, Grand Tactics, Logistics, Engineering and Tactics.'[7]

The above views reflect the necessity for effective and efficient logistical planning, warehousing or storage, supply chains, including transportation and distribution, and force sustainment during domestic, cross-border and expeditionary operations. The examples are however all related to historical European and Eastern approaches to logistical support during operations.

Combat operations in contemporary Africa, be they offensive, defensive, containment, or expeditionary, are faced with numerous unique challenges.[8] Force sustainment and operational momentum and tempo are dependent on efficient logistical supply chains. Logistical deficits as a result of a lack of realistic forward planning and investment into African logistical structures and systems have affected forces engaged in combat operations negatively. Degraded, destroyed or ill-maintained road and rail infrastructure amplified these deficits.

In the early to late 1990s, Angola, Sierra Leone and several other African governments found themselves in the unenviable position of having to counter armed threats and rebellions[9] while lacking the ability to project sustainable domestic hard power. Having been abandoned by foreign powers and governments, under-siege and sanctioned African governments were forced to turn to private companies they believed could assist and support them in overcoming their domestic and regional threats.

Deployments by the South African (SA) private military company (PMC), Executive Outcomes (EO), into Africa in support of under-siege governments[10] necessitated an urgent reassessment of the operational approaches by the South African Defence Force (SADF) to doctrine and logistical sustainment. Faced with a myriad of operational challenges, it became evident that African government forces lacked coherent, intelligence-driven and informed campaign strategies. These forces, furthermore, made use of foreign military doctrines not suited to the African areas of operations (AOs), along with a lack of equipment standardisation, inadequate command and control, poor intelligence – especially actionable intelligence – inadequate investment in logistical support and supply chains, poor medical support and evacuation procedures, and poorly trained troops.

Several African governments were also under international restrictions and sanctions preventing them from procuring and/or maintaining their required defence needs. This negatively affected their abilities to secure peace and security. Ironically, the armed threats they were facing were often not subjected to the same, and in some instances, these threats were both overtly and covertly supported by foreign governments and aid agencies.[11,12]

The military campaigns of EO in Angola and elsewhere, and later STTEP[i] International[13] in Nigeria, provide some insight into the criticality of military logistics during expeditionary operations in Africa. They also address the hard power deficits experienced by many African countries engaged in containing and neutralising armed anti-government forces and hostile regional incursions.

The Criticality of Military Logistics

Military logistics is the golden thread that ensures the sustainment of any military force.[14] It enables the movement of forces and their equipment to a combat zone, supports the forces with their ongoing requirements such a fuel, oil, and lubricants (FOL), ammunition, rations, water, medical supplies and support. Military logistics further guarantees the control over and management of such requirements.

Conducting expeditionary operations across numerous and varied terrain and vegetation requires an adaptable and focussed approach to supporting and sustaining forces in foreign or remote AOs.[15] This approach equips them to be ready for combat at all times. It enables their rapid deployment across environments where infrastructure is either lacking or non-existent. Successful expeditionary operations are dependent on real-time intelligence, coherent campaign strategies, and the development, control, maintenance, and management of efficient supply chains.

The Allied invasion of Europe during World War II was crucial to defeating Nazi Germany and her allies – known as the Axis forces. The invasion remains an example of the largest expeditionary operation in modern warfare. Without a sustainable and efficient logistical backbone and adaptive and well-managed supply chains, the Normandy landings on 6 June 1944, codenamed Operation Overlord*,* would have failed.[16] To succeed, Overlord required a well-planned and well-managed large-scale expeditionary logistical operation to support the offensive and defensive Allied actions. The Allied forces exploited their air, ground and naval delivery assets. The effect on the outcome of the war was extraordinary, and the planning of the logistical support to underwrite the invasion forces took several years of planning and preparation.

The South African Defence Force (SADF) demonstrated its logistical prowess during numerous high-tempo mechanised operations in Angola in the late 1970s and 1980s.[17] These offensive operations required enormous amounts of FOL, ammunition, rations, medical support, and the other requisites of war. It was the logistical effectiveness that enabled the SADF to keep its adversaries off balance and maintain its operational tempo and momentum. These lessons appeared to have been discarded by the post-1994 South African National Defence Force (SANDF)[18] during its recent deployments into the Democratic Republic of Congo (DRC) as part of a sub-regional peacekeeping and intervention force (Southern African Development Community Mission in the DRC or SAMIDRC).[19]

[i] STEPP is an abbreviation for Specialised Tasks, Training, Equipment and Protection.

Conducting expeditionary military operations in Africa can be challenging.[20] The diverse and vast operating environment; road and rail infrastructure deficits or the lack of such infrastructure; a lack of aircraft; threat-held and ungoverned areas; popular local support to adversarial or hostile forces; the enemy and his weapon systems; and long distances amplify the challenges – and create new ones. The ability or inability to deploy expeditionary forces is inextricably linked to the ability of a government to project sustainable hard power.[21]

Logistical Challenges in African Armed Forces

The greatest challenge to any logistician and his supply chain system, and management of it is guaranteeing the requisite equipment, materiel and/or stores are available at the correct place and time to allow the combat forces to maintain and sustain operational momentum and tempo.[22] This presupposes a coherent and realistic intelligence-driven and informed campaign strategy where the requisite means are available.

Many under-siege African governments lack credible actionable and predictive intelligence, and are, therefore, unable to develop either coherent or realistic, intelligence-driven campaign strategies.[23] Institutional, economic, and political impediments create their own unique challenges that must be overcome.

Furthermore, many African logistics compartments are antiquated, inadequately staffed and trained, and they lack functional requisition and supply procedures, equipment and assets to develop and sustain operations domestically. Resultant from a lack of investment, they are unable to respond rapidly to the needs of the armed forces[24] and are poorly controlled and managed. This has severe consequences for the levels of logistics: strategically, operationally, and tactically. The lack of investment in military logistics and enabling technologies, in turn, had a negative effect on the mandate of government forces to deploy and engage in domestic combat operations, foreign or regional peacekeeping operations, or possible expeditionary operations either in remote areas or beyond their national borders.

The lack of or deficit in supplies and materiel can adversely affect both the morale and fighting spirit of the combat forces. Consider for a moment forces deployed in torrential rains without any rain protection, getting by with a shortage of food and ammunition, and facing an adaptive, well-armed, and intent-driven enemy – their morale and will to fight will be seriously eroded while affording the enemy numerous advantages.[25]

The majority of African armies are clones of their former colonial masters or later Cold War allies.[26] Their orders of battle (ORBAT) and tables of organisation and equipment (TOE) are aimed at mimicking those of either the East or the West – and in some instances, contain elements of both. These ORBATs and TOEs are inadequate for African domestic and/or regional combat operations.

The armed forces that follow the Soviet bloc structures along with their combat and logistical doctrines are too centralised to enable rapid action, thereby positing them as reactive forces as opposed to proactive forces. The forces that have adopted the European or North Atlantic Treaty Organization (NATO) force structures and logistical doctrines are unable to conduct high-tempo combat operations due to the logistical sluggishness and cumbersome logistical tailback. Furthermore, these forces have asset deficits, inadequate training, a lack of investment, a shortage of delivery assets, inadequate command and control, a lack of investment, and poor stores management.

In addition, modern African armies are given notoriously bad advice and poor training by their so-called "international partners" regarding logistical support.[27] The infrastructure on the continent is neither that of Europe nor of the United States. African armies do not possess the same horizontal and vertical delivery assets as their so-called "international partners". Nor do they have comparable assets, budgets, means, resources, and infrastructure.

Very little emphasis is given to the art and science of military logistics, its criticality, and control over supply chain systems. It serves no purpose to train logisticians in the art of air supply when both aircraft and parachutes are lacking.[28] Substandard foreign training, domestic asset deficits, and a lack of actionable intelligence have a negative influence on domestic and/or sustained combat transnational operations and logistical support to expeditionary combat units.[29] The above were typical challenges and problems experienced by EO during its deployment into Angola in 1993.[30]

Angola: Laying the Foundation for the Future

Following rapid Angolan decolonisation,[31] the country erupted in a civil war that pitted the three major Angolan political parties against one another. The warring parties comprised the MPLA (*Movimento Popular de Libertação de Angola*), UNITA (*União Nacional para a Independência Total de Angola*) and the FNLA (*Frente Nacional de Libertação de Angola*).[32] Ultimately, the MPLA took control over Angola and its government while UNITA, despite its initial Maoist ideology, and later support from South Africa and the United States, continued fighting. The FNLA all but disappeared.

The conflict attracted foreign governments, especially Cuba and its Soviet allies, intent on gaining control over the Angolan political trajectory along with its tapped and untapped resources. The United States provided propaganda and political support to UNITA and supplied it with Stinger surface-to-air missile systems.[33]

Despite the ongoing armed conflict, the Angolan MPLA also provided a safe haven and support to two SA adversaries: the South West African People's Organisation (SWAPO), its military wing (PLAN)[34] and the African National Congress (ANC).[35] This resulted in the SADF conducting numerous offensive operations in South West Africa (now Namibia) and later in Angola.[36] These operations were well supported by an efficient SADF logistical structure and supply chain.

The withdrawal of the SADF from Angola and Namibia later was the result of the negotiations (the New York Accords) concluded in New York. Signed by Angola, Cuba and South Africa on 22 December 1988,[37] the negotiations made provision for the withdrawal of SA forces from Angola – a process that had already been completed by 30 August 1988.[38] The negotiations furthermore called for the withdrawal of South Africa from Namibia, Namibian independence, and the staged withdrawal of Cuban forces from Angola.

The implementation of the New York Accords demonstrated the SADF logistical prowess to support a planned withdrawal and to transport its military personnel and the majority of its equipment from the Angolan and thereafter from the Namibian operational areas back to South Africa. It was hoped that, with the ending of hostilities, Angola would find peace and stability. Entering a period of national recovery following the devastating three-decades-old civil war interspersed with numerous offensive SADF operations, strikes and raids into its territory,[39] the Angolan armed forces[40] were operationally exhausted and economically and logistically constrained.[41]

The 1991 Angolan Peace Accords, known as the Bicesse Accords, made provision for a ceasefire agreement, the establishment of peace in Angola, resolving the issues still pending between the government and the rebel forces, and the Protocol of Estoril. The latter made provision for elections, the transition to a multi-party democracy, military monitoring, internal security, political rights of the rebels, administrative structures, and formation of the new Angolan Armed Forces.[42] This resulted in a shaky ceasefire between the Angolan armed forces and UNITA.

The MPLA-led Angolan government held the first national elections in the country in 1992. The rejection by UNITA of the election results reignited the civil war, further hampering the recovery of both the government and the newly reconstituted Angolan government forces (FAA or *Forças Armadas Angolanas)*.[43] Having unsuccessfully called on the international community for assistance to bring about an end to the renewed post-election armed hostilities, both the government and the FAA were forced to seek assistance elsewhere.

The National Union for the Total Independence of Angola (i.e. UNITA), led by Dr Jonas Savimbi,[44] comprised both a political and military component. It was supported by both the West and the East. It had "diplomatic offices" in several European and United States (US) cities. The movement had a formidable media capability and was able to disseminate its own propaganda and press releases via European and SA media houses. The SA Military Intelligence Division exploited its agents in the media houses to propagate attacks on the MPLA government while praising the actions by UNITA. One principal UNITA advisor was an SA businessman[45] who was also an advisor to President Thabo Mbeki, SA civilian and military intelligence agencies, the De Beers mining house, and the US State Department.[46] This provided UNITA easy access to selling its illegally mined diamonds, while simultaneously presenting it with numerous disinformation and misinformation

options. The international diplomatic presence of UNITA further gave it a legitimacy the MPLA government lacked.

The UNITA military forces, supported by several foreign governments, were able to inflict heavy losses on the Angolan government forces. Comprising almost 90 000 men under arms, it was equipped with a variety of East bloc weapons and weapon systems. It had its own armoured forces as well as artillery, anti-aircraft, engineering, and logistics elements. Its approach to defeating the Angolan forces consisted of semi-conventional, guerrilla, sabotage, and propaganda actions and operations. Its US-supplied Stinger surface-to-air missiles posed significant dangers to the National Air Force of Angola (FANA).[47] Its foreign suppliers made use of both air and sea delivery methods. Mmabatho International Airport[48] served as a major supply hub for air delivery of equipment and materiel from South Africa to UNITA-controlled airfields in Angola. The northwestern Angolan seaport of Soyo,[49] under control of UNITA, was used as its safe harbour. Both air and sea assets were used to deliver military equipment and to transport diamonds sold by UNITA to international markets, including to South Africa.

The renewed UNITA offensive in mid-1992 was able to seize the diplomatic and military initiatives, inflict heavy losses on FAA, and take control of much of Angola. By early 1993, the MPLA government and FAA estimated that UNITA controlled most of the Angolan countryside along with numerous cities and towns. The FAA general staff believed that more than two thirds of the country (approximately 800 000 square kilometres) had been lost to UNITA.

By mid-1993, the Angolan government contracted the private SA military advisory company,[50] Executive Outcomes (EO), to assist, advise, train, equip and mentor a newly envisaged mechanised infantry brigade[51] in order to reclaim territory lost to UNITA and bring about an end to the reignited post-election armed conflict.[52] The contract EO entered into with FAA required training and mentoring the new brigade. The training of the brigade had to make provision for offensive, defensive and containment operations against an agile, well-equipped, well-trained, foreign-supported, battle-hardened and successful enemy.

The FAA was able to provide much of the offensive requirements of the brigade, such as ammunition, uniforms, base facilities, weapons, and an assortment of vehicles. The logistical constraints and deficiencies of the FAA however necessitated the procurement of equipment and supplies from South Africa, Germany, the United Kingdom, Russia, Ukraine, the Czech Republic and elsewhere. Equipment, such as ballistic body armour, helmets, personal loadbearing equipment, medical supplies, daily ration packs, infantry fighting vehicles (IFVs) and even utility helicopters had to be procured and shipped to a primary facility for both the training and operational deployment of the brigade. A rapid casualty and medical evacuation (casevac and medevac) procedure had to be developed and implemented to ensure injured and wounded soldiers, and sick EO personnel could be rapidly evacuated to hospitals in South Africa.

If the brigade had to conduct high-tempo combat operations successfully in order to unbalance the enemy, regain the initiative, and impose its will on UNITA, it would require an intelligence-driven and informed campaign strategy. Such a strategy would, in turn, require a restructured logistical system and supply chain to ensure maintenance of the momentum of the brigade.

The brigade, however, lacked numerous of the essential components required to project rapidly and to sustain hard power.

Assessing the Situation

Housed at the old Cuban airbase at Cabo Ledo,[53] approximately 80 kilometres south of the Angolan capital city Luanda, it became apparent that EO would need to ensure the brigade was independent in terms of command and control, operational planning, selection and vetting of troops, training programmes, logistics and engineering. It was critical that the brigade was postured to conduct rapid horizontal and vertical manoeuvre operations, augmented by clandestine and pseudo-operations. Its attainment of mission success would require the brigade to apply, align and synchronise all of its elements of combat power, which were defined as:

- Mobility and manoeuvre;
- Firepower (direct & indirect including airpower);
- Force preservation;
- Command and control;
- Communications;
- Technologies;
- Intelligence; and
- Logistics.[54]

Despite the ongoing conflict with UNITA, the FAA had neither a sustainable campaign strategy for the pending deployment of the brigade, nor a realistic vision of what the brigade could and/or should do. Lacking a campaign strategy, several unforeseen challenges were obvious as the envisaged brigade – later designated 16 Brigade – had neither the manpower nor the means with which to conduct its as yet unknown mission(s).

The EO premise remains that intelligence drives and informs strategy, and strategy determines structure. The brigade structure, coupled to terrain and the enemy, would determine its ORBAT, its doctrine, its TOE, and standard operating procedures (SOPs), the challenges that could be anticipated, and how best to sustain combat operations with a very reduced logistical footprint.

Lacking a clearly defined mission, EO interpreted its primary function as preparing the newly constituted 16 Brigade (16 Bde) to ensure the smooth deployment drills of the unit, i.e. to rapidly guarantee the correct manpower, at the correct place and time, correctly trained, equipped and supported to do battle[55] with the enemy, UNITA. An agile, flexible, adaptable, efficient and well-managed logistical rear area and supply chain would be critical to sustain any planned combat operations.

It was evident that sustaining the brigade logistically would present numerous challenges, as the existing Soviet approach of the FAA to logistics was both limited and disconnected from the realities of an African battlefield. It lacked control and logistics management, and was sluggish. Sustaining operations against an elusive enemy over a large AO had become problematic for FAA. If the logistical requirements of 16 Bde and EO had to be met by both current Angolan means and beyond, it would necessitate incorporating elements of expeditionary logistics to ensure an agile, flexible, rapid, and smooth functioning system. Left unattended, these shortcomings would deny the brigade the ability to exploit its combat power while providing UNITA with numerous battlefield advantages and giving it the initiative.

Given the uniqueness of EO operations across Africa, it was apparent that the SADF logistical doctrine (according to which EO initially worked) would require numerous adaptions and adjustments to cope with the diverse operational challenges in different theatres of conflict and war. These changes included adapting the fighting (F) echelon into an echelon that could operate for longer durations, along with forward stacking of FOL and ammunition, and air delivery of FOL and other requirements to guarantee operational tempo and momentum.

The hurriedly approved, jointly developed FAA–EO campaign strategy confirmed the ORBAT and TOE of the brigade. To execute the campaign strategy, 16 Bde required two mechanised battlegroups, its own air support (helicopters and strike aircraft), air assault elements, pseudo teams, indirect fire support teams, a rapid reaction force, along with combat engineer, intelligence, communications (signals), medical support and logistics elements.[56]

The broad campaign strategy, as illustrated in Figure 1, made provision for:

- An airlanded operation launched from both Cabo Ledo and Luanda to insert a fully equipped, combat-ready joint FAA–EO combat team rapidly into the FAA garrison at Saurimo in the eastern Angolan province of Lunda Sul;[57]
- A two-pronged advance from both Luanda and Saurimo to retake the UNITA-held diamond fields in the Lunda Norte province; and
- The retaking of the UNITA-controlled harbour town of Soyo in northwestern Angola.

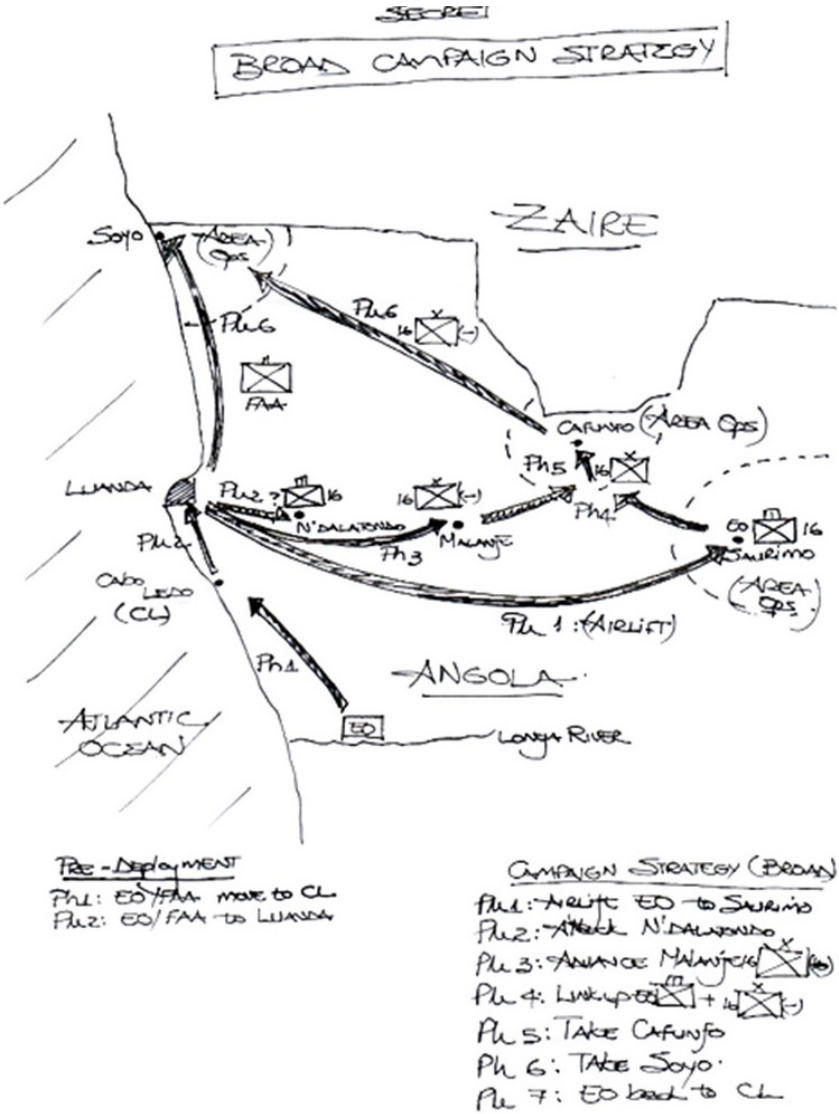

Figure 1: EO hand-drawn broad campaign strategy.[58]

The campaign envisioned the brigade conducting intelligence-driven, high-tempo combat operations over large distances with an efficient and flexible yet significantly reduced logistical footprint. To maintain operational momentum and tempo and to endure in its mission, 16 Bde required agility, firepower, manoeuvrability, force protection, and sustainability. These critical factors required investigation into and the adjustment of the available logistical means to guarantee campaign success. The enemy, time and distance, coupled to terrain and vegetation related to logistical support posed several significant challenges to the brigade. Procuring war materiel and supplies from beyond Angola to Cado Ledo and Luanda had a time implication and required a minimum delivery distance of approximately 2 400 kilometres. Due to the lack of FAA logistical support vehicles, contracted private contractors and resources needed to be engaged.

Whereas Cabo Ledo would initially serve as a main logistical depot and supply point, equipment and materiel needed to be supplied rapidly to the brigade forces operating considerable distances from the proposed Cabo Ledo hub to the Lunda Norte and Lunda Sul provinces of Angola. Ensuring the requisite combat requirements were available to the brigade and its battlegroups at all times, necessitated adaptions to the traditional first line, first-line reserves and second-line logistical requirements. It also necessitated identifying and establishing forward supply bases as well as resupply points during an advance.

The logistical doctrine to sustain the SADF forces in their combat and support operations in Angola could not be used in its entirety as a template. The FAA logistical systems were both inadequate and impractical for high-tempo composite warfare operations[59] across a fluid battlefield against an elusive, mobile and successful enemy and over considerable distances.[60] In addition, the road and rail transport infrastructure was severely degraded and neglected, destroyed, mined or not available. Air delivery would require flying through a gauntlet of UNITA anti-aircraft guns and missiles.[61]

Mission success required a reassessment and reconfiguration of the existing and predicted logistical support, supply depots and chains, resupply points, and management systems from Cabo Ledo to the Lunda. During the unfolding of the campaign, numerous additional lessons were learned relating to the resupply of ammunition, FOL and rations as well as medevac and the treatment of FAA and EO casualties. Forward supply areas needed to be established and protected. As medical facilities in Angola were dilapidated, under-equipped and understaffed, EO and FAA casualties would require immediate casevac by helicopter – often under direct and indirect fire by UNITA – to an EO medical post at Saurimo. Whereas FAA would ensure its casualties were medically evacuated (medevac) to Luanda, EO casualties were flown from Saurimo to SA hospitals by Boeing 727 aircraft.

As one of the EO combat team commanders would later relate:

> Flying re-supply mission after re-supply mission, our pilots were keen to make sure that we had everything we needed. Apart from this, everyone knew that a casevac was literally only minutes away, so if anyone was wounded our pilots would fly in to take them to

> a hospital. Knowing that the company was willing to ensure the best medical treatment at a private hospital in South Africa was great for moral.[62]

The lessons learned in Angola would become part of the EO approach to logistics and force sustainment, and were later elaborated on during deployments to Sierra Leone and Indonesia. In later years, the approaches, methods and techniques of logistical sustainment used by STTEP in Nigeria (discussed later in this article) became part of the planned anti-Boko Haram campaign.[63] The EO campaigns in Angola and elsewhere were, however, not explicitly expeditionary in nature. They always formed part of larger state-sanctioned military campaigns where the armed forces of the governments under siege were (and are) engaged in countering armed anti-government forces, proxy forces, or hostile regional military forces – and, at times, included cross-border operations.

Operating semi-autonomously came with both advantages and disadvantages. As an independent brigade, the battlegroups were able to execute their operational designs with speed and therefore dictate the tempo of operations. This allowed 16 Bde to seize the battlefield initiative rapidly. A major disadvantage was having to rely on the logistical capacity of the FAA, which was often unable to supply the brigade with its requirements. As an example, the EO campaign strategy made provision for the establishment of medical posts for the local population in areas retaken from UNITA. As medical support by the FAA was generally poor, medicines were donated to EO by private SA hospitals and flown to the Angolan AOs.[64] The approach and methodology adopted by EO to support government military campaigns were based on what later become known as "composite warfare".[65]

The fighting concept relied on small highly mobile combat teams supported by utility helicopters and strike aircraft. Intelligence feeds and targeting relied on human agents recruited by EO within the UNITA ranks as well as on reconnaissance and pseudo-teams and the local population. Longer-range aerial reconnaissance was conducted with an EO-modified King Air aircraft equipped with forward-looking infrared (FLIR)[66] sensors. These assets identified UNITA deployment areas, camps and supply dumps, as well as potential helicopter landing zones for future resupply points.

Having been deployed into numerous African conflicts, elements of the deployments can be viewed as "expeditionary" as they were mostly conducted into either remote ungoverned areas or areas under occupation of hostile anti-government forces. Nonetheless, the company was and is always integrated into the armed forces of the contracting government where, if possible, use is made of logistical supply chains and distribution systems of the military of the relevant government. Unencumbered by restrictive procurement procedures, EO was able to rapidly advise on the procurement of personal equipment, medical supplies, ration packs, and even commercial technologies, such as rangefinders and, infrared sensors.

EO was and is, however, a PMC based in South Africa, owned by South Africans, and staffed by Africans. The company is located far from the conflict areas and zones, and possesses no military equipment or vehicles. It must utilise what is available in a particular country, advise on essential requirements if government funding allows and/or improvise where possible. This presents some unique challenges, uncertainties, and a loss of operational momentum and tempo.[67]

Prior to the deployment of 16 Bde, the following operational challenges that would affect logistical sustainment were identified:[68]

- A lack of actionable operational and tactical intelligence created numerous challenges in terms of predicted ammunition expenditure and FOL, rations, medical support and water requirements;
- A lack of transport infrastructure would necessitate the brigade moving cross-country and, where necessary, constructing improvised bridges to cross large water obstacles;
- The attitude of the local population and their perceived support to UNITA could hamper the resupply of forces by laying mines, constructing obstacles, and providing intelligence to UNITA forces;
- The availability and willingness of private transport companies to assist and support the movement of stores and supplies when the brigade had insufficient vehicles to resupply its forces;
- Access to anti-aircraft gun and missile systems and barrel and rocket artillery by UNITA and using it could prevent the horizontal and vertical delivery of stores and supplies; and
- The decision by the post-1994 SA government not to sell critical equipment to the FAA necessitated the sourcing of critical materiel and equipment elsewhere[69] thereby creating delivery and time challenges.[70]

The Uncertainties of the First Logistical Test

Given the superiority of UNITA in terms of manpower, equipment and international support, and the influence thereof on both the AO and the operating environment, any campaign strategy had to enable the brigade to regain the initiative and unbalance UNITA forces. As UNITA controlled more than two thirds of the country, it provided them with operational flexibility across a large and fluid battleground. The campaign strategy therefore had to force them into static defensive positions while simultaneously degrading their forces. It furthermore had to force UNITA to divide its forces and increase their vulnerability to the combat power of the brigade.

The approved joint FAA–EO campaign strategy consisted briefly of the following phases:

Phase 1: Take, hold, secure, stabilise, and expand Saurimo[71] in northeastern Angola;

Phase 2: Develop Saurimo as a primary logistics depot or hub and supply point;

Phase 3: Attack and capture the primary UNITA logistics base at N'taladando;[72]

Phase 4: Commence with two-pronged advance on Cafunfu[73] from Luanda and Saurimo;

Phase 5: Assault on Cafunfu;[74]

Phase 6: Consolidate, exploit and expand hold over Cafunfu and environs;

Phase 7: Advance on the UNITA-held harbour town of Soyo;[75]

Phase 8: Assault, take and hold Soyo and thereafter return to Cabo Ledo.[76]

The campaign strategy focussed on degrading and neutralising the UNITA trinity of gravity:[77]

- altering and shaping the perceptions of the local population to support FAA and reject UNITA;
- cutting off the UNITA diamond mining income and their safe harbour; and
- systematically annihilating the UNITA military forces.

The first phase of the campaign strategy to impose the will of the Angolan government on UNITA required the deployment of an independent, self-sustaining combat-ready combat team consisting primarily of EO members from Cabo Ledo and Luanda to Saurimo. This allowed securing and expanding the AOs at and responsibility of Saurimo (see Figure 2). Both Luanda and Saurimo would serve as the start of a two-pronged advance on the UNITA stranglehold over the diamond fields at Cafunfu.[78] Both locations would also serve as primary logistics hubs for the two-pronged advance.

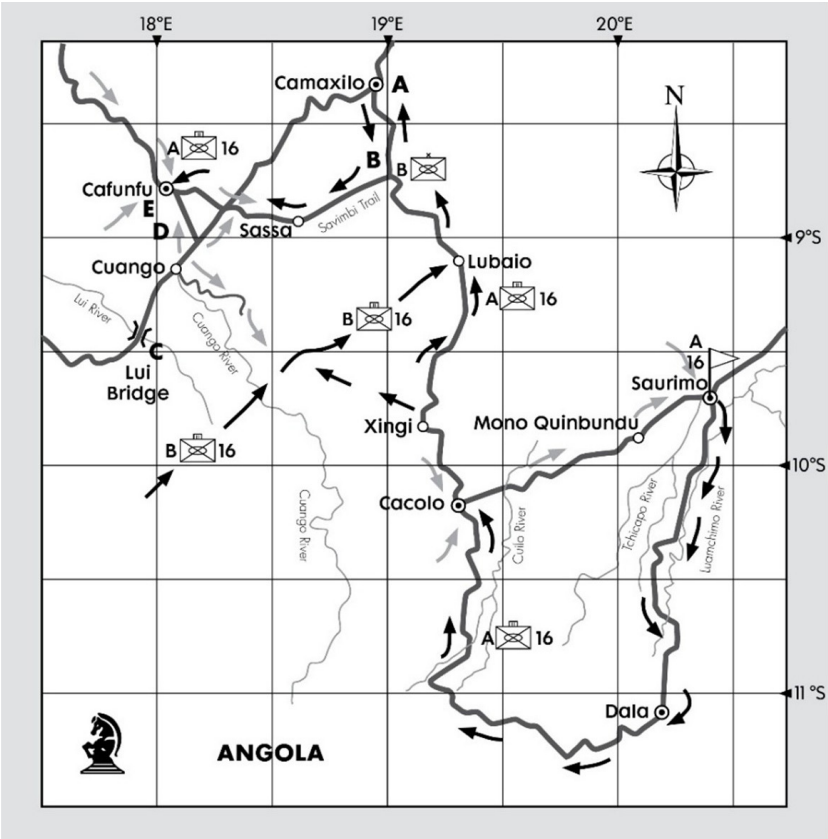

Figure 2: The campaign strategy for the FAA 16 Brigade in Lunda Sul and Lunda Norte provinces.[79]

The roads between Luanda and Saurimo were severely degraded and heavily mined, and provided numerous options for UNITA road ambushes. The initial deployment to Saurimo was by air to secure the garrison and its airfield, establish an air bridge, and reinforce and then sustain the garrison. The airlanded deployment required speed and surprise to unbalance and deceive UNITA. A secure Saurimo enabled the build-up of forces to execute the first phases of the campaign.

The subsequent air bridge from both Cabo Ledo and Luanda to Saurimo allowed ammunition, FOL, rations, medical equipment and other vital requisites to be prepositioned at Saurimo. Once achieved, the other phases of the operation could be executed. The subsequent phases of the campaign strategy were successfully accomplished within a few months.

Given the uncertainties of multiple offensive and other events during any military campaign, EO logisticians were forced to make numerous assumptions to support and sustain the campaign and its subsequent operations. These assumptions related to the availability and/or lack of controlled FAA procurement processes, equipment, stockpiles or supply dumps, reserves, lines, recovery of equipment, defence-related supportive industries, and the protected movement of stores and supplies. It also extended to the condition of roads and bridges during inclement weather, vegetation, other critical infrastructure, along with seasonal variations and the impacts thereof on both the participating forces and the supply chains.

To validate assumptions and overcome the uncertainties and the fogginess of the supply chain, logisticians were granted access to classified intelligence data relevant to their area of operation as soon as possible. They were also engaged during all phases of planning the campaign strategy. This guided them in terms of logistical planning and aided them in overcoming uncertainties of what combat units could expect, where, and when. This allowed them to make sound predictions and to anticipate the potential requirements, dangers and risks, and possible supply lines and points.

The success of the campaign relied on EO logisticians guaranteeing operational sustainment. The final logistics plan was lean, fast, and robust – and, above all, practical – and enabled effective and efficient implementation under adverse and trying conditions over disparate terrain and great distances. Exploiting both horizontal and vertical delivery assets, the logistics plan supported all elements of the doctrine of the brigade and the phases of the operations. The plan was tightly controlled to prevent losses and shrinkage. This enabled the brigade to achieve a successful strategic outcome that resulted in UNITA accepting the November 1994 Lusaka Protocol.[80] Despite the protocol, UNITA continued to violate the ceasefire and the FAA 16 Brigade continued with its operations.

The lessons learned in Angola relating to force sustainment were encapsulated in the approach by EO and later STTEP to logistical support in Nigeria. The delineation of the logistical lines of support, the principles of composite warfare logistics and supply chains, and approaches to supply chain delivery were successfully applied in Sierra Leone, Indonesia, Uganda and the DRC, the Central African Republic, and later in Nigeria and elsewhere.

The input of EO logisticians remains crucial from the initial development stages of any campaign strategy or operational design. Their input is considered vital throughout the implementation phases of the campaign or operation. They are mandated to veto operational designs if they believe they are unable to sustain operations.

Logistical Lines of Support in Nigeria

Although the Christian and Muslim communities in Nigeria[81] generally co-exist peacefully, there have been frequent religious riots. In 2002, numerous ethnic-related clashes took place, mainly between Christians and Muslims.[82] Despite President Goodluck Jonathan's

election victory in 2011, he was faced with a mounting Islamist problem, a problem that had already intensified in July 2009. In that year, an Islamist movement known as Boko Haram launched a campaign of violence across the northeast Nigeria, killing hundreds of people – Christian and Muslim alike.

The mass kidnapping of 276 mostly Christian female students by Boko Haram from their secondary school in the town of Chibok, Borno State, during the night of 14 April 2014, shocked the Nigerian government and the international community.[83] Faced with severe criticism for its slow response to the kidnapping, the Nigerian Army (NA) subcontracted an EO offshoot known as STTEP International to assist in training and mentoring an NA hostage rescue force to secure the release of the Chibok girls.[84] The subcontract was for three months. It required the deployment of STTEP personnel to the Nigerian School of Infantry (NASI) at Jaji, Kaduna State during December 2014–January 2015. In this case, STTEP was to select and train a hostage rescue force to secure the release of the kidnapped girls.

Shortly after the training commenced, Boko Haram began an offensive in the neighbouring Borno State and was threatening to overrun the headquarters of the NA 7 Infantry Division (7 Inf Div) in Maiduguri.[85] If Boko Haram were successful in capturing Maiduguri, it would signal a massive defeat to the Nigerian Army. This would undermine the faith of the citizens in the government and the Nigerian Army, as well as give Boko Haram access to the weapons and equipment of the division. A victory would further incentivise Boko Haram as well as provide them with numerous propaganda options and enable them to recruit new members to its cause. The renewed Boko Haram offensive resulted in STTEP being asked to discard its Chibok girl rescue mission and instead to deploy to Maiduguri to support the division.

This sudden posture change necessitated a highly mobile force capable of striking deep into Boko Haram-controlled areas. Such a force, comprising selected NA and STTEP members, would require both horizontal and vertical assets. It would need to operate autonomously across Borno State. To give the force both agility and flexibility and to enable it to apply its combat power to maximum effect, it would need to control its own logistics to sustain the force.[86]

The formation of 72 Mobile Strike Force (MSF) as an independent, self-contained NA unit attached to 7 Inf Div was hurriedly approved. This gave credibility to the logistical lines of support defined in earlier EO campaigns. Similarly, EO principles of logistics and the approaches to supply chain delivery were found to be applicable to both low-intensity and high-tempo combat operations. These operations spanned the gamut of desert, jungle and urban warfare.

The 72 MSF was structured according to the tenets of a composite warfare combat team.[87] It was composed of four mine-resistant ambush protected (MRAP)[88]-mounted strike teams, each team consisting of four MRAPs, along with an MRAP-mounted indirect fire support team. It had its own air wing comprising an MI-24 attack helicopter, two modified Gazelle

attack helicopters along with a single UH-1D and a Puma helicopter. The Nigerian Air Force would deliver air-to-ground strikes if called on. Casualties would be immediately evacuated to its own medical centre at its forward operating base (FOB) at Maiduguri. The FOB would serve as 72 MSF launchpad to conduct operations against Boko Haram as well as serve as its logistical hub.

Despite lacking critical equipment, such as radio communications, night vision and thermal equipment and unmanned aerial vehicles (UAVs), it was a highly mobile, agile manoeuvre force. Its mission was to act as the tip of the spear for 7 Inf Div, and to locate and strike Boko Haram forces in Borno State. The MSF did not hold ground but paved the way for 7 Inf Div to hold and exploit terrain and areas retaken from Boko Haram.

Supporting the 72 MSF with its logistical means and resources during high-tempo operations to implement its mandate successfully was challenging. It required convincing the hierarchy of the Nigerian Army that force sustainment based on numerous antiquated and irrelevant foreign doctrines from the United Kingdom, the United States, France and Israel held numerous disadvantages for the strike force. The NA hierarchy finally accepted that logistics is a costly and ever-evolving process that must be studied, adapted, refined, implemented and controlled by professional logisticians. Approaches and doctrinal adaptions to the approach followed by the NA to logistics were therefore crucial.

Acting as advisors to 7 Inf Div headquarters, senior personnel of STTEP were able to formulate a campaign hurriedly to adopt an offensive posture and take the fight to Boko Haram. The campaign strategy was simple. Codenamed Operation Anvil, it made provision for three broad phases as illustrated in Figure 3:[89]

Phase 1: Aim – to divide the Boko Haram AO by driving a wedge between them. To achieve this:

- 72 MSF had to retake and secure the Mafa–Dikwa–Ngala access route;
- The strike force had to exploit ten kilometres beyond Dikwa and Ngala, while 7 Inf Div occupied Ngala; and
- Elements of 7 Inf Div had to secure and patrol the wedge actively.

Phase 2: Aim – retake and dominate Boko Haram strongholds south of the wedge:

- 72 MSF had to retake Bama and Gwoza;
- 7 Inf Div had to occupy and dominate key areas and key terrain (elements of STTEP had to become embedded with those elements to train them in defensive warfare and area operations);
- 72 MSF had to conduct strike operations, and locate and annihilate Boko Haram in the area south of the wedge, including sweeping the Sambisa Forest area; and
- Elements of 7 Inf Div had to dominate the area with listening posts and mobile patrols, supported by NA air assault units.

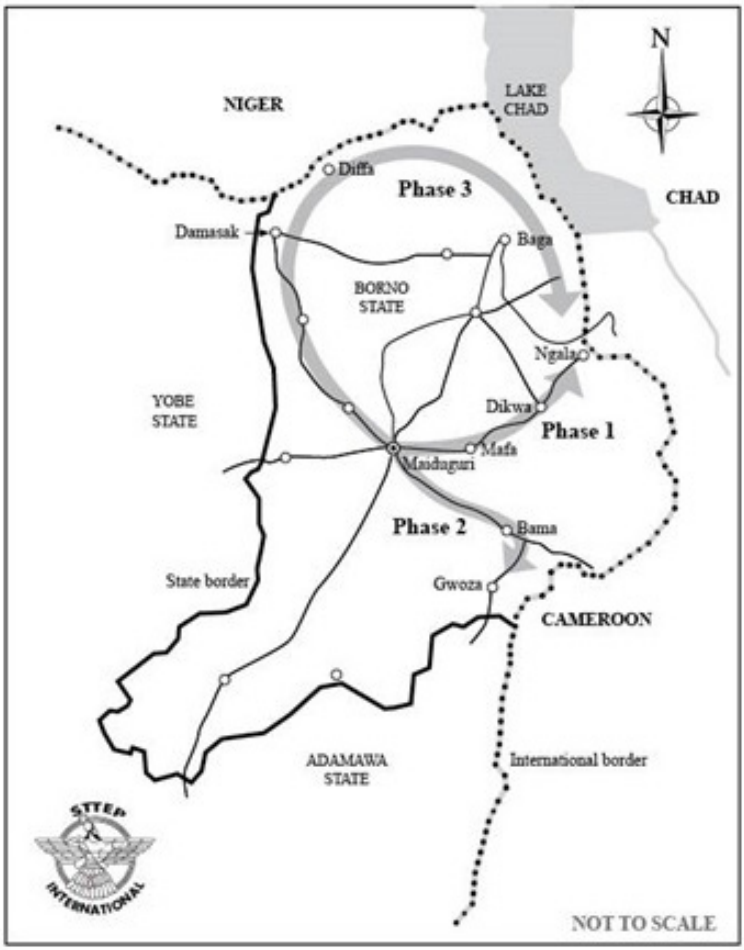

Figure 3: Broad strategic intent of Operation Anvil in Borno State, Nigeria[90]

Phase 3: Aim – retake and dominate Boko Haram strongholds north of the wedge:

- 72 MSF had to retake Damasak, Giri and Bosso to be occupied and defended by elements of 7 Inf Div;
- 72 MSF had to strike south and retake Baga, Doro Gowon and Gambaro;
- 72 MSF had to conduct area operations, and locate and annihilate Boko Haram elements in the northern sector of the "wedge"; and

- Elements of 7 Inf Div had to dominate the area with listening posts and mobile patrols, supported by NA air assault units.[91]

Preparing the equipment-deficient 72 MSF, along with the poor equipment delivery schedules of the Nigerian Army, the strike force had one month left in which to conduct anti-Boko Haram operations. It was realised the MSF would not be able to carry out the entire campaign strategy in that space of time. Despite the lack of critical equipment, it was argued that once the strike force and division started achieving operational success by destroying Boko Haram elements and retaking ground held by the Islamists, the government would allow the strike force to continue with the campaign strategy.

The recommended flow of logistics was formulated according to the lessons learned by EO in Angola and Sierra Leone. It was, as illustrated in Figure 4, structured according to line, echelon, and assembly area or headquarters-based support, and is generally structured as follows:

- First line: allocated to the fighting element (F echelon), this includes all stores (ammunition, FOL, rations, water, and medical) required for immediate combat operations, and was intended to last for three days.
- Second line: As there was no first line reserve, the second line fulfilled this role as African armies were unable to sustain the large logistical tailback required to enable the traditional A and B echelons.[92] This line included all stores and equipment not required for immediate battle. It was intended to last for five days, and these requirements had to be able to replenish the F echelon immediately. This line was kept at the Battle Group FOB. Battle-damaged equipment was recovered and delivered to the third line. Equipment that could not be recovered had to be destroyed *in situ*.
- Third line: kept at the Combat Operations Group (COG) assembly area (COGAA) or COG headquarters (COG HQ). This included all logistical requirements to maintain and repair recovered battle-damaged equipment, and replenish the equipment and stores drawn from the second line. The requirements of this line were held at the division assembly area (DAA) or HQ, and were intended to last for seven days. Battle-damaged equipment that could not be repaired at the COGAA was delivered to the fourth line.
- Fourth line: the division headquarters (Div HQ) functioned as an intermediate rear area for its forces. It held and provided all logistical requirements necessary to replenish the equipment and supplies of the division. It was kept at the Army Group assembly area (AGAA) or HQ, and was intended to last for fourteen days. If battle-damaged equipment could not be repaired at the AGAA, it was delivered to the fifth line, in effect, the rear area.
- Fifth line: this included all in-country defence-related and supportive industries. The fifth line provided the equipment and stores to replenish the AGAA or HQ, and on demand. Battle-damaged equipment that could not be repaired at this line, was disposed of.

- Sixth line: this encompasses all equipment, materiel, spares and such that had to be sourced, purchased and imported from foreign sources. It was at the sixth line that African governments usually fund themselves under foreign sanction, supply-lethargy, and/or sabotage.

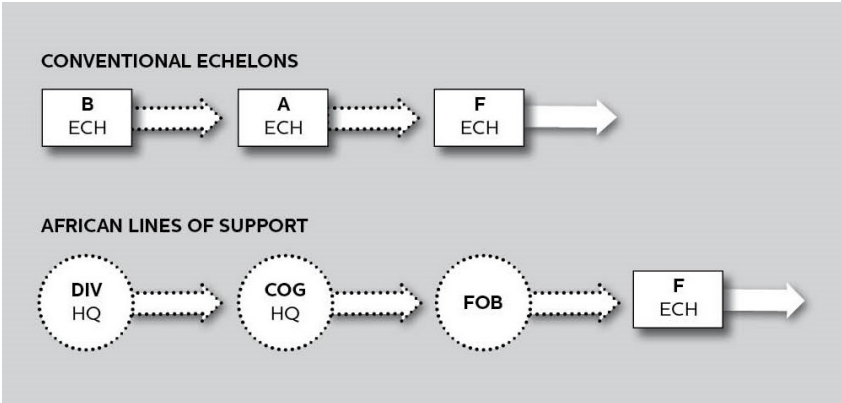

Figure 4: Comparative lines of support as employed by EO[93]

To sustain expeditionary military operations related to war (MORW) and military operations other than war (MOOTW), the logistical and supply chain system was based on a "use-and-replace" approach: As the F echelon expended its ammunition and other stores, it immediately replenished its outgoing stocks from the FOB. These, in turn, were replenished from the COGAA who was replenished from the DAA or the AGAA. The AGAA received its equipment and stores from the fifth- and sixth-line depots, factories, and warehouses.

To ensure an adequate fifth line, advance campaign planning and equipment and stores anticipation were critical to enable materiel to be identified, assessed, purchased, imported, and warehoused for future defence and/or pending operations. To ensure the immediate flow of logistics along the supply chain, logisticians had to ensure the delivery of:

- The correct equipment and/or materiel;
- At the correct amount;
- At the determined date and time;
- At the correct place;
- To the correct unit(s);
- In a usable condition; and
- In a cost-effective manner.

It was essential, during the campaign planning phase(s) and operational design development, that logisticians –

- Were granted access to classified intelligence data relevant to their area of operation;
- Were given sufficient early warning;
- Had clear guidelines for planning along with restrictions; and
- Were mandated to veto operations if they were unable to guarantee sustainment.

Logisticians therefore had to have a comprehensive understanding of the enemy, their weapons and weapon systems along with their obvious or predicted intent. They furthermore had to know how the enemy was supported by aid agencies, foreign governments, multinational corporations, and/or the local population.

Principles of Composite Warfare Logistics and Supply Chains

To sustain composite warfare campaigns and operations in Africa, regardless of whether they were expeditionary or not, were offensive, defensive, or containment-related, were being planned or already unfolding, the successful PMC supply chain, at a minimum, had to adhere to the following twelve basic principles:[94]

- **Expeditionary structure:** intelligence drives and informs strategy and strategy determines structure. The mission, ORBAT and TOE of the expeditionary force should determine what its logistical requirements will be. The supply chain structure, doctrine, staffing, training and leadership must ensure that all logistical requirements are met as rapidly as possible to sustain the operations.
- **Planned anticipation**: engagement during the initial development stages of campaign strategies, operational designs, and courses of action will enable logisticians to anticipate or predict the logistical requirements of the force – from ammunition to toilet paper – and be responsive. The engagement of logisticians from the outset and during the development of all campaign strategies, operational designs and courses of action is crucial to logistical sustainment of the forces. Anticipation can enable pre-stacking and resupply points to speed up the supply chain. During clandestine or pseudo-operations, extensive use must be made of caches. Planned anticipation can only be achieved by enabling access to available intelligence and intentions.[95]
- **Movement**: the logistical supply chain must have access to both horizontal and vertical mobility assets to enable it to integrate with the mobility of the expeditionary forces. It must ensure rapid logistical supply and replenishment and not hamper or slow down the operational momentum and tempo. Transportation assets must align with the operation and enemy threats – ground and air – as well as with terrain, local population challenges, infrastructure, and vegetation. This includes movement control, and the requisite protection and escorts where

necessary. Logistical night movement and replenishment can be extremely difficult if control is lacking.

- **Storage**: all anticipated logistical equipment requirements and stores must be stored safely and securely in the correct place and manner to ensure longevity, protection, and safety. Correct storage enables ease of positioning and replenishment. Storage areas can include rear area bases, staging areas or bases, and FOBs. Field storage and supply points must be considered. These areas must be protected from attacks by enemy air, artillery, and first-person view unmanned aerial platforms (FPV UAPs). Ammunition and explosives must be stored below surface level to ensure blast containment.
- **Adaptability**: the logistical supply chain system must transition rapidly to changing conditions, environments and situations. It must adapt to operational phase transitions without losing logistical momentum and the tempo of the resupply and replenishment of combat and other forces. Inclement weather conditions, vegetation, and day and night operations must not disadvantage or retard the supply chain.
- **Flexibility**: the supply chain command and control systems must be flexible and consider all approaches, challenges and problems that may be encountered. Overcoming logistical challenges and problems requires mental agility and improvisation. Flexibility is enhanced by utilising FOBs and other forward-staging areas from which to initiate the supply chain. It also entails locating and exploiting competent and vetted private contractors when there is a government or military transport deficit.
- **Simplicity**: the entire supply chain command and control system must be simple and allow for ease of rapid replenishment. Complex logistical systems are challenging and difficult to implement under arduous, dangerous and stressful conditions. Simplified request, replenishment, and stock control procedures and policies must be put in place – and adhered to.
- **Efficiency**: the flow of equipment and stores across all logistical lines must be efficient and rapid. Adaptable and robust supply chains add to efficiency. Speed or velocity control and oversight add to supply chain control and efficiency, in turn adding to sustained operational momentum and speed.
- **Responsiveness**: the supply chain must be responsive and able to cope with both emergencies and contingencies. Logistics can be prepositioned at staging areas and FOBs to enhance speed of supply chain efficiency. Field stacking may at times become necessary.
- **Control**: all equipment and stores must be controlled prior to and during all phases of MORW and MOOTW. Good administrative procedures ensure that logistical supplies are controlled from the point of origin to the point of consumption or the end user. Good control ensures the efficacy and rapidity of the supply chain. On campaign or operational termination, all issued and unused stores must be recovered and transported back to the originating HQ. Where repositioning of equipment and stores cannot be accomplished as a result of enemy pressure, such must be destroyed *in situ*.

- **Speed**: all delivery methods must be considered, and all routings must be assessed to ensure rapid delivery of critical materiel and items. Route and storage protection must be guaranteed. Delivery can be via vehicles, aircraft (including air supply), boats, civilian contractors, all-terrain vehicles, unmanned ground platforms, UAPs, and even mules and donkeys.
- **Recovery**: all stores not used during the campaign or operation must be recovered and transported back to the main logistics centres. Hazardous items that cannot be recovered or transported must be destroyed *in situ* without creating collateral damage to civilians and their properties or allowing their use by adversarial forces.

These twelve principles are proven EO guidelines that govern the planning, implementation, delivery and distribution of logistics to the forces that require them. These principles, originating from 1990s EO campaigns in Angola, Sierra Leone, Indonesia and elsewhere became the guiding logistical tenets for STTEP and are again being applied by the re-established EO.

Approaches to Supply Chain Delivery

As a PMC operating alongside and as part of the armed forces of a government – whether for domestic, cross-border or expeditionary operations – it is critical that the logistical supply chain is adapted to ensure rapid delivery under varying conditions and situations. To ensure adaptable and rapid supply chain flexibility and responsiveness, the following can be used and are used:

- Road delivery by the logistical units of the armed forces;
- Road delivery using civilian contractors;
- Airlanded delivery using the cargo aircraft of the air force;
- Airlanded delivery using civilian aircraft;
- Delivery by helicopter;
- Delivery by air-drop supply;
- Utilising the local population to assist with delivery;
- Harnessing government departments to effect delivery;
- Delivery by using naval or riverine forces;
- Utilising the military reserves or even militia forces to collect stores at field-stacking areas for delivery to frontline units.

Command and control during road movement from the logistical hubs to the combat zone is overseen by either the military police or by law enforcement or traffic officers. Where relevant, private security contractors may be employed to add value to the protection and flow of logistics.

On arrival, logisticians and their staff must immediately take control of all stores and their distribution. As stores are issued to units, new requests to replace outgoing stores must

be submitted to ensure rapid replenishment where necessary, especially on fast-moving items, such as ammunition, rations, water, FOL and medical supplies. This ensures that the logistical lines of support remain controlled, intact and functioning.

Where road movement is used, traffic control points must be deployed to monitor the flow of the movement and progress of the supply chain. Traffic control indicating time-past point (TPP) is essential to enable combat units to plan the receipt of equipment and stores timeously without affecting the tempo of operations negatively. During high-intensity operations, all supply chain road movement must occur on roads parallel to the main axes of the forces to ensure roads in use by the F echelon do not become clogged with traffic.

Conclusion

The engagement of EO by under-siege governments to assist in countering armed anti-government and hostile neighbouring forces across Africa and beyond compelled the company to reassess and adapt doctrines to numerous domestic and foreign challenges and hostile conditions. To support the offensive doctrines further necessitated adaptions and control mechanisms to support offensive operations. On occasion, this required the prepositioning of logistical requirements for sustainable offensive, defensive and containment operations.

Always integrated into the armed forces of a government and allowed to operate autonomously during operations, EO ultimately developed its own approach to warfare and its logistical support. This approach, as illustrated in Figure 4, has enabled African government forces to deploy and sustain combat forces with great success. Composite warfare has also confirmed that the projection of military force or hard power, along with the foundations of force sustainment during any expeditionary campaign is five-fold: intelligence, structure, mission, doctrine, and logistics.

An adaptable, efficient and well-structured, planned, correctly staffed, and controlled logistical system – as well as its associated supply chains – enables the continuance of campaign and operational momentum and tempo. This adds to force preservation, and reduces the fog and friction of combat.

The joint government–private military campaigns and operations in which EO and STTEP participated all achieved rapid and successful outcomes. Without planned logistics approaches, methods and techniques, success would have been impossible. A successful logistical system and its associated supply chain must be intelligence-driven and simple, and must avoid complications. Good logistical and supply chain administration ensures system simplicity along with the sustainment of the domestic and expeditionary forces.

Without a well-managed and efficient logistical structure and its supply chains, no PMC operation can add value to the campaign strategy of an under-siege government. It remains the most crucial element for force sustainment during expeditionary operations.

Endnotes

[*] The author served in conventional, clandestine and covert units in the SADF from 1974 to 1989. He established Executive Outcomes (EO) in 1989, and served as its chairman and chief executive officer (CEO) until 1997. He was the chairman of STTEP International Ltd from 2011 to 2020. After vacating the STTEP chair, he was requested by several African governments to re-establish EO. He is currently the chairman–CEO of the rebirthed EO.

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26 E Barlow, *Composite Warfare: The Conduct of Successful Ground Force Operations in Africa* (Pinetown: 30 Degrees South, 2016), 15.

27 Barlow, *Composite Warfare*, 15.

28 E Barlow, *The War for Africa: Conflict, Crime, Corruption and Foreign Interests* (Pinetown: 30 Degrees South, 2024).

29 Barlow, *The War for Africa*.

30 E Barlow, *Executive Outcomes: Against All Odds* (Pinetown: 30 Degrees South, 2018).

31 Located on the southwestern African seaboard, Angola was colonised by Portugal in the 16th century. Its anti-colonial struggle against Portugal began in 1961 and culminated in 1975 when Portugal abandoned Angola.

32 AJ Venter, *Battle for Angola: The End of the Cold War in Africa c1975–89* (Solihull: Helion, 2017), xxxv.

33 Venter, *Battle for Angola*, xxxv.

34 People's Liberation Army of Namibia.

35 The former was a South West African political and military movement, and the latter a South African liberation movement.

36 Venter, *Battle for Angola*, xxxix.

37 United Nations, 'Note Verbale Dated 22 December 1988 from the Permanent Representative of the United States of America to the United Nations Addressed to the Secretary-General', General Assembly, 22 December 1988. <https://peacemaker.un.org/sites/default/files/document/files/2024/05/ao881222tripartiteagreement28en29.pdf> [Accessed on 20 August 2025].

38 GJJ Oosthuizen, 'The Final Phase of South African Transborder Operations into Angola: Regiment Mooi River and Operations Modular, Hooper, Packer and Displace (Handbag), 1987–1988', *Journal for Contemporary History*, 28, 2 (2003), 105.

39 Initially aimed at countering the armed wing of SWAPO, Angolan military interference resulted in numerous clashes between the SADF and the Angolan government forces.

[40] At that time, the Angolan Armed Forces were known as *Forças Armadas Populares de Libertação de Angola*, or FAPLA.

[41] In contrast, it was the logistical structure and supply chain, along with a coherent logistics doctrine, that enabled the SADF to sustain its combat operations in northern Namibia and into Angola. These operations cost the Angolan forces dearly in terms of matériel and manpower.

[42] United Nations, 'Peace Accords for Angola (Bicesse Accords)', 31 May 1991. <https://peacemaker.un.org/en/node/9614> [Accessed on 8 June 2025].

[43] P Gleijeses, *Conflicting Missions: Havana, Washington, Pretoria* (Alberton: Galago, 2003).

[44] C Breytenbach, *Savimbi's Angola* (Aylesbury: Howard Timmins, 1980).

[45] Mr Shaun Cleary of Midrand-based Strategic Concepts.

[46] Barlow, *Executive Outcomes*.

[47] Venter, *Battle for Angola*, 46.

[48] Mmabatho was located in the Bantustan of Bophuthatswana during the apartheid era in South Africa. It served as the capital of Bophuthatswana, which was one of the "homelands" or Bantustans created by the apartheid government as a territory designated for Tswana-speaking people.

[49] Seabay Logistics, 'Port Codes: Soyo', Seabay Cargo', n.d. <https://www.seabaycargo.com/seaport/detail/Soyo_Angola_AOSOY.html> [Accessed on 20 August 2025].

[50] Initially known as a military advisory company, the term was later changed to "private military company".

[51] This brigade became known as 16 Brigade, and it spearheaded all FAA offensive operations against UNITA.

[52] The contract was resultant from initial successful EO engagement by a UK oil company to secure the harbour town of Soyo for its ongoing oil operations. Soyo was again lost to UNITA shortly after EO had left Soyo.

[53] Airports, Cabo Ledo Air Base, n.d. <https://www.airportprofile.com/airports/cabo-ledo-air-base.html> [Accessed on 8 June 2025].

[54] E Barlow, *Composite Warfare: The Conduct of Successful Ground Force Operations in Africa* (2nd ed.). (Pinetown: 30 Degrees South, 2025).

[55] This is a standard, internationally accepted manner in which forces ought to deploy for combat operations. It is referred to as "deployment drills".

[56] The FAA battlegroups were not clones of the SADF battlegroups. Their structures were later adapted as operations unfolded and culminated in a battlegroup structure encapsulated in Barlow, *Composite Warfare* (2nd ed.).

[57] The combat team was to develop Saurimo into a jumping-off point for later operations while simultaneously conducting area operations in the east of Angola while awaiting the arrival of the remainder of the combat teams of the battle group.

[58] Barlow, *Executive Outcomes*, 238.

[59] Composite warfare is an intelligence-driven, 'whole-of government' approach that integrates multiple domains of warfare, such as land, air, sea/riverine, intelligence, information and cyberspace, along with the pillars of state, to achieve a desired national strategic outcome. It is applicable to all offensive, defensive, and containment military operations related to war (MORW) and military operations other than war (MOOTW). It utilises and exploits a variety of approaches, tactics, techniques, technologies and procedures (TTTPs) and manoeuvre options to create a force that is greater than the sum of its parts. By leveraging the powers and strengths of each domain, composite warfare aligns and synergises all government agencies and departments along with relentless combat power to provide a decisive advantage on the battlefield. Underpinned by horizontal and vertical manoeuvre and firepower, feints, ruses and other deception measures, it is used to counter and deceive/destroy/neutralise a host of violent and non-violent threats, including an enemy invasion and an anti-government force (AGF) campaign. Combining elements of conventional, unconventional and covert activities, actions and TTTPs, it can triumph over guerrilla warfare, irregular warfare, asymmetric warfare, hybrid warfare, criminal warfare, insurgencies and such like. Correctly applied, it can destroy an enemy, compel an enemy to make decisions that disadvantages their forces or unintentionally expose their intentions. See Barlow, *Composite Warfare* (2nd ed.).

[60] The logistical supply chains would require covering distances in excess of 1 000 km (Cabo Ledo to Saurimo, Lunda Sul province) and 1 500 km (Cabo Ledo to Cafunfu, Lunda Norte province).

[61] UNITA was able to deploy 12,5-mm, 14,5-mm and 23-mm anti-aircraft guns along with Soviet-era SAM-7 missiles and US-supplied Stinger missiles.

[62] Barlow, *Executive Outcomes*, 744.

[63] At that time, the author was the chairman of STTEP International Ltd.

[64] A small medical clinic established at the town of Cacolo to treat the local population soon exploded into more than 5 000 people arriving daily for medical treatment. This initial disadvantage also provided advantages to the battlegroup, as the local population were keen to provide intelligence information on UNITA deployments and activities, enabling numerous pre-emptive strikes against UNITA forces.

[65] Barlow, *Composite Warfare* (2nd ed.).

[66] Forward-looking infra-red.

[67] Further hampering these unique challenges was a weaponised media aimed at vilifying government forces and incentivising restrictive international sanctions related to the sale of military equipment.

[68] Barlow, *Executive Outcomes*.

[69] Both the FAA and EO were subjected to a mass disinformation campaign run by agents of influence in the legacy media.

[70] The refusal by South Africa and Western governments to sell infantry fighting vehicles, artillery systems and ammunition to the FAA resulted in the government turning to Russia and China for such equipment.

[71] Situated in eastern Angola, Saurimo was an isolated and logistically starved FAA garrison. Located approximately 950 km from Cabo Ledo and Luanda, large tracts between Luanda and Saurimo were under control of a well-armed and equipped UNITA.

[72] Located approximately 190 km from Luanda, Vila Salazar was renamed N'dalatando in 1975.

[73] R Snyder, 'Exploring Cafunfo: Angola's Remote Diamond Mining Town', *Shun Culture*, 29 August 2024. <https://shunculture.com/article/is-cafunfo-in-angola> [Accessed on 9 June 2025].

74 The town served as UNITA's primary diamond mining hub.

75 Seabay Logistics, 'Port Codes'.

76 Barlow, *Executive Outcomes*.

77 Barlow, *Composite Warfare* (2nd ed.).

78 Barlow, *Executive Outcomes*.

79 Barlow, *Executive Outcomes*, 311.

80 University of Notre Dame, 'Cease Fire: Lusaka Protocol', Kroc Institute for International Peace Studies, n.d. <https://peaceaccords.nd.edu/provision/cease-fire-lusaka-protocol> [Accessed on 8 June 2025].

81 Following independence in 1960, the West African state of Nigeria has developed into Africa's largest economy. It has, however, experienced a plethora of assassinations, *coups d'états*, attempted coups, the suppression of dissent and the looting of state coffers.

82 DJF Jacobs, *Islamist Insurgency in Northern Nigeria, 2009–2020* (MMil Thesis, Stellenbosch University, Stellenbosch, 2024), 54.

83 CK Onah, '#BringBackOurGirls: Transnational Activism and the Remediation of the 2014 Chibok Girls' Kidnapping in Nigeria', *African Studies Review*, 67, 2 (2024), 295–296.

84 The contract was resultant from EO's highly successful hostage release operation on Indonesia's Irian Jaya. See Barlow, *Executive Outcomes.*

85 The Editors, 'Maiduguri: Nigeria', *Encyclopaedia Britannica*, 2025. <https://www.britannica.com/place/Maiduguri> [Accessed on 10 June 2025].

86 The Editors, 'Maiduguri: Nigeria'.

87 A composite warfare combat team has a very different organisational structure when compared with the typical SADF combat teams.

88 MRAP, an acronym for Mine Protected Ambush Resistant vehicle. MRAPs provide armoured protection from small arms force and ensure survivability in the case of a landmine explosion. Typically, MRAPs are used by motorised infantry forces.

89 The campaign strategy required a period of three months to achieve its ends. However, foreign political interference prevented phases 2 and 3 from being implemented.

90 Barlow, *The War for Africa*.

91 STTEP File/Nigeria: Campaign Strategy/Op design Operation *Anvil*.

92 Whereas the F-echelon comprises the forces and their equipment needed for immediate battle, the A-echelon comprises the immediate combat service support such as ammunition and FOL. It is usually located a tactical bound behind the F-echelon to enable immediate force sustainment. The B-echelon is less mobile and is located further behind the A-echelon. It conducts extensive maintenance, resupply and personnel recovery. It supports the A-echelon.

93 Barlow, *Composite Warfare* (2nd ed.).

94 Barlow, *Composite Warfare* (2nd ed.).

95 Logisticians must have the power to veto operations if they are unable to sustain them.

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Book Review

The Art of War and Peace: Understanding Our Choices in a World at War

David Kilcullen and Greg Mills

Cape Town: Penguin Random House South Africa
2024, 320 pages
ISBN 978-1-776-39185-1

Published in 2024, *The Art of War and Peace*,[1] by David Kilcullen and Greg Mills, has emerged during a volatile time where the stability of the post-Cold War order is in flux. War in Europe and the Middle-East has returned; the utility and use of nuclear weapons has become a serious concern again; authoritarianism and identity politics are on the rise; direct conflict between the United States (US) and China is no longer discussed only theoretically; and non-state armed groups supported by powerful state actors, continue to proliferate in regions where Western democratic influence is now being replaced by authoritarian influence. These security concerns are interlinked with economic uncertainty as the Trump administration applies wide-scale tariffs and shuns multilateral trade agreements.[2] As Nick Carter notes in the foreword to the book, the contemporary strategic context is now 'increasingly complex, dynamic and competitive'.[3] Kilcullen and Mills take a wide-angled view of the state of the world and broadly discuss not just how to win wars in this challenging context but, more importantly, also how to win a durable peace.

Together, Kilcullen and Mills bring vast experience and expertise to the nebulous subject of war and peace. Kilcullen, who served the US and Australian governments for 25 years and was named one of the Foreign Policy Top 100 Global Thinkers in 2009, is currently a professor at University of New South Wales (UNSW) Canberra. He is a soldier-scholar with vast experience in practicing and writing about guerrilla warfare, counterinsurgency, and counterterrorism. Mills, a prolific author on African political affairs, leads the Brenthurst Foundation in Johannesburg, is a member of the advisory board of the Royal United Services Institute, and is a former national director of the South African Institute of International Affairs (SAIIA). Significantly, both authors have advised governments in conflict zones, and have personal experience in traversing the difficult and treacherous path from war to peace.

The Art of War and Peace, perhaps invoking in its title an understated intellectual homage to Sun Tzu's *Art of War*, Clausewitz's *On War*, and Leo Tolstoy's *War and Peace*, is fundamentally about why conflicts escalate, why peace efforts fail, and how sustainable peace might be achieved. Kilcullen and Mills argue that Western thinking since the Cold War has neglected to focus on the objective beyond war, and how to translate battlefield

victories into enduring and advantageous political settlements.[4] The authors describe the de facto approach since the Cold War as a 'battlefield-centric micro-view'.[5] They go on to touch on a series of case studies of wars both "big" and "small", and emphasise three issues that need to be kept in mind when analysing modern warfare: First, war changes not only in its character, but also in its purpose. Second, they emphasise the importance of all elements of national power being applied to create resilience and deterrence. This point also touches on a thread that runs through the entire book: no one is isolated from conflict. In an integrated, connected world, everyone is affected by war, even those far away from the epicentre of war. Third, the Kilcullen and Mills emphasise the importance of credible deterrence. By this is meant the credible communication of national 'resolve, capability, and resilience' to deter aggression.[6]

In discussing bigger wars, the focus is on the conflict in Ukraine, the potential Chinese invasion of Taiwan, and the conflict in the Tigray region in Ethiopia.[7] For Kilcullen and Mills, Ukraine and Taiwan offer lessons about the crucial need for deterrence and the adoption of asymmetric methods, the integration of technology, and the dire need for strong local leadership and support from international allies.[8] The conflict in Tigray is described as flowing from a lack of leadership and how the lack of effective involvement by outside actors 'feeds the delusions of leaders'.[9]Although there is some resistance in academic circles to drawing explicit "lessons" from any conflict, the authors nonetheless come to crucial important conclusions about "big" wars. Keeping in mind especially the war in Ukraine – on which they argue the overall credibility of Western deterrence depends[10] – the authors flesh out problems related to, among others, the internal and external consequences of propaganda; the under- and overestimation of the role of technology; the link between how wars are fought and the way war shapes participants' ideas of future peace; and, the way military solutions in and of themselves are simply not enough to end wars.[11]

In discussing smaller wars – low-intensity, irregular, limited-objective conflicts – Kilcullen and Mills focus on Mali, Burkina Faso, Niger, Angola, Liberia, Iraq, and Afghanistan. As with their focus on "big" wars, the authors draw several practical lessons in the movement from war to peace in "small" wars. Lessons include not becoming obsessive about battlefield metrics; the importance for local leaders to take leadership and ensure the alignment between international goals and local goals; avoiding 'cockeyed theories and magic bullet solutions';[12] the importance of winning the trust of local populations; and putting a premium on human agency over technological assistance.[13]

With this broad sweep of conflicts, Kilcullen and Mills move to a more theoretical yet still grounded discussion on translating tactical successes into enduring settlements. What emerges is a succinct list of dos and don'ts that should be integrated into staff-level courses on strategy and perhaps hung in presidential offices around the world. Notable points include putting politics at the centre, not personalities; creating national narratives and not relying on victim narratives; being inclusive of all parties to a conflict; and not trying to negotiate separate deals with different sides of a conflict.[14]

For this review, the first notable point that emerges from the book is the authors' general insistence on non-military factors as these relate to the fighting and resolution

of wars, such as narratives, alliance dynamics, leadership, intelligence, diplomacy, and economics – all without losing sight of the role of the armed forces. Showing their Clausewitzean grounding, the authors ultimately teach that failures in conflict resolution can be attributed to failing to integrate these elements, especially the political dimension. This is not a controversial point or a particular new one, but it is one that unfortunately needs reiteration as global political and economic contexts continue to shift. This is also crucial as new leaders enter positions of power – leaders who do not necessarily have experience or extensive knowledge about the unpredictable political consequences of the use of force and who might maintain an unflinching faith in the decisive victory through overwhelming force. The second notable point is the authors' insistence that none is spared the consequences of conflict in a globalised world. Here is an interesting thematic overlay with Tolstoy's epic *War and Peace*, which echoes in the title of Kilcullen and Mills's book. Tolstoy was somewhat dismissive of the influence of "great men" and individual agency in directing history, famously claiming, with reference to Napoleon Bonaparte and Alexander the Great, 'kings are the slaves of history'.[15] Tolstoy emphasised the role of those not in positions of immense political or economic influence, and how the course of war and its consequences are shaped by the actions of many, stating, 'the course of history depends on the actions of all the people who participate in the event, and not on the will of one man'.[16] The overall point to be made is that in a world where none is spared the fallout of war, everyone has a role to play in addressing its course and resolution. At the very least, this means holding leaders fully accountable – not just for strategic choices as they relate to the fighting of war, but also for their narratives and choices that contribute to the wider context of the successful resolution of a war.

From the perspective of this review, the implication this book holds for the academy is not in its problematisation of war, but in its problematisation of peace. What is clear from the sheer variety of the case studies used in the book is that peace is not inevitable, that it can be misused for the purposes of war, and that peace does not guarantee its own continuation. While the strength of the book lies in the breadth of its scope, there is also an inherent weakness arising from this breadth, as many readers may find its treatment of individual cases to be cursory. Experts on individual cases will likely also identify contextual factors that the authors did not fully address in their analyses of such cases. Moreover, while the lessons the authors drew and the prescriptions that resulted from these lessons are analytically sound, their implementation remains profoundly difficult and complex and requires sound decision-making throughout societies, not just by individual leaders. With that said, it is clear that the authors indeed wrote the book not just for academics, strategists, and those in positions of political power, but also for the many – those who are not spared the consequences of war, who are not in positions of power, but who are able to hold leaders accountable through democratic mechanisms. The book is thus intended for wide readership, for anyone with an interest in political affairs, while it also serves as an excellent contribution to introductory courses in political science, international relations, and strategic studies.

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Endnotes

1 DJ Kilcullen & G Mills, *The Art of War and Peace: Understanding Our Choices in a World at War* (Cape Town: Penguin Books, 2024).

2 *Reuters*, 'Major Developments in Trump's Trade War', 21 August 2025. <https://www.reuters.com/business/autos-transportation/major-developments-trumps-trade-war-2025-05-26/> [Accessed on 29 August 2025].

3 Kilcullen & Mills, *The Art of War and Peace*, xiii.

4 Kilcullen & Mills, *The Art of War and Peace*, 70.

5 Kilcullen & Mills, *The Art of War and Peace*, 70.

6 Kilcullen & Mills, *The Art of War and Peace*, 73.

7 Kilcullen & Mills, *The Art of War and Peace*, 75, 96.

8 Kilcullen & Mills, *The Art of War and Peace*, 107.

9 Kilcullen & Mills, *The Art of War and Peace*, 107.

10 Kilcullen & Mills, *The Art of War and Peace*, 115.

11 Kilcullen & Mills, *The Art of War and Peace*, 119.

12 Kilcullen & Mills, *The Art of War and Peace*, 161.

13 Kilcullen & Mills, *The Art of War and Peace*, 158–66.

14 Kilcullen & Mills, *The Art of War and Peace*, 232–233.

15 L Tolstoy, *War and Peace*, L Maude & A Maude (trans.) (New York, Amazon Books, 2022 [1869]), 982.

16 Tolstoy, *War and Peace*, 982. The argument is also echoed by Aleksandr Solzhenitsyn, a Soviet dissident, who won the Nobel Prize in Literature in 1970 in part for his opposition to the Soviet state. Solzhenitsyn, in his book *The Gulag Archipelago*, emphasises the role of the citizens of a country, and how repression by a government cannot function in the first place if it were not for the passivity, fear and sometimes active collaboration of ordinary citizens. See A Solzhenitsyn, *The Gulag Archipelago* (New York: Vintage Classics, 2018 [1973]).

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Book Review

Professionals Talk Logistics: Sustaining Strategy and Operations

Jon Klug and Steve Leonard (eds.)

Hampshire: Howgate
2025, 210 pages
ISBN 978-1-9124-4067-2

Jon Klug, Dean at the United States Army War College, and Steve Leonard, from the University of Kansas School of Business, combine their experience in military strategy, leadership development and multiple deployments in this anthology dealing with logistics as a critical aspect in sustaining strategy and operations, and the implicit influence of logistics on military strategy.[1] The chapter contributions are written from the perspective of predominantly United States-based subject matter experts.

The volume journeys through three periods. The first considers the past as a critical aspect in any strategy or future planning in order to understand the past, its mistakes, its successes, and the lessons to be carried forward. The second focusses on the present, and on the way advances in technology influenced warfare, the ease of a supply chain or the disadvantage of a fragmented supply chain. In this section, attention is paid to the way technology shapes the present, its influence on current conflicts, and the way solutions are designed. The third period deals with the future of logistics in the contested supply chain concept, redefining of the supply chain, and new theory requirements. The influence of artificial intelligence (AI) on logistics is discussed, and the period concludes with a chapter describing a scenario of large-scale war in the Indo-Pacific theatre.

In Part I: 'Past: From Oxen to Studebakers', Leonard describes the principles of sustainment in Chapter 1 ('Horses, Camels, or Oxen? How the Great Captains Defined the Art of Logistics') with reference to prominent ancient military campaigns.[2] Here, the importance of understanding the strategic end-state and the flexibility in ensuring sustainment, is demonstrated. A clear understanding of systems and systems thinking in augmenting strategic intuition becomes imperative, culminating in the importance of "numeracy" in logistics, bridging the qualitative and quantitative dimensions. This chapter also reflects on the importance of data-centric or data-informed decision-making.

In Chapter 2 ('Does Logistics Drive Strategy, or Does Strategy Drive Logistics?'), Joe Walden explains that through eons,[3] interaction between strategy and logistics is evident, though situation-driven. Neither can disregard the other; breakdown between them results in an "operational pause", allowing logistics to catch up with the tempo of operation,

or to adjust the strategy to acquire the logistical balance. Walden therefore argues that there exists a symbiotic relationship between strategy and logistics – neither existing without the other.

In Chapter 3 ('What Ever Happened to the Arsenal of Democracy?') Tim Gilhool and Sydney Smith bemoan the reduced state of the American defence industrial base.[4] The American war production effort before and after the Second World War, illustrates the ability, in a concentration of effort and political will, to develop formidable industries. Economic, political and development pressures have however changed over time, and a competitive "worldwide industrial complex" now determines support military requirements. The present American administration seems to be inadvertently embracing the "arsenal of democracy".

Ren Granieri employs the case study of the Berlin Airlift (1948–1949) in Chapter 4 ('Strategy Short of War') to explain how airpower was used to overcome the Berlin Blockade, and how the projection of logistics worth many divisions, forced the Soviets to decide not to lay claim to the enclave.[5] Granieri demonstrates how the use of logistics as a strategy can avert war, although this may require unique systems or processes for delivery.

In Chapter 5 ('The Four Logistical Operations'), Richard Killblane argues that there often exists a conflict of interest[6] between operational planners who require maximum forces on the ground, and logisticians who need to influence the operational strategy and must ensure that, for instance, enough transport is available for the sustainment of the required forces. In this chapter, sustainment is discussed as the invisible factor that ensures victory or defeat. Killblane notes that, when the war effort goes wrong, the logistical pipeline is frequently blamed, but when it goes well, little mention is made of the logistic efforts.

In Part II: 'Present: Sustaining Contemporary War', Rich Creed emphasises why officers must have a thorough understanding of staff systems, and why they have to be able to appreciate and plan in each system (see Chapter 6, 'An Armor Officer's Perspective on Logistical Literacy'). The ability to assess the completeness of proposed plans of action of the combined staff is essential; and logistical exposure is paramount.[7] Creed explains the importance of the logistician as "the translator" and "interpreter" to close the divide between various planners, and between logistics and the manoeuvre elements, ensuring a balanced approach between projection and sustainment of forces.

In Chapter 7, titled 'The Operational Level of War and Logistics', Kevin Benson highlights the importance of constant interaction between policy, strategy and operations[8] in order to navigate the complexities in ensuring that a campaign is sufficiently supported successfully. Benson argues that the operational level of war is dependent on logistics. He emphasises that it is paramount that logistics are studied to ensure operational and strategic success.

In Chapter 8 ('At the End of a 6000-Mile Screwdriver' by Francis Park), the importance of strategy is emphasised and discussed reflecting on the three strategies followed during the American campaign in Afghanistan since 2001. The campaign starting off as a punitive act, followed by coalition-led combat operations, leading to eventual culmination with counterinsurgency and retrograde.[9] Park reiterates that strategy is a determinant to the logistical requirement, and that a clear relationship exists between strategy and logistics.

Large-scale conflicts are shaped by logistics, as explained by Jim Greer in Chapter 9, titled 'Logistics, Operational Warfare, and the War in Ukraine'.[10] Unique to this armed conflict is the extensive use of drone technology, demonstrating the combined use of operational science and art. Here, the Russo–Ukraine War illustrates that traditional military logistic processes cannot support the rapid changes required, and that contested logistics on the battlefield indicate that hybrid logistics will affect future conflicts.

In Part III: 'Future: Brave New Logistical World', Matt Evers ('Towards a Theory of the Supply Chain Environment') focusses the attention on the supply chain as precursor to logistical support for operations. Evers defines the supply chain environment as 'the aggregate of material, information, financial, and human capital factors that affect how humans and automated systems can transform, fulfil, and return products and services'.[11] Given that logistics traditionally does not consider the supply chain, armed forces often get bogged down by the way they think, train and consider logistics. Evers concludes that it requires a mental leap to consider the supply chain as domain-equivalent to strategic and operational environments.

In Chapter 11 ('Artificial Intelligence and Logistics on the Modern Battlefield') the future of AI and the application in logistics is investigated by Stacy Tomic, Michael Posey and Paul Lushenko. The authors created a model of interaction of four types of warfare, two levels of decision-making, and two levels of oversight when AI have to be considered.[12] The chapter discusses "centaur warfare" with human control over machines, "minotaur warfare" with machine control over humans, "AI-general" investing in AI applications with extreme latitude, and "mosaic warfare" embracing algorithms facilitating decision-making with human oversight. The conclusions, following the analysis by the authors, are that the AI-enabled battlefield may require more human oversight than anticipated. Moreover, the use of AI will enable resilient logistics, but the question of trust between the human–machine interface remains.

Chapter 12 ('Darwin Strategic Bastion') ventures into the near future and a second Pacific war scenario. The author, Mick Ryan, embroiders a vision of enough area to build a large logistical hub in Darwin with the housing coalition forces, crewed and uncrewed capabilities. The Russo–Ukraine War prompted major countries to expand force levels and increase national production capabilities, enabling strategic coalition force projection en masse. Whereas this proposed hub is a "strategic bastion", Ryan recognises the requirement of an additional strategic base at Manus Island that will enables the projection of forces in defence of Taiwan.[13]

Editors Klug and Leonard created a useful flowchart that clearly exhibits not only how logistics and strategy influence each other, but also of how this has happened universally over time, although it is not overtly discussed or acknowledged.

The book layout clearly incorporates the past, its lessons, the applications of the present, and the potential considerations for the future. Most of the chapters are easy to assimilate; however, there are highly technical chapters that require attention in reading for the non-logistician. The extensive referencing enables the reader to easily find additional comprehensive information on specific aspects.

The reader, strategist and logistician alike will find this work a compelling read that brings clarity to the need to avoid working in silos, as the complexities of modern warfare and the systems to sustain and enable operations have become interactive and interdependent. Important to note, is that empowerment lies in higher education of decision-makers and not in courses designed to build a superficial generalised knowledge of the logistical and strategic level concepts with deployment experience alone. Based on this book, the importance of strategic deployments in or closer to the theatre of operations, planned or anticipated, cannot be over-emphasised.

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Endnotes

1 J Klug & S Leonard (eds.), *Professionals Talk Logistics: Sustaining Strategy and Operations* (Hampshire: Howgate, 2025), 196–197.

2 S Leonard, 'Horses, Camels, or Oxen? How the Great Captains Defined the Art of Logistics', in Klug & Leonard (eds.), *Professionals Talk Logistics*, 7–14, 17, 18.

3 J Walden, 'Does Logistics Drive Strategy or Does Strategy Drive Logistics?', in Klug & Leonard (eds.), *Professionals Talk Logistics*, 21, 23, 27, 28, 31, 33, 34.

4 T Gilhool & S Smith, 'Whatever Happened to the Arsenal of Democracy?' in Klug & Leonard (eds.), *Professionals Talk Logistics*, 40–45, 48.

5 R Granieri, 'Strategy Short of War', in Klug & Leonard (eds.), *Professionals Talk Logistics*, 53, 54, 56.

6 R Killblane, 'The Four Logistical Operations', in Klug & Leonard (eds.), *Professionals Talk Logistics*, 71.

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11 M Evers, 'Toward a Theory of the Supply Chain Environment', in Klug & Leonard (eds.), *Professionals Talk Logistics*, 168.

12 S Tomic, M Posey & P Lushenko, 'Artificial Intelligence and Logistics on the Modern Battlefield', in Klug & Leonard (eds.), *Professionals Talk Logistics*, 173.

13 M Ryan, 'Darwin Strategic Bastion', in Klug & Leonard (eds.), *Professionals Talk Logistics*, 187, 192, 194.

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Book Review

War of Intervention in Angola, Volume 5: Angolan and Cuban Air Forces, 1987–1992

Adrien Fontanellaz, Tom Cooper and José Augusto Matos

Warwick: Helion
2023, 76 pages
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Africa has often been a theatre of proxy warfare, and the Angolan Civil War (1975–2002), particularly during its climactic years in the late 1980s, was no exception. Helion's *Africa @ War* series has steadily contributed to the body of literature exploring the intricacies of these conflicts, and *War of Intervention in Angola, Volume 5: Angolan and Cuban Air Forces 1987–1992*[1] stands as a testament to this. Written by Adrien Fontanellaz, Tom Cooper, and José Augusto Matos, *War of Intervention in Angola* offers an operational and tactical analysis of the aerial dimension of the conflict, focussing on the logistical and strategic implications of Cuban and Angolan air power during the concluding years of interventionist warfare in Angola.

From a logistical standpoint, this volume provides an illuminating study of how two ideologically aligned but logistically challenged air forces attempted to sustain combat operations over a vast and often inhospitable theatre. The complexity of supporting air campaigns in such a context – amid embargoes, limited infrastructure, harsh climatic conditions, and asymmetric threats – offers a unique opportunity to examine air power projection under duress.

War of Intervention in Angola is structured to provide an in-depth look at the evolution, deployment, and effectiveness of the People's Air Force of Angola/Air and Anti-aircraft Defence (FAPA/DAA) (*Força Aérea Popular de Angola/Defesa Anti-Aérea*) and the Cuban Revolutionary Air and Air Defence Forces from 1987 until the Cuban withdrawal in 1991. Fontanellaz *et al.* have built a narrative not only around air combat operations but also around the broader logistical architecture that enabled these operations – or in some cases, constrained them.

The volume begins with a succinct strategic overview, establishing the military–political framework that influenced air operations. By the late 1980s, the conflict had reached a point of escalation, with South African forces supporting UNITA (National Union for the Total Independence of Angola) and the Soviet Union and Cuba backing the MPLA-led Angolan government (*Movimento Popular de Libertação de Angola*). The air war intensified in response to South African deep-penetration raids and the strategic importance of the Cuito Cuanavale region.

One of the standout strengths of the book is its implicit, though sometimes understated, treatment of logistical challenges. The size of Angola, the lack of infrastructure, and poor road and rail networks meant that air operations were heavily reliant on air transport for resupply over long distances. The use of forward operating bases (FOBs), notably at Menongue, Lubango, and Cuito Cuanavale, necessitated a robust logistical tail to maintain airworthy status, munitions stocks, fuel supply, and personnel rotation.

Fontanellaz *et al.* detail how the Cuban air detachment, operating from bases in southern Angola, often contended with inadequate ground support infrastructure, a shortage of spare parts, and deteriorating airstrips. The Soviet Union attempted to alleviate this by providing Ilyushin Il-76 transports and Antonov An-12s, but these solutions were not always timely or consistent. Moreover, the harsh environmental conditions of dust, humidity, and high temperatures, took a constant toll on airframes, necessitating frequent unscheduled maintenance, and reducing sortie rates.

The Cuban and Angolan forces adopted various mitigation strategies, including cannibalisation of parts from grounded aircraft and the forward deployment of mobile maintenance teams. This, however, created a brittle supply chain where delays in one area could ground entire squadrons.

With reference to aircraft and maintenance logistics, particular attention is paid to the types of aircraft involved, especially the MiG-21bis, MiG-23ML, and Su-22, as well as rotary assets, such as the Mi-24 Hind and Mi-17. Each platform had unique logistical needs. The MiG-23ML, for instance, required a sophisticated maintenance regime, and high-grade aviation fuel was not always readily available in theatre. Fontanellaz *et al.* point out that Cuban technicians often had to improvise maintenance solutions, sometimes at the cost of aircraft longevity.

Another critical logistical insight pertains to munitions management. Precision-guided munitions (PGMs) were virtually absent, necessitating low-altitude, high-risk attack profiles that placed additional stress on both pilot endurance and aircraft systems. Bombs and rocket pods were sometimes manually calibrated on rudimentary equipment, further complicating standardisation and efficacy.

The integration of Cuban and Angolan air operations introduced additional logistical hurdles. Command and control (C2) systems were often fragmented, leading to duplication of effort and inefficient use of air assets. *War of Intervention in Angola* highlights several instances where poor inter-service coordination led to delays in air support or friendly fire incidents. This fragmentation extended to logistics, where overlapping chains of command complicated the prioritisation and allocation of resources.

Despite these setbacks, the authors note significant improvements in C2 and logistics by 1989, particularly with the establishment of joint operations centres and the introduction of Soviet advisors specialising in air operations logistics. This professionalisation, albeit

partial, helped the Cubans and Angolans to increase sortie rates during critical operations around Cuito Cuanavale.

From a military logistics viewpoint, one of the most important themes is how air power shaped and enabled ground operations. Tactical airlift, medevac capabilities, and close air support (CAS) missions were vital in allowing FAPLA (People's Armed Forces for the Liberation of Angola) to extend its operational reach. Air superiority over UNITA-controlled areas allowed the deployment of light mechanised units into otherwise inaccessible regions.

Logistics limitations however meant that such operations were highly localised and often short-lived. In the absence of a robust logistical backstop, even successful offensives stalled as ammunition and fuel ran low. Fontanellaz *et al.* skilfully convey how the tempo of operations was dictated less by strategy than by logistical feasibility.

The withdrawal of Cuban forces from Angola beginning in 1989 marked a turning point. The drawdown itself became a major logistical undertaking. Dismantling airbases, redeploying aircraft and equipment, and maintaining operational readiness during the phased withdrawal required a high degree of logistical coordination. The book captures this well, describing how equipment was either repatriated, handed over to Angolan forces, or destroyed to prevent capture.

This section of the book also touches on the broader strategic implication of the withdrawal, namely the handover of logistical responsibilities to Angolan forces, who were often ill-equipped to manage them. The legacy of Cuban logistical networks, both in terms of physical infrastructure and training, would influence the operational capabilities of FAPA/DAA for years to come.

As with other titles in the *Africa @ War* series, *War of Intervention in Angola* is visually rich. Aircraft profiles, tactical maps, and photographs enhance the reader's understanding of the logistical challenges discussed. Particularly commendable are the annotated diagrams showing airbase layouts and aircraft loadouts.

The use of Cuban and Angolan sources, alongside Soviet-era documents and first-hand accounts, lends credibility and nuance to the narrative. Some of the more technical logistical data would however benefit from tabular representation or appendices for quick reference.

In conclusion, *War of Intervention in Angola, Volume 5* is a concise yet deeply insightful examination of the air power component in one of the most consequential late-twentieth-century conflicts in Africa. For logisticians, military historians, and defence analysts, the book offers valuable lessons in the practical limitations and improvisational requirements of sustaining air operations in austere environments.

By focussing not only on combat outcomes, but also on the behind-the-scenes realities that shaped them, Fontanellaz *et al.* provide a holistic view of air warfare in Angola. The result is a compelling chronicle of how logistical challenges can shape, constrain, and occasionally dictate military strategy. Despite its brevity, *War of Intervention in Angola* stands as a significant contribution to the field of military logistics and African conflict studies.

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Endnotes

[1] A Fontanellaz, T Cooper & JA Matos, *War of Intervention in Angola, Volume 5: Angolan and Cuban Air Forces 1987–1992*, Africa@War, Vol. 63 (Warwick: Helion, 2023).

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Book Review

Handbook of Military Sciences

Anders McD Sookermany (ed.)

Cham: Springer
2025, 48 chapters
ISBN 978-3-0300-2866-4

The *Handbook of Military Sciences*,[i] edited by Anders McD Sookermany, is an excellent reference book to gain an understanding of the military and many of the sciences related to it.[1] This edition of the handbook is an interdisciplinary reference work published by Springer, consisting of 48 chapters that comprehensively delve into the vast domain of military sciences. The book could serve as a crucial resource for academics, military professionals, and policymakers seeking a deep understanding of contemporary military issues.

Covering the field of military sciences in a single book is a daunting, almost overwhelming task. The discipline of Military Science covers so many topics that it would be impossible to cover every topic in one volume, not even in several volumes. What is more effective is to cover several topics that would pique an individual's interest to follow up and to study in depth. In my opinion, this volume achieves this admirably.

Unlike traditional textbooks that cover military topics that may focus primarily on strategy, tactics, leadership or history, this handbook integrates insights from several fields of study. Various areas are covered, such as operational art, psychology, sociology, political science, religion, and engineering. The final product is a holistic and broad overview of military topics, such as military strategy, operations, technology, cybersecurity, logistics, human resources management, resilience, human behaviour, leadership, and ethics.

Since at the time of writing, the hardcopy version of the *Handbook of Military Sciences* was scheduled to be published at a later stage, the reviewer cannot comment on the actual structure of the book or on the ease of navigating and locating relevant information. The chapters in the open access volume however allow readers to approach the handbook either as a reference work for specific inquiries or as a comprehensive study guide.

The key strength of the handbook is the interdisciplinary nature of it. More than 80 authors from more than 30 institutions across 15 countries contributed, thereby providing the

[i] The *Handbook of Military Sciences* is a 'living reference work' that was reviewed in 2025, with many chapters updated on different dates. See A Sookermany (ed.), *Handbook of Military Sciences* (Cham: Springer, 2026). https://link.springer.com/book/9783030272784#about-this-book [Accessed on 1 January 2026]

handbook with diverse perspectives and expertise. This collaborative effort enriched the content, and provides readers with a global viewpoint on military sciences. By incorporating perspectives from various academic fields, the book offers a nuanced analysis of military institutions, warfare, and defence strategies. The inclusion of contemporary challenges, such as hybrid warfare, artificial intelligence in military applications, and the role of international organisations in conflict resolution, makes it highly relevant in today's geopolitical landscape.

Furthermore, several of the chapters of the book strike a good balance between theoretical depth and practical applicability. Military professionals will find value in its case studies and strategic insights, while scholars will appreciate its rigorous research foundation. In general, the contributions are well researched and cite a broad range of sources, making it a valuable academic resource.

Despite its comprehensiveness, the vast scope of *Handbook of Military Sciences* may be overwhelming for some readers, especially those looking for an in-depth introduction to military sciences. In some of the chapters, the focus on theoretical aspects that were not illuminated or supported with historical case studies or practical examples was too broad. For a student or "armchair general" who lacks the practical operational experience or technical expertise, some of the chapters might be too theoretical to comprehend fully. Additionally, while the book provides an extensive examination of Western military doctrines and practices, a broader inclusion of non-Western perspectives could enhance its global relevance further. As an operational psychologist, I appreciated those chapters that focus on the role of psychology in the military but missed emphasis on the role of psychologists as operational force-multipliers or in the field of performance development and enhancement.

The book contains many noteworthy chapters, but considering its length, only a selection of interesting, well-written and insightful chapters receives particular attention in this review. It should be emphasised that there were very few chapters that the reviewer did not find interesting. The chapters discussed here, are in no particular order.

'Military Behavioral Sciences: An introduction' by Irina Goldenberg: This chapter provides a meso-level orientation of all the disciplines involved in the study and application of human behaviour in the military. It refers to the usual subjects, such as military psychology, sociology, and anthropology but also to more unfamiliar fields, such as biology and environmental studies.

Quite revealing is the organisational level at which research is being conducted by research institutes. The examples used in this chapter illustrate the importance of why research should be conducted and communicated at the strategic decision-making level in order for it to be turned into policies that are actionable at the tactical levels. It should answer the questions of 'So what?'. To emphasise this point, Irina Goldenberg quotes McFate *et al.* (2012) in this chapter, when she says 'The military as a customer of social science

knowledge, wants to apply whatever they learn to solve problems in a timely, practical manner'.[2] Human behavioural research for the military should therefore not just be done for the sake of research or to increase knowledge, but rather to find solutions to practical problems.

Another topic that the reviewer found novel and quite interesting was the role of national and international think-tanks and organisations to generate and sponsor applied research. Goldenberg also discusses how these organisations serve as conduits between various research groups and stakeholders, such as universities, military academies, military research institutes and other stakeholders.

'Intelligence in Military Missions: Between Theory and Practice' by Sebastiaan Rietjens: The reviewer really enjoyed the manner in which this chapter was written. Rietjens manages to illustrate how the function of intelligence has changed from a "puzzle" that needs to be "built" through a systematic process that would provide answers to a process of "complex sense-making" that would lead to a better understanding of "wicked" situations without definite answers.

Rietjens illustrates this change in emphasis by contrasting how both the approaches play out differently in the intelligence cycle illustrating the contrast – using examples from the "New Wars" in Afghanistan, Mali, Syria and Iraq. The chapter closes with a brief discussion on the attention (or lack thereof) that have been paid by scholars to study military intelligence, mainly focussing on the limitations in and the reasons for doing so.

'Rationality and Irrationality in Military Organizations' by Joseph Soeters: Throughout the ages, soldiers have understood that rationality and irrationality are two sides of the same coin. The same dichotomy of rationality–irrationality has contributed to the design of organisations and technology that have carried forward massive leaps in development and social change in societies. Prime examples of this are the organisation – some would say militarisation – of labour during the Industrial Revolution according to a system copied from military organisations. Not only did this contribute to the organisation and coordination of labour but it also influenced the modernisation of management philosophy.

This chapter further reports on investigation into and discusses the role that rationality played in the standardisation of processes and procedures in society, including the military – often referred to as 'McSoldiering' (p. 7). Soeters discusses the influence, both positive and negative, of 'McSoldiering' (pp. 7–8) on the effectiveness of operations and military leadership thinking.

The debate around the manner in which decisions are made in order to balance the chaos, uncertainty and ambiguity of war with control, structure and order is at the heart of this chapter. This is a debate that should be held more often by those who are serious students of the military and military leadership.

‘Training-related Stress and Performance in the Military’ by Oshin Vartanian, Cathy Boscarino, Jerzy Jarmasz and Vlad Zotov: As an operational psychologist who is often involved in the training of military personnel, the reviewer found this chapter fascinating for its insights and well-written discussion. The findings on the enhancing effect of positive mood on performance during high-intensity and high-risk training are particularly interesting. The impact of DHEA-S[3] to lower cortisol and to improve performance under stress by improving information processing, such as working memory, was distinctly useful. Furthermore, the findings in terms of the value of working memory as a predictor of stress-resiliency are thought-provoking, and should be pursued further.

‘Military Leadership: Concepts and Theoretical Approaches’ by Franz Kernic, Martin Elbe and Gregor Richter: This chapter provides perspectives on the different theoretical approaches to military leadership. The chapter is however somewhat inconclusive, which is probably a reflection of the ambiguity in this field. In addition, while there seems to be more clarity in terms of what practically constitutes a good or efficient military leader, there is a gap in the theoretical domain.

‘Empirical Research on Military Ethical behaviour’ by Deanna L Messervey & Erinn C Squires and ‘Military Leadership and Ethics’ by Peter Olsthoorn: Although these two chapters are separate chapters in the volume, they are conceptually related, and are therefore discussed together. Both chapters are well researched, providing practical, actionable proposals grounded in theory. The chapters comprise an important link between behaviour in operations, leadership, and ethics. In, ‘Military Leadership and Ethics’, Olsthoorn argues that the two concepts “ethics” and “leadership” are actually inseparable. This argument is important, based on the research findings that highlight the facilitative influence of leadership on ethical behaviour as well as the development of ethical behaviour by both military leaders and their subordinates. This is a crucial finding that needs to be considered seriously both for further research and for inclusion in military development courses.

‘Military Leadership and Resilience’ by Danny Boga: This chapter provides a good summary of what resilience is, but is somewhat one-dimensional, both in the definition as well as in the theoretical approach upon which it is based. Although there are some emphases on the dynamic nature of resilience, Boga focusses only on resilience as a trait within an individual. This approach disregards the view by O’Neil & Kruger (2022), that resilience is also a process of ‘learning and adapting’ to adverse conditions, that include individuals, groups and organisations.[4] Apart from this, the chapter highlights interesting research results in the development of resilience with several practical findings that can be turned into actionable strategies.

‘Anthropology of the Military’ by Maren Tomforde and Eyal Ben-Ari: I found this chapter convincing as it highlights areas that have been studied by scholars – such as the use of violence and power that is integral to societies and military forces but that has been somehow neglected within the military community as seen from this perspective.

One part of this chapter that was quite engaging was on teaching cultural competence. This section focusses on the part played by anthropologists in operations as force-multipliers. Here, Tomforde and Ben-Ari discuss how anthropologists are used to prepare and enhance operational effectiveness by teaching cultural awareness, intercultural competence, and what is in general referred to as "cultural intelligence".

'History and Development of Military Psychology' by George R. Mastroianni: This chapter highlights the modern necessity for psychology as a discipline but also links it to its classical roots in ancient Greece. Mastroianni highlights the fact that military psychology is an ever-changing discipline that adapts as the context changes to become a strategic force-multiplier. Simultaneously, the author managed to convey the importance of remembering that human nature remains relatively unchanged, despite technological advances. This necessitates that, as the character of warfare evolves, military psychologists should continuously balance the need to enhance military performance while simultaneously caring for the humans that practice war. Related to this dichotomy, but not addressed in this chapter, is the role of ethics for psychology and the role that psychologists play in the field of operational psychology and performance enhancement.

To conclude, the reviewer found *Handbook of Military Sciences* an extremely useful reference tool. Its interdisciplinary approach, comprehensive coverage, and contemporary applicability make it quite relevant and a "must-have" publication in the field for people who are engaged in the practice of military science. Furthermore, anyone who is a serious scholar of the military sciences – as all professional soldiers should be – would be able to use this handbook productively both as a reference source as well as a teaching tool.

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Endnotes

[1] A Sookermany (ed.), *Handbook of Military Sciences* (Cham: Springer, 2025).

[2] I Goldenberg, 'Military Behavioral Sciences: An Introduction', in A Sookermany (ed.), *Handbook of Military Sciences* (Cham: Springer, 2022), 7 with reference to M McFate, B Damon & R Holliday, 'What Do Commanders Really Want to Know? U.S. Army Human Terrain System Lessons Learned from Iraq and Afghanistan', in SH Laurence & MD Matthews (eds.), *The Oxford Handbook of Military Psychology* (New York: Oxford University Press, 2012), 102.

[3] DHEA-S refers to the levels of dehydroepiandrosterone-sulphate (DHEA-S) in one's blood. One's adrenal glands make DHEA-S, a steroid hormone found in all genders. The body converts DHEA-S into androgens (testosterone and androstenedione) and oestrogen.

[4] JW O'Neil & L Kruger, 'Mindset as a Resilience Resource and Perceived Wellness of First Responders in a South African Context', *Jamba-Journal of Disaster Risk Studies*, 14, 1 (2022), 1–10.

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Book Review

Point of Failure: British Brigadiers in France and Norway 1940

Philip McCarty

Warwick: Helion
2025, 228 pages
ISBN 978-1-8045-1427-6

The book, *Point of Failure: British Brigadiers in France and Norway 1940*, is the output of a doctoral thesis and maintains the academic structure in its published format. The content however, is the culmination of years of military experience and academic labour, representing a unique insider view of the British Army. The study reported here makes a unique contribution by using a modern analytical technique, namely social network analysis, in a historical context.

The book concentrates on the brigadier rank of military officers, tracking the career progression of 156 British Army officers who held the rank in 1940. The brigadier held a unique position in the British Army in the Second World War (1939–1945), being predominantly a temporary rank at the time. The main focus of *Point of Failure* is to peel back the layers of networks that enabled these officers to progress to higher command during the war. The book addresses multiple gaps in literature. Firstly, few studies have been conducted on the middle echelon of command, specifically brigadier-level, caught between the tactical and operational levels of war. Secondly, within military history where the narrative approach has dominated, McCarty chose a thematic analytical approach. Thirdly, the author uses a lesser-used method, social network analysis, to explore the multiple linkages between the officers under consideration qualitatively. He points out that this technique has been used by military intelligence analysis to understand connectivity within adversary organisations. The mathematical nature of this technique (which includes statistical analysis of proximity) and its origins in military intelligence work, means that historians have been wary about applying the technique in their work. The most notable exception is Niall Ferguson, who argues that social network structures have had a significant influence on events.[1]

McCarty conducted a prosopographic study, where a group of carefully selected people are handled as a 'collective biography' where characteristics are averaged across the group, to flesh out the biographic data that are required to undertake a social network analysis.[2] He fully exploited various archives, biographic directories, obituaries, published lists and newspaper articles to place each candidate in time and place.

The author discusses the various networks in a logical, chronological manner. Chapter 2 covering the early life (formative years) of the officers, focussing on family, education and commissioning regiments. Chapter 3 covers the career development of officers during the interwar period, focussing on their training and postings. Chapter 4 reports on the wartime career advancements of officers to identify key trends and traits. Chapter 5 provides a discussion of the identified group through the social network lens, with the final chapter presenting findings and conclusions.

Despite an in-depth discussion regarding social networks in the British Army, McCarty limits himself to analysing time periods where the experiences of these officers directly overlapped – in upbringing, training or operations. Such analysis, although rigorous, means that common experience and direct social interaction are held at a premium. As a result, many of his conclusions are cautious. He argues, for instance, 'there are no evident "rings" among the officers, based either on places served, or officers served with or under. There is some evidence of patronage'[3] and

> The assertion by Bowman and Connelly that the Edwardian officer corps was dominated by the products of six great schools is not borne out among this group of officers, although over half did come from schools of the Clarendon Group and the Headmasters' Conference.[4]

In this regard, the author could have used the ideas of Bourdieu regarding "social capital" and "habitus", to strengthen his arguments and to provide a strong philosophical underpinning to the study.[5] By doing so, the narrow focus of direct engagement between officers could have been broadened to argue that similar contexts generate similar social capital and habitus, thereby identifying networks of loyalty between soldiers who had attended the same schools and training colleges, and deployed to key operational areas at different times. In this way, the 'old school tie' loyalties (p. 73) could have enriched the qualitative analysis, providing another layer of networking and loyalty.

The tables, figures and photographs reproduced in *Point of Failure* retain the look and feel of a thesis rather than a popular history book, and in this regard, the publisher could have refined the end-product. The layout of graphs is minimalistic and technical aspects, such as table labels being either cropped or not included, unfortunately detracted from the overall presentation. The tables bombard the reader with information, and require explanation in the text. Presenting the data in network diagrams, more focussed tables, and graphs would have made the information more accessible to a person not familiar with the use of social network analysis.

McCarty's rigorous and structured analysis of the British Army brigadiers of the Second World War shows that many assumptions regarding the influence of upbringing, training and experience on promotions in the British Army were overstated. Although the majority of brigadiers attended public school, no specific public school guaranteed promotion. Similarly, no specific regiment gave the brigadiers an advantage for advancement, nor

was there evidence that schools channelled their learners to preferred regiments. Despite finding little evidence of "rings" of officers, McCarty concedes that Generals Alanbrooke and Montgomery did exercise a limited degree of patronage. This could however be attributed to their role of directing staff at the Staff Colleges, which allowed them to "talent spot" among promising students. McCarthy however correctly de-emphasises this point by arguing that the attendance of Staff College, the Imperial Defence College, and operational experience, played a deciding factor in rank advancement. The book stands as an important contribution both in the application of social network analysis and in understanding the British Army culture during the Second World War.

Graeme Plint
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Endnotes

1 P McCarty, *Point of Failure: British Army Brigadiers in The British Expeditionary Force and North Western Expeditionary Force, 1940: A Study of Advancement and Promotion* (Warwick: Helion, 2024), 19.

2 K Verboven, M Carlier & J Dumolyn, 'A Short Manual to the Art of Prosopography', in KSB Keats-Rohan (ed.), *Prosopography Approaches and Applications: A Handbook*, (Oxford: Linacre College, 2007), 35-69, 39.

3 McCarty, *Point of Failure*, 197.

4 McCarty, *Point of Failure*, 198.

5 See, for instance, P Bourdieu & J-C Passeron, *Reproduction in Education, Society and Culture* (London: Sage, 1990).

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