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The worst of both worlds:

An analysis of urban littoral combat

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CONFLICT THEORY AND STRATEGY SERIES

This paper is part of the Occasional Paper – Conflict Theory and Strategy Series and is published in line with the Chief of Army's primary task for AARC: to foster knowledge and debate about the profession of arms. Since warfare began, military leaders have considered what they do and studied the theories behind their actions. Today we study many of these thinkers and writers from the past while considering how their thinking fits into the modern construct of warfare both now and into the future. The unique challenges of modern conflict prompt the military thinkers of today to study the theory of warfare with renewed enthusiasm. This paper, and the others in this series, will add significantly to the body of knowledge in the area of conflict theory and strategy.

Introduction

> *With respect to their cities, later on, at an era of increased facilities of navigation and a greater supply of capital, we find the shores becoming the site of walled cities, and the isthmuses being occupied for the purposes of commerce and defence against a neighbour.*[1]

Thus wrote the Athenian, Thucydides, some two thousand years ago. Describing the geography, the demography and military status quo before the outbreak of the Peloponnesian War, he noted the particular situation of urbanisation along coastlines and the ramifications this had for the conduct of land and maritime operations. Indeed, Thucydides' history remains a wealth of information on diplomacy, the nature of warfare and the conduct of operations. He described the utility of naval power for force projection; it was 'the means by which the islands were reached and reduced.'[2] He also noted the manpower-intensive nature of fighting in and around cities; 'summer and winter the Athenians were worn out by having to keep guard on the fortifications, during the day by turns, by night all together.'[3]

As the Peloponnesian Wars demonstrated, the projection of power onto mainland coastlines or islands is not a new concept. This type of operation combining land forces launched from the sea would later be codified and developed into the concept of amphibious operations. Likewise, the need to besiege, capture or reduce cities has long been a staple of warfare, as cities were recognised as prized hubs of wealth, population or political prestige. Yet, if the political and strategic benefits of both types of operations were recognised by strategists and decision-makers, the associated difficulties and costs in planning and executing such operations were also recognised by those tasked to conduct them. Hence, through military history, two

truisms have come to the fore: that amphibious operations are the most complicated operations to resource and plan and that urban operations are meat grinder affairs exacting a terrible toll in time, blood and treasure. Many military thinkers suggest that amphibious operations, difficult at the best of times, are no longer feasible in the modern age, while others have long warned that fighting in the cities must be avoided at all cost.

Background and context of the problem

This is a paper about fighting in cities on coastlines – the contemporary topic of the combat in the 'urban littoral'. This paper argues that urban littoral combat is the 'worst of both worlds' and brings together two of the most difficult forms of warfare – urban and amphibious operations. As Thucydides demonstrated, the idea of the 'urban-littoral' – that is cities or conurbations able to be influenced or controlled by seaborne forces, is not new. However, the modern world is somewhat different to the Greek mainland and Aegean islands of 430 BC. Eighty per cent of all countries border the sea and ninety per cent of the world's population lives within one thousand kilometres of a coast. Perhaps more importantly, sixty per cent of the world's politically significant urban areas sit within one hundred kilometres of the coast. All seaborne trade starts and ends on a coast and the seas remain the primary conduit of international trade. Ninety-five per cent of international communications are transmitted by submarine cable. Indeed one scholar has noted that 'the importance of the world's oceans and seas to the economic well-being and security of nations and to the projection of power has perhaps never been greater than it is today.[4]

Why is this topical and worthy of study to Australian military professionals? There is a certain urgency to understand the urban-littoral and more importantly to understand what the military ramifications are to project, manoeuvre and sustain a force in such an environment. Historically these forms of combat were avoided wherever and when ever possible; in the future, it is unlikely that Western militaries will have such a luxury.

The Australian Defence Force (ADF) has committed to developing an amphibious capability as the keystone of a wider but as yet largely undeveloped Australian maritime strategy. For an island nation enmeshed in the world of global trade facilitated by free access to the region's oceans, Australia is perhaps unusually late in undertaking this intellectual journey to understand, refine and implement a maritime strategy. There is much

to be done to translate this nascent Australian amphibious concept – built largely around the acquisition of specific naval platforms – into a cogent, joint, combined arms and robust capability that nests with an Australian maritime strategy.

Similarly, the Army is also grappling with the ramifications of its role in any future maritime strategy. On a basic level, this is first a question of integrating a battalion group onto these new amphibious platforms and then determining how it conducts operations ashore. But subsequently, Army will also have to think about the wider question of projecting land power from the sea, including the difficulties of logistics, the deployment of follow-on forces and the command and control of land forces from a variety of platforms, into various environments, all while integrating with joint and allied organisations.

For the Army to answer these questions, it must first understand the future operating environment of the Indo-Pacific region. This includes understanding the identified mega and meta-trends and how they will affect the region in which the Australian maritime strategy will be conducted, and in which the amphibious capability would most likely operate. The Army must also understand the nature of conventional and non-conventional urban operations and the nature of amphibious operations. These will be the operations most likely to be conducted as part of a maritime strategy in the future operating environment.

There is a large body of work to date that has examined aspects of this same problem. These include works on maritime strategy, histories and case studies of amphibious operations, analyses of urban operations, papers on Australia's historical and aspirational involvement in maritime and amphibious operations and analyses of future warfare and the future operating environment. This paper aims to add to the body of work and seeks to provide a coherent understanding of the future operating environment within the urban littoral. From here, a working précis of the military ramifications of this environment will be developed. From this précis we may seek some 'rules of thumb', constants and friction points for military operations in this environment.

This paper is a primer on urban littoral combat. It will conduct a descriptive and comparative analysis of amphibious and urban combat to glean lessons from the past that provide insights for the future. It is not designed to critique

every aspect of the current Australian amphibious capability, nor will it exhaustively list and detail technical aspects of the main platforms. Instead it is hoped that the insights gained from the study will assist the Army and the ADF to develop the capabilities required to support a rational yet nascent Australian maritime strategy. In particular the paper seeks to inform the Army and the ADF enough, to ensure that its amphibious capability – indeed the entirety of war-fighting capabilities – are configured to operate in the future operating environment within the urban littoral.

This paper will include three chapters. Chapter 1 seeks to define and understand the urban littoral through an analysis of urban trends, geographic realities and other societal influences. Chapter 2 grapples with the concept of urban littoral combat. In large part, this will be done through studying historical examples of urban and amphibious operations, seeking trends and constants. The question will be asked as to whether urban-littoral combat is a complex system and whether non-linear effects are present. Chapter 3 thinks about the future. Australia has made, and will continue to make, truly far-reaching strategic decisions in relation to developing an amphibious capability to operate in the Asia-Pacific region. As such, the future cannot be the proverbial 'foreign land'; military professionals must have ideas and tools to take the 'long view'. Chapter 3 aims to conceptualise future urban littoral combat and in doing so discuss ramifications for strategists and decision-makers, ADF war-fighting capabilities and the wider Australian population.

Propositions

This paper is based on a number of propositions. The first is that understanding the meta-trends that will influence the future operating environment is fundamental. The five meta-trends defined in the 2014 *Future Land Warfare Report* of *crowded, connected, collective, constrained* and *lethal,* pithily synthesise the effects of geography, demography, technology and other influences on future warfare.[5] Based on the analysis conducted for this report, Chapter 1 will recommend that a sixth meta-trend of *constant* be added to better illustrate the future operating environment and capture a key influence that will impact the conduct of military operations abroad and the maintenance of public support at home.

The second proposition is that the Clausewitzian prism still remains the best means through which to study war and warfare. Clausewitz's greatest

contributions have been to reinforce the need to link military action to an overarching political objective and, conversely, to stress that military actions have political consequences. This may seem self-evident; but equally there have been many recent examples of nations embarking on military ventures without a clearly defined strategy or defined political end state. The importance of this point will be made clearer in the paper.

The third proposition – also Clausewitzian – relates to that of character. Each war's character will evolve based on unique variations of social, political and economic conditions. Contributing to each war's unique character are the war's participants themselves. The way in which a society fields military forces and wages war is a reflection of that society. Australia is no different; it has traditionally sought to provide land forces to augment a powerful ally for operations away from the Australian mainland. These operations have been expeditionary in nature – in the sense of being conducted from a staging point into a foreign theatre – but Australian forces have never been configured to project power from the Australian mainland into another country. This distinction will be examined more closely in Chapter 3.

The fourth proposition is also attributable to Clausewitz but was popularised by Alan Beyerchen. It deals with the non-linear nature of war and warfare. Linearity is where the inputs and outputs are proportional; in line with this is the concept that the whole is simply the sum of its component parts. Instead, the 'real world and real war are characterized by the unforeseeable effects generated through the nonlinearity of interaction'.[6] As with warfare generally, this paper proposes that the relationship between the urban and littoral spaces is *not* linear. Therefore this paper will argue that the military ramifications of the urban littoral (ie amphibious operations into conurbations) are *not* simply the military ramifications (MR) of urban operations (UO) overlaid with those amphibious operations in the littoral (L) or:

$$MR(UO) + MR(L) \neq MR(UOL)$$

Instead this paper argues that there is an amplifying effect and that operations in the urban littoral are much more than the sum of its parts. To this end, this paper reflects this proposition and argues that future urban-littoral environment represents 'the worst of both worlds'.

Chapter 1: What is the Urban Littoral?

> *A wave of urbanisation propelling growth across emerging economies is a welcome fillip for a world economy…cities have been the world's economic dynamos for centuries, attracting skilled worker and productive businesses and benefitting from economies of scale.*[7]

> *The old waterfront markets, the fishermen's shanties, the blackened façades of high-rise housing projects, and the half-abandoned skyscrapers of downtown Lagos Island loom under a low, dirty sky. Around the city, garbage dumps steam with the combustion of natural gases, and auto yards glow with fires from fuel spills. All of Lagos seems to be burning.*[8]

The McKinsey Global Institute (MGI) report, *Urban World: Cities and the rise of the consuming class*, paints a generally optimistic picture for the future. Noting the trend of greatly accelerated urbanisation and the growth of cities – the majority of which are located on or near coastlines – the report highlights the historical benefits of urbanisation, such as higher educational opportunities, increased economies of scale, higher levels of consumption and higher standards of living. By 2025, MGI predicts that the world's top 600 cities will have a combined GDP of US$65 trillion.[9]

Lagos, the sprawling Nigerian port city with an unconfirmed population of 21 million, is one of the megacities identified in the McKinsey report. It is an urban/coastal hub that has the extremes of wealth and poverty; by some accounts Lagos is the fastest growing city in the world. One article painted a less sanguine picture of Lagos and the benefits of mass urbanisation generally. Lagos was a prospect of millions of 'people squeezed together

and trying to survive like creatures in a mad demographer's experiment gone badly wrong.'[10]

Thus the visions of the urban future vary from cautiously confident to the dolefully dystopian. This chapter seeks to add some clarity to these visions by defining and understanding the 'urban littoral' within the context of other societal trends. In doing so, it will discuss the trend of mass urbanisation with particular reference to those urban areas on or near coastlines. But first, the chapter will analyse the nature of littorals generally, with specific reference to some littoral characteristics in the immediate region. From here the challenges inherent in the urban littoral will be drawn out for subsequent discussion.

Littoral concepts and trends

The notion of urbanisation and what constitutes a city is generally well understood. The concept of the littoral may not be so well known and this paper needs to begin by first defining the littoral.

'Littoral' is both a geographic/oceanographic term and a military one. At its most basic, littoral relates to coasts and coastal regions, deriving from the Latin word for 'shore'. It can also refer to the area between the high and low water marks of a tide. From a purely naval perspective, the United States *Naval Warfare, Naval Doctrine Publication 1* defined the 'littoral' as 'those regions relating to or existing on a shore or coastal region, within direct control of and vulnerable to the striking power of naval expeditionary forces.'[11] Understanding that warfare is a two-way affair and that naval forces are conversely vulnerable to threats from the land, the 2010 edition of the same document altered and expanded the definition:

> *The littoral comprises two segments of the operational environment: 1. Seaward: the area from the open ocean to the shore, which must be controlled to support operations ashore. 2. Landward: the area inland from the shore that can be supported and defended directly from the sea. In naval operations, that portion of the world's land masses adjacent to the oceans within direct control of and vulnerable to the striking power of sea-based forces.*[12]

A perusal of a number of military doctrine publications indicates that the 'littoral' has been defined in similar ways, albeit with different foci and perspectives. For the purposes here, the report will use the RAN's definition:

> *The areas seaward of the coast which are susceptible to influence or support from the land and the areas inland from the coast which are susceptible to influence or support from the sea.*[13]

In seaward terms, the littoral is the 'brown water'– a confined and congested space occupied by friends, adversaries and neutrals. It contrasts with the 'blue water' of the open seas, the traditional and preferred milieu of navies.[14] But in both seaward and landward terms, the notion and size of the littoral area evolves, driven by the technology that increases the range of weapons and mobility platforms that can affect and operate within these littoral areas. Therefore controlling and contesting the littoral space will be extremely problematic and will require the fullest and closest cooperation of joint forces.

Cities, towns and settlements will always exist on, or adjacent to, coastlines. It is important to understand that the urban littoral does not simply refer to large cities but any settlements or conurbations within the littoral. These will possess the same characteristics as a city but doing varying degrees. In the Indo-Pacific region, for example, populations have a greater reliance on seafood as a dietary staple, and are anchored on coasts and the coastal inlets to be close to the food source. This is the region of most importance to Australia; the urban littoral in this region comprises the gamut from large sprawling cities to extended coastal villages. Globalisation and basic geography increases the importance of the littoral and must also be understood.

The Indian naval strategist Vijay Sakhuja noted that the globalised state relied on the sea for its economic growth and that the resources within its littoral, extended littoral-continental shelf and exclusive economic zone (EEZ) contributed to that growth.[15] He also stressed that trade prosperity with access to global markets was abetted by globalisation. With 90 per cent of trade moving by sea – and therefore sent from, and received at, ports in the littoral region – Sakhuja emphasised the symbiotic relationship between globalisation and the sea.[16] In other words, the importance of the littoral is twofold: natural and man-produced resources are located there and it is the origin, passageway and terminus of the majority of global trade.

In a general sense the economic importance of littorals is easy to understand. In basic geographic terms, the same applies. It is a geographic reality that the Earth's surface is two-thirds open seas with an estimated 75 per cent of the world's current population and 80 per cent of capital cities

along the littoral.[17] As demonstrated further in this chapter, rapid urbanisation will increase this percentage markedly in the next two decades. Depending on the vagaries of geography, certain littorals may also assume even more geo-strategic importance. Littorals will be crowded with all manner of land, sea, sub-surface and air vehicles vying for space as they conduct business, military, leisure and personal activities. Other features such as shoals, reefs, sand bars, coastal inlets and promontories will also influence the character of individual littorals and therefore the ability to traverse and access those littorals. Littorals based on straits and archipelagos will be particular chokepoints due to their importance to trade and military operations. In fact, an inversely proportional relationship will occur: the smaller the geographic space between littorals, the greater the strategic importance such space holds. Countries on either side of these commercial and military chokepoints hold a profound geographic and strategic advantage. During hostilities, these strategic spaces must be defended against use or interdiction by enemy forces. For forces projecting power by the sea, they must traverse these dangerous spaces; spaces made more dangerous if adversaries hold the surrounding islands or landmasses.

So while open seas seem to offer unfettered access to the world's littorals, in certain regions, most notably, the Indo-Pacific, the sea serves as both the barrier and the pathway between the coastlines. The littoral space may also be contested due to ill-defined maritime borders facilitating disputes over maritime transit and resources.[18] In the Indo-Pacific region, consumption of fish will increase with population and industrialization, boosting pressure on claimant countries to control their waters. Asian fishing fleets have increased in size and operational reach as they exhaust fisheries and look elsewhere. This situation may have been exacerbated by the United Nations Convention on the Law of the Sea (UNCLOS), signed in 1982. The forecasting agency, Strafor, notes that:

> *The creation of UNCLOS introduced a use-it-or-lose-it element to exploitation of maritime resources, and Asian countries responded with increased fishing activity...UNCLOS also defined what a nation could claim as its exclusive economic zone (EEZ), spurring countries to claim previously unimportant landmasses in order to capture a larger EEZ.*[19]

South East Asia is a convergent maritime hub for the dynamics of emerging regional powers such as India and China. The littoral navies of South East

Asia have engaged in force modernisation including the capabilities of deterrence. China has increased its soft power in the Asia Pacific but actively challenges the status quo in the South China Sea. Recent competition over sovereignty, and resultant maritime disputes, has occurred largely without the direct involvement of military forces, but through proxies such as fishing vessels, oil companies and national maritime law enforcement agencies.[20]

Australia, like the United States, has two interests in the region: access and passage for trade and rule-based stability. The 'long littoral' as identified in one major US project, encompasses the Indian Ocean-Pacific Ocean littoral. It contains a number of threats to the rule-based order, prompting the report to state in 'the foreseeable future the Indo-Pacific littoral, especially in the Western Pacific, will witness a military capabilities competition in which China seeks capabilities that deny access, while the US and its allies seeks capabilities to assure access to these vital waterways.'[21]

Urbanisation concepts and trends

Before the rise of the nation state, the city was the focal point of economic and cultural identity. Even after the creation of the Westphalian system, the city often remained a clear reflection of the culture and state of the nation as a whole. Cities attract people and capital; people within the cities create and use products and services made in that city. In fact the MGI report went so far as to urge multinational companies to disassociate cities from the host nation and consider individual cities as a strategic unit of planning in and of themselves when considering new potential markets.[22]

The MGI report focused on the top 600 cities ('City 600') in the world by their predicted contributions to global GDP growth in 2025. 160 of these cities will be in the developed or 'global north'. The real growth will be the 440 cities ('Emerging 440') located mainly in the developing or 'global south'. Of these 20 will be 'megacities' which have been the focus of much conjecture within military circles. The remainder will be 'middleweight' cities of between 200,000 and 10 million inhabitants.[23] To put this in an Australian perspective: the bottom end of the 'middleweight' scale equates to a large regional capital like Toowoomba, which is predicted to exceed 200,000 persons by 2030.[24] Australia will not have a city at the top end of the 'middleweight' scale with most predictions suggesting that Australia's most populous city, Sydney, will have a population of 8 million by 2055.[25]

It is generally recognised that the rate of urbanisation in the developed world will slow down but increase dramatically in the developing world. 95 per cent of future urbanisation will occur in this developing 'global South'. Whereas most urbanisation in the developed world resulted from at least some form of urban planning or consideration of the utilities and services needed, this may not be the case with the newer cities. The lack of services, infrastructure and governance in these rapidly developing cities will be a major and protracted issue. Even the generally optimistic MGI report stressed there must be massive and sustained investment within these 600 cities, in the key areas of residential and commercial buildings, municipal water supply and distribution infrastructure, and the shipping container handling capacities of ports. The demands for natural resources and capital will be acute and will be a key friction point for the on-going viability of these cities.[26]

If left unattended, the notion of 'fragile cities' as popularised by Robert Muggah, will become more prevalent. To a degree, Muggah's views act as a counterpoint to those expressed in the MGI report. McKinsey viewed cities as producers and consumers of economic value, with theoretically more city-based consumers enjoying the historical benefits of cities, and thus increasing their demand for goods and services. Muggah deals with the notion of the 'broken contract' between municipal authorities unable or unwilling to deliver basic services to citizens, which in turn, increase a city's propensity to be 'fragile'. In this regard, he echoes the MGI report on the growing importance of cities *vis-à-vis* the host nation. 'In the decades to come', Muggah writes, 'the city, not the state, will decide stability and development.'[27]

He also draws attention to those cities outside the MGI report's 'City 600'. These are the 3,400-odd cities with over 100,000 residents and the other 50,000 smaller cities around the world. Muggah stresses that this is worrying 'because it is cities whose names you've never heard of that will shape the future.'[28] This is particularly relevant to this paper as no cities (excluding some cities in Australia/New Zealand and further afield in Indonesia) in the immediate Indo-Pacific region are included in the MGI's City 600. A number, are however, identified as being at varying levels of fragility risk.

Muggah argues that it is not the city's size *per se* that contributes to fragility but rather the rapidity and nature of its urbanisation. This 'turbo-urbanisation' sees cities swell in size with no concomitant growth in infrastructure, services or opportunity. Moreover a city need not be located in a conflict-affected region to be fragile. Instead it is the nexus of urban poverty, urban

violence and urban disaster that makes a city fragile.[29] He states that there is correlation between the concentration of young people, specifically unemployed, undereducated males, and the levels of urban violence. These young, unemployed males become ripe for recruitment into gangs and/or insurgent groups. Crime and instability prevail with some areas 'ungovernable' or under some type of hybrid and/or criminalised governance structure. The so-called digital divide, where cost and access to the internet and ICT, IT literacy and online services available determine one's ability to participate in the new connected global economy, exacerbates these problems. In the immediate region, Papua New Guinea has a homicide rate of 20+ people per 100,000 people and has more than 60 per cent of its population less than 30 years of age. Similarly, Timor Leste is ranked 17th in a ranking of countries with a high disaster risk. Neither country possesses a megacity but its slums and unplanned conurbations are likely to be fragile, and therefore more likely to become a security concern close to Australia's shores.[30] Should climate change manifest itself in rising sea levels, the coastal fishing villages and townships of the various Pacific Islands nations could be unduly vulnerable to disaster, posing another looming security concern within the region.

A key constant is that urbanisation will continue at a rapid and in some cases, unsustainable rate. Cities, whether they are megacities, smaller conurbations or sprawling shantytowns, will be full of people. All will be clamouring for space, opportunity, resources and services, which might not exist or be in short supply, creating sources of conflict. Megacities may capture the imagination for the dystopian military nightmare they conjure, but in the immediate region there may be just as many potential flashpoints in smaller fragile cities and conurbations.

If war is a human endeavour, and people increasingly live in cities, then war will occur in cities. This likelihood is magnified by the trends of rapid urbanisation in the next half century. Logically, it is difficult to avoid the conclusion that future wars and conflicts *must* take place in cities.

Other concepts and trends

The CSIRO report, *Our Future World: Global megatrends that will change the way we live* posited a future narrative based on six global megatrends.[31] These megatrends are similar but not identical to the five of the 2014 *Future Land Warfare Report* and will influence subsequent discussions in this paper.

The first trend, ‘More from less’, notes that there will be increasing demand for limited natural resources. For societies to survive and thrive, new ways in which to share and utilise these resources must be discovered lest significant security challenges result.

The second trend, ‘Going, going…gone?’ captures the effects of climate change and loss of biodiversity. This has the potential to be a significant destabilizing effect in Australia’s immediate region.

The third trend, ‘The Silk Highway’, highlights the on-going trend for the world’s economic centre of gravity to move eastwards and southwards from Europe into Asia. This offers the opportunity to enmesh Australia into the ‘Asian Century’, but also the possibility that the immediate region might see increased competition as merging regional powers flex their muscles.

The aging population of Australia and other OECD countries is captured in the fourth trend, ‘Forever Young.’ This has far reaching ramifications for Australia’s taxation base (fewer working age persons to support an aging population) and government spending (healthcare spending will increase exponentially). This will surely place acute pressures on other areas of government spending, such as defence. On a per capita basis, it will also mean fewer military age persons willing or able to join the ADF.

‘Virtually here’, the fifth megatrend, notes that technology – especially information technology – continues to evolve. It is diffused through globalisation but there is an ever-growing gap between the technological ‘haves’ and ‘have-nots’. This gap may be exponential and without radical remediation may never be closed. Even the generally beneficial side-effects of globalisation, such as locating manufacturing in the developing world to take advantage of cheap labour (and providing a modicum of earning power for the workers and investment in infrastructure) may be removed with technology. The cost savings afforded by additive (‘3D’) printing, intelligent industrial robots and other technologies will allow companies to reposition their manufacturing closer to the point of consumption in the Western markets, saving time and cost in transportation to market. This could reverse globalisation and remove a key growth platform for developing economies, leaving them further behind.[32] The inability to participate in the digitised and increasingly internet-facilitated global economy will be deleterious for large swathes of the world’s population. Information technology supports the democratisation of information and the rapid transmission of news and

opinion via the Internet. Therefore for developing nations and emerging cities, internet access is the *sine qua non* for access to the benefits of globalisation. For developed nations, the internet transmits news with immediacy. Images of natural and man-made disasters will spur Western, liberal populations to demand more humanitarian interventions.

The last megatrend is called 'Great expectations.' This relates to consumer and societal expectations for services, experiences and social interactions, with real consequences for the matters discussed in this paper. On one side, billions of people living in poverty and moving into the urban-littoral, will do so with the expectation of a better life. This expectation may not be met, prompting reactions that may cause crises. On the other side, Western liberal values will generate a greater expectation for humanitarian interventions to be executed with rapidity and regularity. Western armies have been increasingly seen as tools of social improvement, giving rise to discretionary operations to protect civilian populations. These relief or stability operations will cause armies to go into cities because that is where the stability problem is. And as demonstrated previously in this chapter, not only do people live in the cities, but cities might be the *cause* of the disaster.

Extrapolating some of the threads within 'Forever Young', 'Virtually Here' and 'Great Expectations', we may posit the character and disposition of the educated, affluent, connected – but in some ways detached – Western population. It is getting older, and as a percentage of the population, those of working age are getting fewer. Those who have served or will serve in the armed forces are a minute fraction of the population. Worse still is that fewer political leaders have any military experience. This suggests a deep unfamiliarity with the reality of war, and warfare, among those charged with deciding to embark on military operations. So a number of contradictions arise. Western populations will increasingly wish 'to do something' to ameliorate the crises they watch on their personal technologies. But with a smaller proportion of society in the armed forces, those 'doing something' will invariably be 'someone else'.

On the other hand, the will of these Western populations can be directly affected by propaganda and be influenced by state and non-state actors via connected communications. As such, the 'connected' West will be increasingly 'disconnected' from the direct burden of these interventions. Conversely never before has a potential foe enjoyed such direct and 'enhanced access to their adversary's political will.'[33] Pressure to reduce

defence budgets will take place alongside a greater call to use military force. Moreover, this convergence of trends suggests the emergence of a twilight state of 'business as usual' at home with an expanded and constant use of military forces abroad. Patrick Porter suggested that this was a function of modern market economies in that:

> *the current state of "no war, no peace" tells us something about our societies' contradictions. The penetration of security by a neoliberal market ideology has given birth to the idea and, in many ways, the reality of the passive consumer citizen, un-mobilised, insulated from war's revolutionary and subversive power, yet also not granted a condition of peace.*[34]

In recognition of this nexus of trends, this paper recommends the inclusion of a sixth meta-trend – *constant* – into the *Future Land Warfare Report* group of trends. Together, this paper will subsequently refer to the meta-trends as 'C5L' (crowded, connected, collective, constrained, constant and lethal) and will reinforce the justification for it.

Despite popular predictions to the contrary, the Westphalian nation state system still prevails. The US remains the world's sole unilateral, power-projecting nation. It will in time be challenged by China, although opinions vary on the rate of its economic growth, the level of inward focus and long-term intentions. China is restructuring its strategic headquarters indicating single service development under the umbrella of joint command. This, coupled with aggressive island reclamation projects and the use of soft power in the Asia Pacific, potentially indicates a longer-term intention to look outwards. This does not mean non-state, or the so-called 'hybrid', actors are no longer important or influential. On the contrary, globalisation has diffused military technology ensuring that such actors can field substantial military capabilities. Instead it means that conventional armies remain a major part of future warfare and that nations may go to war to defend their honour and interests as they always have done.

A number of militaries, assessing the long-term trends and understanding their ramifications, understand that the urban-littoral will be the geographic area where future operations will most likely be conducted. One can understand why. Urbanisation offers many opportunities but also major threats to stability that may prompt humanitarian or stability operations. The vast majority of the cities, and therefore potential crisis areas, are located on

or near the coasts. Moreover, many of the region's littorals are valuable in their own right and may be the focus of military operations for other reasons. Natural and made-made resources as well as the enablers of global trade such as ports and submarine communications cables reside in the littorals. Littoral regions that confer strategic advantage over key waterways will be increasingly crucial. In short, the urban-littoral is *valuable* and *crowded* and as a result will be increasingly *contested.*

Chapter 2: What is Urban Littoral Combat?

> *In an unlimited war environment, the attacker may have gained a slight edge, but in a limited war it appears the defender has gained... If the attacker is prepared to accept casualties and the consumption of time that fighting in a built-up area engenders, he is in a stronger position than the defender. If minimal cost is a salient factor, however, the attacker is in a substantially more difficult situation.*[35]

> *As (amphibious operations) are conducted at the juncture between military and naval spheres of competence, they have the potential to demonstrate the worst characteristics of both and the best characteristics of neither.*[36]

This chapter will examine the component parts of urban combat and amphibious operations individually to identify trends and constants in each. The chapter will discuss ramifications of these constants – the 'so what?' Finally, this information will be collated to develop the thesis that urban-littoral combat contains non-linear elements that make it more than the sum of its parts.

The focus of this paper has been on urban littoral combat and the ramifications of the 'worst case scenario'. This chapter duly acknowledges the other types of military operations any current and future military force will be expected to conduct in this environment. As the last chapter demonstrated, the convergence of a number of mega trends and the expanded concept of security will see more humanitarian-based operations that could evolve into a wider and far-ranging military commitment.

Urban operations

Defining the urban operations environment

Urban operations are based, by definition, in urban areas: cities, towns, sprawling conurbations or urban fringes. Cities are more than just residential and commercial structures, places of worship, municipal and government buildings, roads, bridges and other infrastructure. These man-made constructions possess tangible political, financial, cultural, emotional, religious and humanitarian value. They may also possess direct military value.[37] Each city will be unique; this uniqueness will be driven by geography and history, culture and economics, demography and politics. Cities may be well planned and resourced, or rather more *ad hoc* and lacking key elements. An urban sprawl may have no distinguishable landmarks, no street names or house numbering. A city may have a wealthy, functioning central business district, or the inner city may be poor and ghettoised, with affluent citizens retreating to safe pockets within the city. Many cities in the developing world will not resemble cities in the developed western world in size, style, function or form. In fact, many of these cities may be extremely confronting to Western sensibilities.

Cities comprise a broad and interconnected network of institutions and individuals that rely on the city to facilitate their livelihoods. Humans, drawn to the wealth, opportunities, employment, security and prestige offered, inhabit these cities. 'The people flow through city streets,' observed Russell Glenn, 'as does blood through arteries and veins; without them the city is as inert and lifeless as a bloodless body.'[38] Ideally these institutions and individuals will understand that a commitment to bettering the city will benefit all.[39] Alternatively, in a fragile or failed city, people may flock to the city attracted to the power vacuum seeking the peculiar rewards and opportunities lawlessness offers. The very presence of people in the city, most notably the non-combatants, is the key difference between urban combat and combat in open terrain; their presence alone leaves open the chance for tactical actions to escalate into episodes of strategic importance.

The people who inhabit cities are likely to be far more heterogeneous that those found in rural areas. This heterogeneity will be a function of age, political affiliation, gender, ethnicity, religion, education and wealth. This will manifest itself in a myriad of groupings each with a gamut of affiliations, objectives and worldviews. In a time of conflict, an army may expect to

encounter citizens who may be allied, congenial, neutral or hostile. These groups will have their own self-interests. Their affiliations may change (ie switching from neutral to hostile) based on any number of influences, including the military action taken by armies. This in turn will affect the conduct of subsequent operations. Cities represent a human environment that interacts with armies in a way that jungles and forests do not, and urban operations are special because their environment explicitly shapes them.'[40]

Non-state actors and conventional military forces will operate in the urban environment in the future. Non-state actors have enjoyed a real comparative benefit from globalisation, giving them access to information, capabilities and military technologies that were once the preserve of the nation state. Although such actors have intuitively understood and exploited information technology for propaganda, they can also conduct military actions or even wage near-conventional operations due to the military skills and technology they have garnered through globalisation.[41] The Second Lebanon War demonstrated the relative ease to transition from a low-level non-state irregular capability to a middle-level, state-sponsored hybrid capability; a state sponsor that can provide weapons and training to irregular forces is all that is required. Hamas and Hezbollah were able to conduct major combat operations because of their training, discipline, organisation, command and control, and 'game changing' weapons such anti-tank guided missiles and man-portable air defence systems.[42] This hybrid capability wherein conventional weapons and tactics may be deployed in conjunction with irregular or even criminal actions may confound categorisation and therefore military responses to it.[43]

The consensus in most armies is that urban areas are best avoided, but they increasingly realise that the multi-faceted political, cultural and economic importance of cities means that they cannot be avoided. This poses a real problem for Western armies. Urban warfare is slow, costly and primitive but Western armies will carry a moral burden to minimise casualties and reduce the damage to infrastructure. Operationally such a burden limits courses of action and the combatant's doctrine, force structure and weapons systems may be ill suited to succeed in the urban fight.[44] High technology standoff weapons have been spectacularly unsuccessful in a number of recent conflicts – they seldom kill the enemy in sufficient quantities but cause unnecessary damage to buildings and infrastructure. The armies of other nations may not view warfare through the same prism as Western armies

do. If a combatant does not have the same concern for collateral damage or casualties, indiscriminate firepower may be effective with more courses of action for the prosecution of military operations. This may include a callous disregard for civilian casualties or at worst the deliberate targeting of civilian for military benefit. For this reason, Alice Hills noted the truism that 'immediate tactical advantage usually accrues to the side with less concern for the safety of non-combatants.'[45]

All manner of governmental and non-government organisations may be operating within a city at the same time. They may be replacing, repairing or augmenting key infrastructure or services. One UN report noted that in some cities the 'urban poor are trapped in an informal and "illegal" world – in slums that are not reflected on maps, where waste is not collected, where taxes are not paid, and where public services are not provided.'[46] In response alternative providers of governance and security, such as terrorist, para-military or criminal organisations may fill the vacuum left by governments and councils or operate in parallel to official efforts, competing for resources and power. Understanding the capabilities, affiliations and linkages between individuals and groups within a city will place an extraordinary strain on the intelligence capabilities of forces deployed there.[47]

Buildings and infrastructure add a dimensional element absent from traditional battle spaces. On one level, these man-made additions provide shelter, facilitate commerce, generate and deliver essential services and tend to the needs of the residents. They contribute to the on-going wellbeing and viability of the city. Their loss or destruction not only impacts on the livelihood and security of the citizens themselves but create second-order effects. As Glenn argued, the buildings and infrastructure in a city represent a form of *capital* – the accumulated wealth of a city that is used to produce more wealth. Tactically, the loss or destruction of key buildings or infrastructure may generate immediate friction points, such as displaced persons, that further burdens combatants. Strategically and politically the loss of this *capital* is far-reaching. 'The destruction of the social and physical capital of cities,' writes Glenn, 'marks the decline of a nation as a viable member of the world order. Armed forces that ignore this relationship may succeed in accomplishing military tasks only to fail in serving political objectives.'[48]

Western armies, increasingly seen as tools for governments to affect social improvement, will not be allowed to conduct operations that destroy a city outright or produce extensive non-combatant casualties. Military operations

must have an immediate military objective but this objective will be limited to absolute military utility and necessity. More importantly, military operations will be so structured to allow a return to the *status quo ante* as soon as possible. A functioning city and a (relatively) safe and content population are not only politically appealing but also tactically easier to control and manage.

Sean Edwards noted that 'the manipulation of information is becoming more central to urban operations because of recent technological, political and social developments.'[49] Military actions will be judged on appearance and 'optics' as well as the actual impact of the actions themselves. The media will be able to cover combat as it happens and transmit its images to a global audience. However, it may also be used to propagate or rebroadcast narratives for all actors within the urban operation. Moreover, smartphone technology places the power of the media in the hands of anyone who willing to take a photograph and post it on a myriad of social media options. There is little chance that an army or government can 'control' the narrative, but it may be able to influence currents within the flow of ideas and counter-ideas.[50]

But focusing solely on the technology and reach of social media is flawed. Governments and organisations must have a sound and cogent strategy as a foundation. Without this clarity of foundation, any campaign for the narrative will be for naught, regardless of the mastery of social media itself.[51] The costs and potential consequences of urban combat demand that this underlying strategy is sound and linked to a clear and enunciated political end state.[52]

What about the impact of the physical dimensions of infrastructure on combat? Unlike an open field or even close jungle, urban operations are distinguished by a multi-dimensional battle-space with a variety of man-made features grafted on or under the natural terrain. Much of the key infrastructure might not be immediately visible. Water and sewerage pipes, tunnels and gas mains will be underground. Roads may vary from well-paved highways to uncovered dirt tracks, barely passable to bicycles, let alone fighting vehicles. Overhead power lines might criss-cross neighbourhoods, limiting the ability for rotary wing aircraft to land.

Cities may generate their own microclimates.[53] Depending on the size and nature of the economic activity there may be smog, industrial and effluent fumes and odours, and dust further churned and channelled by winds

funnelled in and around the buildings. These microclimates may be transitory and located in certain parts of the city only. There may also be constant ambient light cast across the city that may confound night vision equipment. Structures, power infrastructure, smoke, wind and other climatic influences will greatly affect radio communications within the urban environment.

The presence of buildings in the battle space will confuse situational and spatial awareness. Soldiers may fight through the collapsed rubble of multi-story buildings or through small and humble single storey structures of mixed material. The presence of larger structures does not necessarily mean combat is more difficult than in cityscapes with smaller structures, only that it will have a necessarily different character. Beyond a superficial understanding afforded by a building's exterior façade or streetscape's appearance, the internal structures will remain largely opaque to remote observation or aerial reconnaissance.

Buildings offer vantage points for weapons and opportunities for defensive hardening. But operating within a building limits observation and reduces the ability to directly supervise and command troops. Instead combined arms teams comprising largely of infantry, along with engineers and armour will have to reconnoitre these buildings and clear traps, hardened positions and mouse holes. Fighting will often be at extremely close ranges. Operating within buildings, sewers or tunnels presents a series of microenvironments and creates the problem of relative isolation, wherein the physical surrounds exacerbate the feeling of being separated from one's fellow troops. On a larger scale the isolation posed by urban surrounds – there may be no clear front line or rear areas – makes resupply and casualty evacuation problematic. Similarly, troops may experience rapid environmental change through compression into confined areas and expansion into open areas and *vice versa*. This increases the psychological stresses already inherent in combat.[54]

A city may be forcibly deconstructed and then reconstructed to create defensive points or canalise movements into certain areas. [55] Streets, vacant lots and open areas are not avenues for movement but killing grounds to be avoided at all costs.[56] Well-positioned cheap anti-armour and anti-aircraft weapons can play a decisive role. High trajectory weapons such as mortars are useful, while line of sight weapons may be less so. Even if wanton usage of high explosive munitions is not present, ammunition consumption is very high in urban operations. The performance of weapons

themselves will be affected. The built environment increases the destructive effect of munitions, with greater propensity for ricocheting and creation of rubble, dust and detritus. There is a greater chance of fratricide and civilian casualties. Gunshot wounds, often caused by ricochets off angular surfaces, and blunt injuries are more prevalent in urban operations. The soldiers' senses and physical capacity are battered in urban terrain. The surfaces are harder and sharper, cutting uniforms and skin alike. The importance of helmets, protective eyewear, gloves and kneepads is paramount. Infections and contaminated wounds can be exacerbated by proximity to the structural detritus, or proximity to damaged or primitive sewerage systems. The buildings and surrounds amplify the cacophony of combat with dirt, dust and smoke combining to be inhaled by soldiers. All these factors contribute to a much higher casualty rate, which in turn places greater burdens on medical services. The urban operations environment comprises artificial terrain, human density and supporting infrastructure; these features combined negate the organisational and technological strength of most militaries.[57]

Urban Operations – Constants and ramifications

The numerous influences of the urban terrain coupled with the presence of non-combatants make conducting urban operations problematic. One US study opined that it was prudent to avoid cities in principle but demonstrated that a well-conceived attack can be successful. 'Such an attack is not necessarily overly expensive in casualties or resources,' it noted, 'depending upon a number of factors, several of which are not under attacker control.' An urban assault would take time to prosecute; that time will increase if defenders have time to prepare their positions. Moreover if the attacker 'is subject to any major constraints, the defender has a good chance to win or at least prolong the battle and raise the cost for the attacker'[58]

The March 2016 Syrian government offensive to re-capture Palmyra from Islamic State validates this assessment. Palmyra, a small city with a pre-war population of approximately 55,000 people, presented a relatively simple urban environment of basic two and three storey buildings and limited subterranean infrastructure. Located in the open desert, the city's area was relatively contained and its ingress and egress points easily identified. Even so, the city posed a problem for the attackers. The Syrian Army deployed a number of elite ground units and utilized sizeable foreign Shiite militias. Most importantly, Russia provided special forces on the

ground and close air support with attack aircraft and helicopter gunships. Even with overwhelming superiority in attack aircraft, artillery, armour and ground forces, *and no qualms about collateral damage*, the government forces suffered considerable casualties against the determined Islamic State defenders, taking three weeks to capture Palmyra.[59]

The battle for Palmyra illustrated many of the constants of urban combat. The next section describes ten constants of urban combat derived from a number of historical studies and operational analyses of urban combat.

The savagery of urban combat

In war, Clausewitz's chaos, chance and friction are present. In urban warfare, this trinity is present writ large and exacerbated by particular savagery. Why is urban combat so brutal? A civilian population may be caught in the middle, adding to the misery and pathos of the situation. The terrain magnifies every problem and vulnerability inherent in combat. The sights, sounds, smells and sensations of combat within the multi-dimensional landscape will mentally and physically deplete soldiers at an exponentially faster rate than combat in other environments. Casualties will be greater, placing strains on medical services to evacuate soldiers in a timely manner. A causal feedback loop will be generated. Prompted by Western armies' aversion to casualties and driven by home populations' expectation that soldiers will have access to life-saving treatment, armies will be forced to place their finite medical assets in more danger to extract casualties from the urban battlefield. These finite medical assets will also be required to work harder treating more casualties. The ability to provide medical support to urban operations will be a critical point of failure. Urban warfare is more damaging psychologically; armies may need to prepare its soldiers more for its stresses in training and bolster psychological support for them after combat.

Due to the limited utility of indirect fires, the inherent strength of the defence and the need to minimise civilian casualties, urban warfare will eventually result in manoeuvre seeking close combat. Small arms, grenades, flamethrowers, bayonets and even fists are the weapons of choice. Close urban combat is pre-modern in its conduct and morality. The intractability of defenders aided by key weapons systems and abetted by the urban terrain, means that combat is slow, grinding and costly. It is the antithesis of the antiseptic high technology, standoff, and precision strike vision of modern warfare. When the enemy is finally engaged and the physical distance

between combatants is removed, the clash of wills becomes personal and devoid of any restraint. In addition the nature of urban combat means that warfare techniques such as tunnelling and counter-tunnelling, fortification of structures, and neo-siege craft measures may be resurrected.

Whatever technologies and military acumen are applied at the tactical level, it will be increasingly difficult to win urban conflicts at the strategic level. Hills concludes that urban warfare and humanitarian war are irreconcilable insofar that prosecuting an urban fight while trying to enforce peace and minimise casualties cannot be done concurrently.[60] Such is the wretchedness of urban combat; the mutating humanitarian crises it generates may prompt calls for more interventions. But these interventions may cause more casualties and destruction, burdening the armies that must fight there and challenging the scruples of the public whose support is necessary for the on-going legitimacy of such operations.

The relative advantage of the urban defence

Studies demonstrated that all things considered, the defence was the preferred posture in urban combat. The proliferation of cheap and effective anti-armoured and anti-aircraft weapons has given a key advantage to non-state actors and hybrid forces. During the Chechen War, the RPG-7 was dubbed the 'national weapon of Chechnya.'[61] Urban terrain greatly enhances the ability to cover avenues of approach with snipers and anti-armour weapons. The natural canalising effect of streets can be enhanced with roadblocks, and traps, mines and weapons can cover points of ingress and egress into buildings. For those opponents that are willing, 'hugging' civilians or key protected structures negates much of the advantages of Western standoff firepower. Cheap anti-aircraft weapons may cover the immediate airspace and landing areas, negating the ability for heliborne manoeuvre and casualty evacuation.

In urban combat, the conduct of defensive activities links inextricably with time to form a wicked calculus. The time to prepare defences greatly enhances these latent advantages. The more prepared the defences are, the more time it will take for an opponent to close with and defeat an enemy in such defences. The better prepared the defences are, the greater the skills in combined arms manoeuvre the attacker must possess.[62] The more time that is required to attack and clear a position, the more casualties an attacker will sustain. While force protection is an aspiration, it cannot be a mission in and of itself; battle will have to be joined to force a decision.[63] This

will have immediate tactical consequences and longer-term political ones. A smart enemy will understand that a long protracted war is not politically palatable to most western nations.

Combined arms manoeuvre is crucial, but infantry is 'king'

Standoff weapons have some utility and may destroy key assets as a precursor to ground manoeuvre.[64] But due to the protective nature of urban terrain, the vagaries of weather and urban 'micro-climates', the propensity of some enemies to 'hug' civilians, the need to limit damage to infrastructure and the difficulty in detecting fleeting targets, airpower may have limited efficacy.[65] History has proven that the ability to conduct combined arms manoeuvre is necessary to negotiate and survive the urban terrain, and defeat the enemy with minimal friendly casualties. Combined arms manoeuvre will cause collateral damage and may kill and injure civilians, but the perception is that it is more discriminate than standoff, 'precision' weapons.

Ground manoeuvre remains indispensable for seizing the initiative, achieving decision and avoiding a costly and protracted battle.[66] Recent conflicts have confirmed that armoured forces based on tanks and infantry fighting vehicles have enduring utility in combat, stability and counter insurgency operations in urban terrain. Light skinned and other forms of protected mobility vehicles may complement mechanised forces but lack the survivability, lethality, or mobility needed to counter enemies with appropriate weapons and military training in the urban environment. One study bluntly stated that 'armoured forces reduce operational risks and minimize friendly casualties.'[67]

Heliborne manoeuvre remains problematic due to the pervasive anti-aircraft missile threat and the urban clutter of power lines and multi-story buildings. Engineers are indispensable in clearing mines and IEDs, creating improvised mouse-holes and hardening defensive positions. In the 2008 Gaza War, Israeli engineers used armoured bulldozers to cut paths through IEDs. In the Chechen Wars, the Russians eventually developed a 'storm group' based on an infantry company, with an attached tank platoon, artillery troop, mortar platoon, automatic grenade launcher platoon, engineer platoon and chemical troops.[68]

But if studies consistently highlight the importance of combined arms, they also reaffirm that 'infantry is king' in the urban environment.[69] Besides their well-understood role and contribution to the functioning of the combined

arms team, infantry also provide a refined sensor role, reinforcing the importance of human intelligence (HUMINT) collection and providing the situational awareness that aerial and remote platforms cannot. They can provide a persistent and visible presence on the ground that may contribute to stability actions. In combat, infantry's persistent presence holds ground; within an urban environment only infantry can do this. In the future, infantry may come to mean humans or robots in an infantry-like role, but the enduring necessity remains.

Effective combined-arms operations require workable doctrine, habitual relationships based on trust and knowledge, command and control facilitated by robust communications and the right platforms and technologies. Most important is the requirement for dismounted infantry equipped, trained and conditioned to survive and fight successfully in the urban environment.

Force ratios still matter

Much has been written on the possibilities of distributed manoeuvre and 'swarming' breaking the urban defensive deadlock. Distributed manoeuvre involves operating and fighting in smaller teams enabled by enhanced detection capabilities and response time for fires with a trusting and devolved command culture that encourages proactivity. Swarming builds on the same principles of smaller distributed forces but differs insofar that these forces come together as a 'swarm' at the crucial moment when the tactical situation unfolds. Facilitated by communications and shared situational awareness, the swarm becomes a simultaneously generated mass directed at a single, temporal target.

Whether armies can exploit such shared-awareness and communication technologies, develop responsive command cultures and integrate fires to improve the efficacy of small combined-arms teams remains moot. Even within armies with a *stated* adherence to mission command, this signifies a marked departure from previous ways of doing things. This aside, urban warfare remains manpower-intensive. Regardless of whether such innovative concepts are adopted, it takes more troops to conduct defensive and offensive activities in the urban terrain than it does in open terrain. This makes operating in urban terrain extremely problematic for smaller, professional Western armies. For example, the doctrine of most armies states that once a building is captured it must be occupied from that point forward to stop the enemy reoccupying it. This means that the more buildings that are captured, the more troops that must be diverted from subsequent combat tasks to

occupy these buildings. Casualties must be evacuated and replaced; if they cannot be replaced, the forces on the ground must have the resilience and capability to continue to prosecute their missions.

Technology and training may affect force ratios but basic force ratios are required to conduct the gamut of military activities in urban warfare. Military forces may disaggregate to move and survive in urban terrain, but unless concomitant improvements in the responsiveness of devolved capabilities are in place, disaggregation may increase survivability but it will not increase the ability to fix and destroy an enemy. As such, basic military concepts such as force ratios still apply. Most importantly, the distributed nature of urban forces – whether by design through a doctrine such as swarming or simply caused by the nature of the urban terrain – means that finite enablers such as logistics elements must be queued, scheduled and protected in such a way that they resupply multiple elements within the highly deadly urban environment.

Stretching the sinews of war

Force ratios are also important in urban combat as studies suggest that casualties from urban operations can be as high as 50%.[70] This places an enormous strain on smaller, professional Western armies with such casualty rates being unsustainable to achieve tactical objectives and very likely to be politically unjustifiable. Higher casualties place greater burdens on the key enabler of medical services. This burden is increased with the expectation of 'state of the art care in the middle of nowhere.'[71] It is increasingly accepted that the 'golden hour' of casualty evacuation from the battlefield to a medical facility will be met. The surrounding terrain and the prevalence of anti-armour and anti-aircraft weapons make casualty evacuation from an urban environment extremely problematic. The dispersion of forces places greater demands on limited medical support assets and increases the number of missions needed to extract casualties, placing these limited assets in even greater danger.

Within urban combat, suppression of targets and strenuous manoeuvre results in greater ammunition and water consumption. Studies suggest that materiel consumption rates for urban combat may be as much as ten times greater than those in open areas. There will also be greater occurrences of vehicle damage and 'mobility kills' as well as wear and tear on other key pieces of equipment, necessitating more recovery and repair. To compensate for this increased rate of consumption and need for recovery

operations, logisticians will have to either supply combat troops more frequently or deliver greater amounts of certain classes of supply. Either way, this poses the same problem as casualty evacuation; it will require protected mobility and the ability to maintain lines of supply to multiple distributed force elements in an all-encompassing environment. Medical staff and logisticians will be increasingly expected to provide for civilians displaced by urban conflict. Not only does this place more burden on an already strained force element, but it will also produce manning and supply ramifications. Logisticians and medical staff will have to carry different classes of supply and the medical staff will have to prepare for different operations and procedures. This will affect personnel staffing and the medical equipment/ facilities deployed.

Controlling a city?

The case study of twenty two historical urban operations conducted by McLaurin *et al* concluded that an attacker should encircle a city and isolate where possible, using airpower to assist the cut-off of reinforcements and supplies.[72] Others have concluded the size and dimensions of modern cites, including the presence of peri-urban fringes and conurbations make it very difficult to achieve this. The force ratios and material required would be problematic for most western armies. There was some limited ability to encircle and isolate cities in the Chechen Wars, and evidence suggests that Iraqi forces were able to secure the landward edges of Ramadi before entering the city in 2016.[73] Tactically, the US was able to impose some control of areas of Sadr City in 2008 with concrete T-walls. This allowed US forces to set the tempo of operations and methodically capture or kill insurgent leaders in that discrete area. Outside these areas, the insurgents still had freedom of action and were able to attack US forces from those unsecured portions of Sadr City.[74]

It is no longer feasible for most armies to hope to control a city by encircling and effectively laying siege to it. Nor can armies bomb a city into submission without prompting adverse public opinion and unacceptable death and damage. Can a military avoid a city yet aspire to control its population? Without being present in the city or having the freedom of action to move within in it, an army cannot hope to attend to humanitarian issues or protect the population. It cannot engage with the population, facilitate governance or challenge criminal governance and as a result may not meet the intent of the original intervention or mission.

The US forces in the battle for Sadr City sought to 'create the conditions that would make it impossible for the insurgents to operate effectively and possible to restore security to the broader population.'[75] Michael Evans has suggested that the concept of controlling a city needs drastic revision if it is to remain a viable concept. Numbers and brute force need to be replaced with a refined understanding of the city as an ecosystem. For example, could cutting off the water supply be a means of controlling or at least influencing those within a city? What might be the second order effects of such an action? Controlling such key elements of an urban ecosystem would require armies to acquire a polymathic grasp of a number of disciplines such as urban studies/urban design, police and security studies, architecture, disaster management, anthropology and sociology and geography. To this end, Evans suggests that armies must aspire to nothing short of 'integrating and adapting established doctrine and concepts into a systematic interdisciplinary strategic-level engagement with the field of urban studies.'[76] Whether this is feasible, remains to be seen.

Intelligence is critical but elusive

McLaurin's study concluded that many urban attacks failed due to intelligence failures ceding advantages to the defender.[77] The urban terrain masks movements, heat signatures and visual cues and therefore makes collecting and producing useful and timely intelligence notoriously difficult. Intelligence is doubly important in the new urban fight: it determines what *not* to target as much as what to target. Traditionally, human intelligence collected and verified by conventional and special forces 'boots on the ground' has been superior to aerial reconnaissance and signals intelligence. The widespread use of unmanned aerial vehicles (UAVs) has altered this perception markedly. UAVs can loiter over targets and provide persistent coverage. Micro UAVs and small, unmanned ground vehicles (UGVs) may even be able to move within structures. They are also relatively cheaper than other airframes and being unmanned eliminates the risk of losing a pilot in the high-threat urban environment. The ability to command and control a combination of ground forces and joint fires all operating off a common operating picture provided by assets like UAVs is critical in attacking fleeting, time-sensitive targets and in avoiding collateral damage.[78]

Sustained intelligence, surveillance, and reconnaissance contributing to joint fires capabilities have, in the past, allowed the attacker to seize the initiative.[79] Now and in the future, Western armies will seek to reduce their

own and civilian casualties, and minimise collateral damage. The role of intelligence will be doubly important. UAVs offer a persistent, effective and reduced risk solution. But UAVs must be enmeshed in wider network of electronic and signal intelligence, as well as intelligence provided by other government agencies, non-government organisations, non-combatants and open sources.

The means and technology to *collect* information is just one component; the means to analyse and produce timely and useable intelligence is the other. Logically, this means that more intelligence analysts, with competencies across a number of functional disciplines, will be needed. Acquiring and applying such competencies is no easy task. In 2008, in the contained battle-space of Gaza, the Israelis were able to strike targets hidden among the people successfully *and* warn civilians to avoid certain areas. But to do so 'required a combination of *exquisite interagency intelligence*, precision strike, and low-yield weapons'. This may represent the aspirational standard for the use of intelligence-driven strikes to minimise casualties and shore up support at home and abroad. But David Johnson noted the sophistication, breadth and depth of this intelligence would be difficult for the Israelis – or any Western military – to attain elsewhere in current and future conflict environments.[80]

Decentralised command, decentralised capabilities?

The urban terrain breaks up military formations and forces them to conform to the strictures imposed by its terrain. Moreover the multitude of influences acting upon and with each other produces situations that mutate faster than in other operations. These smaller, dispersed forces therefore have less time to make a decision; potentially these time-critical decisions may have political consequences. One US study of combat operations in Iraq stated that over-centralisation within military organisations in urban operations equates to paralysis. The ebb and flow of urban combat presented fleeting opportunities for targeting or manoeuvre. The ability to decide on a course of action and capabilities to support it must reside at a lower level of command.[81] This suggests a substantial culture shift for most Western armies. It also requires junior leaders with greater tactical and technical professional mastery, coupled with awareness of the wider strategic/political context. This would be facilitated by a true adherence to mission command facilitated by technical capabilities to enable decentralized decision-making and small-unit initiative.[82]

At this point it is necessary to look at the relatively recent concept of the Multi-Domain Battle (MDB) and what impacts this concept might have on the urban combat in the future. In short, MDB may reinforce the trend of decentralisation – or in fact reverse it entirely. Firstly, what is Multi-Doman Battle? There is no rigid definition for the concept but the most obvious aspect is its name.[83] The concept incorporates the idea of conducting warfare across the traditional domains of air, land and sea as well as 'newer' domains of space and cyberspace. Inherent in this first point is that MDB must be waged through combined, joint, interagency and inter-allied efforts. Secondly, this warfare is conducted concurrently and continuously across all five domains, the purpose of which is to create momentary windows of opportunity within time and space for exploitation.

MDB sees the only way forward as creating these fleeting windows of spatial, temporal, cognitive or technological advantage using all means at one's disposal to find and exploit chinks in the defensive systems. This is where various concepts of MDB potentially diverge. In order *to create* the preconditions across five domains *to open* a fleeting window of opportunity and then have the forces and effects queued *to exploit* it, suggests coordination and centralisation of assets at the highest level. Subordinate forces may operate dispersed in order to survive, but they will have to re-aggregate at some point and to some degree in order to create the required force ratios within these windows. This would suggest detailed planning and coordination by a higher headquarters.[84]

Alternatively, MDB might require a level of mission command and devolved access to cross-domain effects to a degree that can be scarcely be imagined today. Instead of windows of opportunity being painstakingly created by the higher headquarters, the subordinate units are empowered to identify and exploit windows. To do so, they must have cross-domain effects assigned to them so that this window can be opened at that moment in time and space and kept open in order to exploit it. The headquarters would need to ensure other forces are able to support those in the window and keep abreast of actions in the window.[85]

The mixed utility of joint fires

With the presence of non-combatants and an underlying imperative to limit collateral damage, the use of joint fires is problematic. The Russian experience in Grozny demonstrated that artillery is effective but was not precise enough to protect Russian infantry in close combat. Moreover artillery

bombardment of cities was not enough to guarantee their pacification.[86] Joint fires are important for interdicting resupply and reinforcements into a city or isolating smaller urban pockets. They are also useful to target key identified weapons emplacements and infrastructure targets. Generally only fixed wing aircraft are capable of delivering precision ordnance with the payloads necessary to destroy large, multi-storey structures and tunnels.[87] Rotary wing aircraft remain particularly vulnerable to anti-aircraft weapons.

Crucially, joint fires still facilitate ground manoeuvre by supressing or destroying the enemy. The challenge remains to target enemies while protecting friendly forces and limiting collateral damage. Certainly, the US-led coalition in Iraq, after seeing the destruction inflicted on Ramadi after its capture from IS in 2016, sought to reduce the urban destruction in subsequent operations with fewer airstrikes and smaller, more targeted munitions.[88] Also the realities of fighting in complex terrain, particularly urban areas, will require forces to drop munitions closer to friendly troops. Therefore, smaller and highly precise munitions are needed to avoid fratricide.[89] Studies of recent conflicts suggest therefore that the key is the ability to find and then strike fleeting targets among civilian populations with precision and very low-yield weapons. This also suggests closer air-ground cooperation across the services to integrate fixed, rotary and UAVs with ground forces so joint fires can be employed most effectively. Doctrine and processes, robust communications, habitual relationships and the ability to decentralise the control of fires to lower levels is required.[90]

Public opinion and whole of government responses

The last constant is a reflection of the modern permutation of warfare wherein the modern urban operating environment exaggerates the combined effect of all ten constants. It is influenced by changing standards on the morality of war, the ubiquity and influence of media and the political imperative to communicate the national interest involved before a government embroils its military into a war. 'The future urban fight is perhaps more than any other context of warfare,' stated one US Army report, 'conditioned by the "battle of narratives" among combatants to secure legitimacy and authority in the eyes of the target population.'[91] To a large degree, the conduct and study of urban operations has traditionally focussed on the immediate tactical aspects and neglected the wider security and stability context. The looming crises posed by rapid and unplanned urbanisation, coupled with state and non-state threats and the as-yet

unknown ramifications of cyber-warfare all suggest a tighter coupling of military actions with whole of government capabilities all nested within a cogent political justification. The political environment of urban operations was almost certainly neglected; now it is a significant component of warfare and urban warfare in particular.[92]

Amphibious operations

Defining the littoral and amphibious operational environment

Speller and Tuck noted that militaries have developed refined definitions of 'littoral manoeuvre' as a departure from treating amphibious operations as a discrete and separate activity. To this end, such militaries seek to conceptualise 'seamless manoeuvre within the littoral, without undue focus on the point at which the waves lap the shore.'[93] This may be so, but it is useful to examine the component parts of the littoral and amphibious operating environment before assessing the constants of amphibious warfare. In the first instance, the future littoral and amphibious operating environment may include urban areas described in this and previous chapters. This section will remove the urban overlay from this discussion so that further salient points about the littoral operating environment can be made. To this end, this section will subjectively delineate the operating environment into the shore and landward area, the immediate offshore area, the intervening seas between the littoral and the point of embarkation and the point of embarkation itself.

The shore and inland areas

Amphibious theory has evolved from the traditional operation of lodging onto a secured shore, conducting an operational pause while building up reinforcements and supplies before breaking out and advancing to the objective. Instead new concepts such as *Ship to Objective Manoeuvre* (STOM) desire to move from the ship directly inland to the objective.[94] Be this as it may, there remain consistent and salient factors and elements.

The first is environmental risks such as the vagaries of weather and the impact of terrain.[95] Man-made effects such as smog may intensify the weather. It can obscure visibility, mask defenders and affect the use of aircraft in providing fires, conducting heliborne landings and supporting subsequent operations. Like all military operations, the terrain itself will be a critical consideration. This may include the configuration of the coastline;

the terrain on, around and beyond the beaches; the suitability of landing areas for build-up or attainment of the final ground objective; the effect of topography on communications and even the locations of roads and railways affording interior lines of supply for defenders.

Naturally, enemy dispositions and capabilities comprise the key risk and consideration. This includes the location of enemy airfields, enemy dispositions including the location, type, range of anti-access/area denial capabilities (in this case missiles launched from land or the air) and quality of the defending troops themselves. The proliferation of anti-access, area denial (A2/AD) capabilities has generated the most debate. Anti-access (A2) generally refers to capabilities to prevent or degrade the ability to enter an operational area, whereas area denial (AD) refers to threats to forces within that operational area. Finney *et al* noted that 'cheap, easily acquired, yet advanced weapons,' have given potential adversaries the ability to 'contest access to the global commons to a degree not seen since the demise of the Soviet Union and the decline of its navy.'[96]

A2 and AD capabilities include long-range precision-strike systems such cruise and ballistic missiles enabled by GPS technology with increased accuracy to target fixed targets such as ports and airfields; high quality air defences with ranges out to 400 kilometres as well as improved anti-aircraft guns, shoulder fired anti-aircraft weapons and long range artillery and rocket systems. The most important development has been greatly improved anti-ship ballistic missiles (ASBMs). [97] With ranges up to 2000 kilometres, some smaller ASBMs may even be launched from mobile and concealable platforms, compelling an amphibious force to operate much farther from the coast. This will force militaries with amphibious aspirations to either operate with much greater risk or to develop adequate counter-measures and new methods of operations.[98] It will also force place a greater burden on intelligence, surveillance and reconnaissance capabilities to locate these dispersed A2/AD platforms.

These A2/AD technologies have been rightly recognised as 'game changers'. But Theodore Gatchel, in his analysis of defending against amphibious assaults, noted that the professionalism, disposition and doctrine of the defending force were just as critical. He recorded that a cogent joint doctrine facilitated by unified command was as important for the conduct of the defence as it was for the conduct of the amphibious operation itself. Leaving aside the conduct of defensive, pre-landing

operations, the defender essentially has the option to defend at the water's edge (literally or more figuratively, denying key ground) or conduct a mobile defence. In the former, the main consideration in denying key ground is to target the attacker during the critical ship to shore/objective phase forcing them to culminate before sufficient strength has been built up. This requires the defender to identify the key ground, which may be difficult and resource intensive for a large area with multiple landing areas. In the latter, the defender may allow the attacker to secure, reinforce and even break out of a foothold. The defender will then seek to destroy the attacker through manoeuvre but its success is predicated on the correct placement of the counter-attacking force, the ability to counter-attack without interdiction by joint fires and selecting the right moment to counter-attack.[99] This means that understanding the doctrine and the command arrangements of the defender is a crucial for the assaulting amphibious force.

The operational environment of the onshore and inland areas will have an impact on the composition of any landing force in amphibious operations. Such a force will be determined by the objectives it must achieve inland and the conditions it must operate in. An analysis of successful amphibious operations in the 20th century concluded that three tactical prerequisites must be in place. These are: ensuring 'air superiority, the selection of a suitable landing location where assaulting troops can have a marked superiority over the defenders, and the ability to reinforce the beachhead faster than the defender.'[100] All three of these preconditions are impacted by weather, terrain and the capabilities of the enemy, and therefore by the operating environment of the shore and inland area.

The immediate offshore area

The immediate offshore area will be cluttered with large numbers of friendly, enemy, and neutral commercial vessels, warships, and auxiliaries. The A2/AD capabilities work best in congested areas or where surrounding land limits the freedom of manoeuvre of the amphibious vessels. Mines and coastal missile or gun batteries can block narrow passages between islands. Numerous islands canalize the movements of the enemy forces. Several island chains running parallel with the mainland coast extend the defensive depth of the coastal area. Protected bays or channels offer refuges for ships, and islands conceal the movements of surface ships and troop transports. Shallow water may limit the employment of major surface combatants or at least force them to reduce speed.[101]

The challenge of A2/AD will affect the immediate offshore area, with ever increasing ranges of such weapons systems challenging what is considered 'near' or 'inshore'. Control of the sea in the immediate amphibious objective area will be difficult if the enemy has sea denial capabilities. ASBMs represent the high technology threshold of the A2/AD challenge; but relatively conventional and low technology options also challenge amphibious operations. These include mines, diesel submarines and fast attack surface craft. Some modern mines can be deposited on the ocean floor with on-board sensors that identify the high targets. Because these systems are passive, it is very difficult for most navies to detect them before the mines are activated. There are variations of mines that may be laid in very shallow waters and are designed to attack landing craft approaching a beach. These mines may be located and cleared, but only with considerable time and resources.[102] Large numbers of mines are needed to be effective and like any obstacle, need to be monitored to prevent removal. Other asymmetric actions may enhance mining operations. Opponents could turn off, remove, or destroy current markers; sink ships; or emplace other obstacles to physically block part of narrow and shallow areas.[103]

A number of nations have acquired modern diesel-electric or air-independent propulsion submarines that are capable of operating very quietly and may be armed with advanced torpedoes, mines, or submarine-launched cruise missiles. Such submarines can operate further out to sea and threaten amphibious convoys *en route* in the open seas; but their true value is their ability to operate undetected closer to shore, masked by the acoustic noise of the littoral. Milan Vego notes that within the littoral, ships' electronic sensors are prone to degradation due to a variety of climatic, electromagnetic (EM), and atmospheric anomalies, the presence of a large landmass, human-made clutter, and the proximity of multiple EM sources such as cellular networks, television, commercial aircraft, and ships. This, Vego concludes, 'creates substantial difficulties in using ESM sensors to sort out and identify emitters or signals of interest.'[104]

In the near future, unmanned submarine vehicles will offer a cheap yet potent littoral defensive capability, posing a real threat to the high-value, high-cost amphibious shipping. Forming the last part of this layered defence, small, high-speed boats can be used to attack landing craft or larger shipping operating within coastal regions. This can be achieved by on-board weapons systems such as ship-mounted anti-shipping missiles or even by suicide

ramming. Unmanned aerial vehicles can be used for the same effect; multiple unmanned aircraft 'swarming' a ship would confound and overwhelm its close defensive weapons systems, until one gets through and hits the ship.[105]

The passage and open sea

The operational environment in the open seas is generally less precarious than in the immediate littoral region but an embarked amphibious force having ceded strategic surprise may be vulnerable to interdiction at sea. This requires the amphibious force to be protected and escorted by substantial quantities of surface and sub-surface vessels as well as aerial patrols. Amphibious operations entail long and tenuous supply lines between the embarked force and the home base; this line must be maintained and protected.

As Peterson has noted, amphibious warfare comes down to the availability and commitment of resources in sufficient amounts to deliver the required combat power onto the objective. 'With regards to resource restraints on amphibious operations', he writes 'the lack of shipping is a common theme.'[106] The requirement for sufficient logistical support and force projection will be covered later in this chapter.

The point of embarkation

The final component of the amphibious operational environment is the homeport and the point of embarkation. Traditionally blockading a port, or even destroying a fleet while it was in harbour, was a pre-emptive means to counter an amphibious threat. In the modern age, it would be difficult to achieve the strategic surprise required to sail warships to a friendly port and destroy the docked fleet. However, port facilities and/or docked vessels remain vulnerable to sabotage and/or raids by aircraft, special forces, electronic attack and other asymmetric threats. Force protection of key enabling assets within any amphibious capability remains crucial, as their destruction would represent the crippling, if not the single-handed elimination of, the amphibious capability. Likewise, operational security measures must be in place to allow the amphibious fleet to concentrate, force elements embark onto to ships and to leave without informational security breaches.

Amphibious operations – constants and ramifications

There are essentially two schools of thought in relation to the on-going efficacy of amphibious operations. One is that developments in relatively cheap and effective defensive technologies make it tactically impossible and economically unfeasible to conduct forcible entry or even operate in contested waters.

The other is that the overwhelming strategic flexibility afforded by the ability to project power and influence the world's urban littorals makes amphibious capabilities indispensable. This realist school suggests that lacking such an amphibious capability cedes initiative to would-be enemies and that nations need to be wholly committed to investing in capabilities to defeat these defensive technologies. What neither school would debate is that even without the enemy's actions, amphibious operations are difficult and require a number of prerequisites to be successful.

Countering the widely held consensus that amphibious operations are no longer possible due anti-access technologies, Frank Hoffman argues that amphibious capabilities have an enduring attraction for governments. 'In addition to deterring bad behaviour from potential aggressors,' he argued, 'amphibious power projection capabilities have strategically positive effects such as reassuring allies and underwriting stability and crisis response operations, including humanitarian aid and disaster relief.' He also assessed that possessing a forcible entry capability provided a country with many strategic advantages and options.[107] Amphibious forces can be configured to conduct a range of activities from humanitarian assistance/disaster relief to war fighting. In the absence of securing a friendly port or assembly area to land troops, amphibious operations remain a key means to conduct forced entry operations into a hostile area.[108] An amphibious force's ability to be notionally self-sustaining, self-sufficient and strategically mobile makes it an attractive proposition for decision makers.

There are five types of operations that can be conducted by amphibious forces: assaults, raids, withdrawals, demonstrations, and the generic 'amphibious support of other operations'. Assaults are conducted to forcibly establish a landing force on a hostile shore to achieve a variety of objectives, such as theatre entry. They may support wider manoeuvre, such as the Russian concept of the *desant*. Raids are essentially assaults that do not seek to hold ground and involve the pre-planned re-embarkation of the landed force. Designed to inflict damage, cause a diversion or secure key information, raids are limited in time and space. Withdrawals are the planned re-embarkation of military or civilian personnel and equipment. If the environment is non-permissive, the range consideration of enemy weapons will determine how far offshore the amphibious group can linger and will also affect how the shore to ship withdrawal of personnel/equipment is conducted.

Non-combatant evacuation operations (NEOs) may occur with or without the support of the host nation and may occur at short-notice, with surrounding political ramifications. An amphibious capability provides a robust ability to conduct NEOs, with helicopter assets allowing rapid, multiple-lift sorties to be conducted some distance from the shore, especially if there are no heavy stores to be evacuated.[109] Amphibious forces are also capable of conducting demonstrations of strength and intent. This includes participation in any peacetime exercise or international engagement visit. In war, it includes a demonstration in the tactical sense of diverting attention away from a main effort elsewhere. For the demonstration to be effective it must be a credible threat; for amphibious forces, credibility is linked the ability to conduct forcible entry. Finally, amphibious forces can support other operations, insofar that modern amphibious ships have sophisticated on-board C2 systems, quarter personnel, treat casualties and project power inland. This makes amphibious forces particularly useful for humanitarian and disaster relief missions.

Milan Vego suggested that the 'foundations of littoral warfare should be historical experience and the vision of the future war at sea.'[110] While not referring to amphibious operations exclusively, Vego warned that either an over-reliance on what worked in the past or an exaggerated view on technology was an unsound means to develop a theory. The constants below represent a synthesis of analyses on both historical experience and new technologies.

Crossing the deadly space to the objective

An amphibious capability is simply a means to an end. It is a means to launch a land force from the maritime environment on to, or near to a military objective for the purposes of seizing, clearing or destroying that objective. If the land force cannot achieve its objective, then the underlying purpose of the amphibious capability is nullified. The principles of war apply to amphibious operations as to any type of warfare.

In the amphibious context, the three components that underwrite the ability of the land force to generate combat power and achieve its mission are the ship to shore/objective connectors, the rate of build-up and the force ratio. The rate of build-up is tied directly to basic mobility algebras which are in turn predicated on planning parameters such as number of sealift ships in the amphibious fleet, aircraft/surface assault vessels, payloads, average speeds of the craft, distance from the ship to the shore/objective

and other ship-based constraints such as how many aircraft can operate from the finite deck space at once.[111] The importance of having the vessels and aircraft of the right type and in sufficient quantity is paramount. Leaving aside preliminary military actions to reduce some of the A2/AD systems, the ability to build up forces ashore safely and rapidly is linked to ship-to shore/ objective connectors. One analysis put it thus:

> *The key is the availability of sufficient amphibious shipping and ship-to-shore connectors. While protection is important, it is far more important to have enough simple, reliable connectors to get as many troops ashore as possible…therefore, the ship-to-shore connection is the single point of failure for any operation that means to overcome A2/AD systems.*[112]

Historically, crossing the deadly space between the ship and objective has been *the* critical vulnerability for amphibious forces. This is supported by a recent Australian analysis of amphibious operations. It demonstrated the 'action phase' (comprising ship to shore movement and activities to secure a beachhead for subsequent operations) accounted for 74 per cent of killed in action and 90 per cent of wounded in action casualties. The analysis demonstrated that enemy fire contributed to over 90 per cent of these casualties and that in recent case studies helicopter accidents contributed to a significant proportion of casualties.[113] To achieve the objective and build up land power rapidly, there must be enough surface and/or aerial ship to shore connectors. They must possess sufficient capability to carry enough personnel and support equipment (ie gun batteries) *and* survive in the dangerous A2/AD environment. Due to the A2/AD threat compelling amphibious forces to stage from greater distances, it will be difficult to achieve a rapid build-up with greater time and distances imposed. Technology may offer some qualitative advantages, but amphibious operations overwhelmingly adhere to that basic mobility algebra where there can be no half measures. As a result, for a successful amphibious capability, 'minimalism is incompatible with achieving access; quality is important, but it must be balanced with quantity.'[114]

Unified command, joint forces and specialised capabilities

Modern amphibious operations require a military to project and supply a force across an ocean, guarantee at least localised air/sea superiority and coordinate a complex assault into an operational environment characterised by enhanced kinetic and non-kinetic weapons. To achieve this, amphibious

forces must achieve nothing short of the acme of combined arms and joint warfare. Indeed, such is the size and scope of the operational challenges facing an amphibious group, that only a multi-national force bringing its combined strengths to bear may guarantee success.[115] Successful amphibious operations also require a corpus of tested doctrine and expertise that governs everything from reverse planning, loading and embarkation, resupply afloat, the application of fires in support of manoeuvre and the practice of joint command. For navies, this includes developing doctrine and capabilities for operating in the littoral as well as the open ocean. Such doctrine may include the means for incorporating merchant marine vessels or 'ships taken up from trade' (STUFT) to augment the logistical staying power of the amphibious capability.[116]

With joint-ness comes a complex command organisation, meshing single-service cultures and biases, divergent doctrine and different communications systems and procedures. If operating as part of a larger multi-national force these problems are exacerbated. Generally speaking amphibious doctrine is well developed in relation to the command structures and most western forces have adopted similar models relating to command of the amphibious task force, the landing force and so on.

Specialist capabilities such as the ship to shore connectors are required. This may be purpose built equipment or standard equipment that has been 'marinised'. Moreover, recognising the specialist nature of amphibious operations, especially the ability to be deployable (and trained) at short notice in response to contingences, most countries with an amphibious capability have a dedicated marine force. This allows the marines to develop habitual relationships and familiarity with the joint force components, maintain specialist competencies without undue personnel churn and continually practise and develop specialised expertise at both the individual and collective training levels. This also allows commanders to understand that 'impenetrable mystery surrounded by sea-sickness' and practise and refine the specialist planning skills required to load, embark, sequence and supply amphibious operations.[117]

The fundamental preconditions of precise intelligence and air/sea superiority

Friends, foes and neutrals operating on the land, in and under the sea, in the air and in cyberspace, will populate the modern littoral battle-space. To load the appropriate force elements, survive *en route*, project force safely, and

achieve immediate tactical objectives as well as longer-term political ones, a substantial and wide ranging intelligence gathering and analysis capability is required. This must include regional oceanographic, demographic and geographic competencies as well as understanding enemy force capabilities and tactical dispositions. This suggests among others, enhanced littoral surveillance capabilities, the ability to launch and extract pre-landing forces and the means to incorporate all source contributions to a refined operating picture.

In short, amphibious operations also demand air and sea superiority. It is the *sine qua non* for success. This suggests utilising friends and allies to aid safe passage to the objective area as well as contributing to securing local air and sea superiority to reduce or circumvent the A2/AD technologies. This is extremely difficult for most nations to achieve unilaterally.

Strength of defence and the cost of forcible entry

Just as cheap weapon systems and the advantages inherent in the terrain enhance the urban defence, so too do they advantage the defence against forcible amphibious entry. Short and long-range A2/AD technologies coupled with cunning and cheap asymmetric defences anchored on and exploiting the nuances of the littoral, pose a wicked dilemma for the use of amphibious forces.

Peterson argues that an amphibious capability loses its credibility and potency if it cannot conduct forcible entry. 'Defenders won't fear an amphibious force afloat if they know they can repel the landing' he writes, 'any political and strategic advantages are moot, should the threat of an amphibious assault be diminished due to technological advances favouring the defenders on the beaches.'[118] This means those militaries aspiring to have a credible and potent amphibious capability must commit to developing technologies and techniques to counter the A2/AD threat and maintain the offensive advantage. It cannot simply be wished or theorised away. The relative benefits of operating extremely expensive, high-value and hard to replace amphibious vessels, no matter how capable, may be outweighed by the risks posed by layered and relatively inexpensive A2/AD systems. Even if the defender is nominally weaker, all that is required is to deny absolute control of the sea, thereby partially or completely frustrating the amphibious force's ability to use it. This may be achieved by seizing strategic land points to dominate a strait or threaten the amphibious force's line of operation noting that it only can use only a single line of operation and

a single line of retreat.[119] It should also be noted that the loss of all or part of an amphibious capability comprising personnel, land and air assets as well as the capital ships themselves, would have drastic strategic and political consequences.

Therefore, to possess a credible amphibious capability, militaries must commit to a substantial investment in naval platforms, the defensive measures for these platforms and the means to overcome A2/AD defences to force entry. Amphibious platforms represent huge capital costs, long production times, substantial refit times and ever-increasing costs to equip them with defensive measures to survive in the new operating environment. A recent trend has been the spiralling costs to develop and fit defensive technologies on ships. Due to the finite amount of space on a ship, these defensive technologies add no offensive benefit and may even pose an opportunity cost to offensive capabilities or room to load amphibious force elements. As George and Meredith Friedman argued, a weapon system reaches its limit of usefulness when the cost of the defensive measures necessary for its survival undermines the weapon's overall cost effectiveness.

There will always be an iterative cycle of technological advances where relative advantage moves from offence to defence and so on. The life span of a weapon system/capability is determined when the pace of implementing counter measures against it overtakes subsequent measures to counter the counter-measures. If a weapons system or capability cannot evolve to outperform counter measure against it, it becomes a 'senile' weapon system or capability.[120] Certainly, these iterative pressures apply to A2/AD technologies as well as amphibious capabilities; Hoffman even argues that existence of amphibious capabilities requires would-be opponents to invest in A2/AD technologies, imposing opportunity costs within other areas of their militaries.[121] This may be true, but it is difficult to dispute that the costs of fielding an amphibious capability would far outweigh the cost of fielding A2/AD technologies.

Logistics, logistics, logistics

Much of the attraction of amphibious operations is its self-sustainability and its notional ability to support forces ashore without need of ports and unloading facilities. This may be true if the amphibious force is equipped properly for the operations it is expected to conduct and has platforms and systems in place to sustain a force ashore. If 'amateurs talk tactics,

and experts talk logistics' then amphibious operations require a sage-like understanding of what to bring on-board initially, how to stow and cross-load a multitude of stores, weapons platforms and personnel and then how to supply troops ashore while operating in a hostile environment.

Beside the very real limitations of 'coming as you are' to the operational area, amphibious operations place acute strains on logistics. In this way it is very similar to urban operations. Firstly, like the urban environment, the littoral environment will be crowded and deadly with the tactical situation suggesting frequent violent and potentially decisive contact with the enemy. The intensity of surface and air combat in the littoral – while lodging the land force and then remaining in the operational area supporting it – will result in a very high consumption of fuel and ammunition. Amphibious logistics will be as much about 'supplying the suppliers' and ensuring the support vessels, command systems and force protection elements can operate.

The second issue is the sustaining of distributed land forces ashore. This will entail constant replenishment of key classes of supply, casualty evacuation and land equipment recovery and repair. There will be finite quantities of key ship to shore logistic connectors to undertake these tasks.[122] A canny enemy will understand this. As logistical sustainment is critically important to success, so too, will logistics capabilities be key targets for the enemy.

On the nature and character of Urban Littoral Combat

If combat is a function of warfare and warfare is the way the war is made, then urban littoral combat reflects the nature of war as Clausewitz defined it: a clash of human wills through violent interactions in a chaotic environment for an underlying political purpose. Logically, if urban littoral combat is part of war it must possess this nature. But urban littoral combat reintroduces and reinforces this old truism in the minds of those considering engaging in such combat. It does so because within urban littoral combat, combining as it does urban and amphibious operations, war's nature is amplified exponentially. Urban littoral combat is 'the worst of both worlds'. It would be hard to think of a mode of warfare in which the operating environment has so many multifarious actors seeking to impose their will on others; in which passion, violence, uncertainty and chance have so many means to interact

with these actors and so many consequences; and where the underlying political purpose of the combat must be so necessary and justified to warrant involvement in such a potentially costly mode of combat. This is not to suggest that urban littoral combat should never be embarked upon because it is so terrible; rather that the calculation of cost versus benefit for engaging in it must be cogent, realistic and acceptable.

The character of urban littoral combat overwhelmingly confirms Clausewitz's assertion that war's character reflects the 'spirit of the age' and how social, political and military norms, technological advances and the various effects of the operating environment impact on its conduct. In this case, urban littoral combat can be characterized as warfare driven by political imperatives, posing strategic dilemmas underpinned by a tactical nightmare.

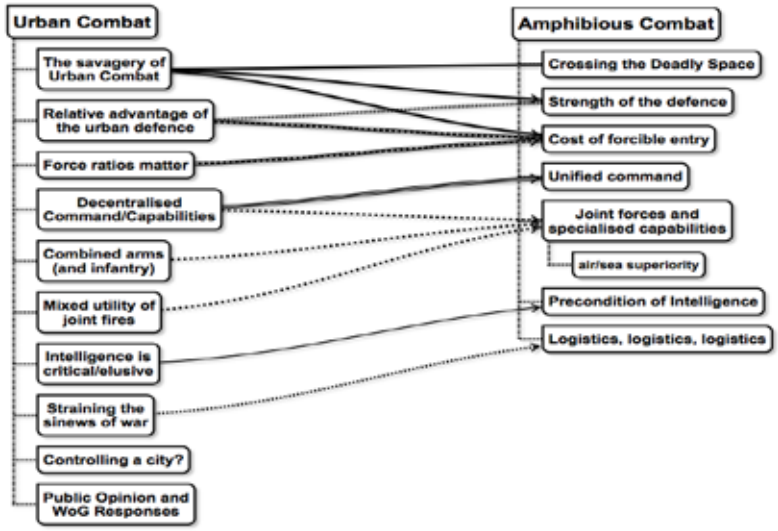

Figure 1. Constants of Urban and Amphibious Warfare

Urban littoral combat will combine the technical complexity of amphibious operations with the brutality and human cost of urban operations. The constants of both types of operations and the linkages between them are shown in Figure 1. It will be conducted in an operational environment of increased urbanisation, globalisation and strategic interest in the world's urban littorals. All trends suggest that the imperative to project force overseas to operate in cities will be driven by political and strategic necessity. It may even be driven by public demand for action to be taken to avert a looming

humanitarian crisis. Conversely, these same trends suggest that urban littoral combat will be so violent and costly in the blood and treasure needed to prosecute such combat successfully, that it will be beyond the means for most militaries. Failure to resource and train a military adequately, as well as understanding the urban littoral operational environment in which it is to fight, will result in a catastrophic loss of life and military capability. In turn, this creates subsequent strategic and political issues. Pressure from the home front, now able to be influenced directly and indirectly by the various actors involved, will continue to influence political decision-making. The resilience of the home front will be a critical element in the globalised, networked battle space. The compression of the political and tactical levels will never be so acute as it will be in the urban littoral environment.

Strategically, urban littoral combat poses a classic dilemma. What does any deployment of troops into the urban littoral hope to achieve? Does the force have the ability to deploy, sustain itself, protect itself and achieve the mooted objectives? If it cannot, what decisions relating to force structure, training, doctrine, key equipment and platforms need to be made now in order to prepare a force for urban-littoral combat? In other words, the 'C5L' mega-trends and the future urban littoral operating environment pose a strategic problem. In order to stimulate a response to this strategic problem, a correct strategic question should be asked.[123] For the ADF desiring to operate in the urban littoral, the strategic question is:

> *In the light of global mega-trends and the 'C5L' future operating environment, what capabilities must the Australian Army and the Australian Defence Force possess in order to contribute to an Australian maritime strategy?*

The strategic dilemma is exacerbated because the acquisition of such capabilities will take a long time. It is confounded by the fact that the guiding principle – the Australian maritime strategy – is undeveloped. Contributing to the dilemma is the tactical nightmare posed by urban littoral combat, in which the 'C5L' environment exacts an awful toll during passage to the operational area, lodgement, sustainment and the conduct of ground operations. Table 1 illustrates these interrelated influences on urban littoral combat. If urban littoral combat is a strategic and political problem as well as a tactical one, it is because the consequences of a misplaced confidence in a force's ability to operate in such environment will be immediate, costly and far-reaching.

Table 1. Urban Littoral Combat as a function of the 'C5L' operating environment

		LITTORAL/AMPHIBIOUS					
		CROWDED	**CONNECTED**	**LETHAL**	**COLLECTIVE**	**CONSTRAINED**	**CONSTANT**
URBAN	**CROWDED**		-Lack of OPSEC negates strategic surprise	-The poor man's wars; high cost platforms and systems vulnerable to proliferation of cheap A2/AD systems	-Substantial joint and allied assets required to operate in littoral -Unilateral action beyond means of most nations	-Cost of amphibious capability credible enough for to operate in contested littoral in Asia Pacific	-Need persistent littoral ISR -Personnel and equipment resilience in prolonged use
	CONNECTED	-Fight for the narrative among competing narratives -Strategic ramifications for tactical errors		-Littoral environment overlaid with A2/AD sensor/strike capabilities	-C2 platforms and doctrine must allow interoperability with joint, allies, OGAs and other actors	-Imperative to develop C2 systems for projection of force within a joint and allied environment	-Home front perceptions, no war/peace -national resilience and ongoing support
	LETHAL	-The poor man's wars- cheap weapons enhance the defence and the capabilities of non-state actors	-Imperative to develop cyber warfare capabilities and new operational mindsets to counter 'poor man's war' situation		-Sea and air superiority *sine qua non* for success - loss of key air and sea platforms = mission failure	-High cost, single point of failure platforms -Loss of one or many platforms signifies a tactical and strategic defeat	-Redundancy in key platforms, ability to regenerate and refit after highly lethal combat
	COLLECTIVE	-The difficulty of applying combined arms and joint effects in urban terrain to target enemy but not non-combatants -Doctrine for inter-agency cooperation	-The actions of joint and collective partners linked to us for reputation management -C2 systems and doctrine must facilitate joint actions	-Use of joint capabilities in lieu of 'traditional' ground operations -Propensity for STABOPs/ HADR mission to become into combat		-Cost to create multiple use capability to meet all joint and interagency needs	-Ability of allies and inter-agency partners to contribute over sustained period
	CONSTRAINED	-Force ratios needed for urbanised operating environment expensive to field and maintain	-Robust C2 platform for urban ops -IO concept to engage all actors within and external to urban fight	-Capability to survive/operate in UO requires substantial investment -Logistic burden to support UO = point of failure	-Propensity for 'joint-ness' to favour RAAF and RAN in budgets -Army may lose out in key UO enablers		-Financial outlay to maintain amphibious capability beyond short finite periods
	CONSTANT	-Mutation in size, intensity and character of urban combat based on number of actors and duration of instability/conflict	-Accelerated technology development/counter development cycle due to constant operations = 'cost of entry' to be credible in UO	-Constant operations = higher casualties, equipment wear and tear -longer term RTS consequences	-Inability to develop optimal doctrine due 'here and now' demands	-Is ADF budgeted for constant operations in new operating environment? -What opportunity costs will be imposed?	

Urban Littoral Combat as a Complex Adaptive System

This paper proposes that there are 'seven deadly trends of urban littoral combat'. These are the identified constants/trends common to both urban operations and amphibious operations. These are categorised these as those trends or constants that are *inherent* in the environment and those that are necessary to *operate* in the environment. Inherent is the problem of logistics, the importance of intelligence, the strength of the defence and the hyper-lethality of combat. To survive and operate in the environment the trends identified were the integration of joint capabilities, the evolution of C2 and operational mindset and the enduring need for force ratios. As shown in Figure 1, they will interact with each other and be influenced by future urban littoral operating environment to develop non-linear relationships. This interaction will develop properties that are more than the sum of the component parts. Urban littoral combat will in fact become a complex adaptive system (CAS).

A CAS is an entity consisting of a number of diverse and autonomous components referred to as *actors*. These actors are interrelated, interdependent and linked through many interconnections. These actors will interact and affect the system as a whole, and in such a way that it cannot be understood by examining the component actors separately. These actors vary in the way they interact and respond to the operating environment, both individually and as a group and the scale and nature of this response. Individually each actor is a complex adaptive system that will most likely adapt through time in response to other actors or to changes in the system itself. In the urban littoral CAS, the seven identified trends will be the actors.

Every complex adaptive system is more than the sum of its actors. The system's behaviour and properties cannot be predicted from the behaviours and properties of the actors. Complex adaptive systems change in response to the feedback received from their environment to survive and thrive in new situations. As a result of all these interactions, inputs and context changes, regularities emerge to form a pattern that feeds back into the system and affects all the agent's interactions. In a CAS, this is *emergence,* wherein the properties of these new regularities or patterns are the result of the interactions of the actors within the environment.

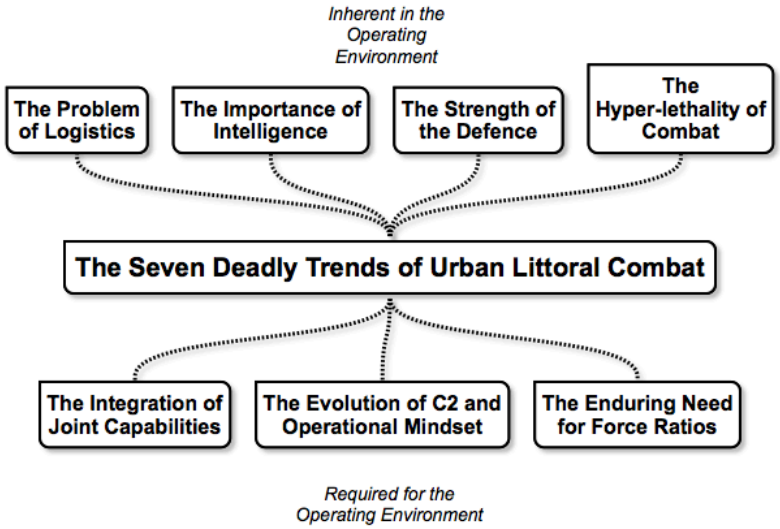

Figure 2. The Actors: The Seven Deadly Trends of Urban Littoral Combat

Figure 3 illustrates the relationship between the actors, the environment, and the feedback that leads to emergence within the complex adaptive system that is urban littoral combat . In the urban littoral CAS, the changing external environment comprises the Clausewitzian forces found in any form of warfare, the effects of the 'C5L' and CSIRO-identified mega-trends and the influence of the urban-littoral environment interacting with the various combatant and non-combatant actors. Importantly it also includes the impact of the 'home front' – public opinion and resilience and the ability of the nation to sustain forces capable of operating in the urban littoral. Pressure from the home front, now able to be influenced directly and indirectly by the various actors involved, will continue to influence political decision-making. The resilience of the home front will be a critical element in the globalised, networked battle space. The compression of the political and tactical levels will never be so acute as it will be in urban littoral environment. The urban littoral complex adaptive system will both *adapt in and with* the changing external operating environment.

In the urban littoral system, the seven actors will vary in the way they interact with and respond and adapt to, the operating environment, both individually and as a group. In other words, although different and unique, the actors are interconnected so that the action of one actor also changes the *context* of other actors. This is feedback as it applies to the urban-littoral complex

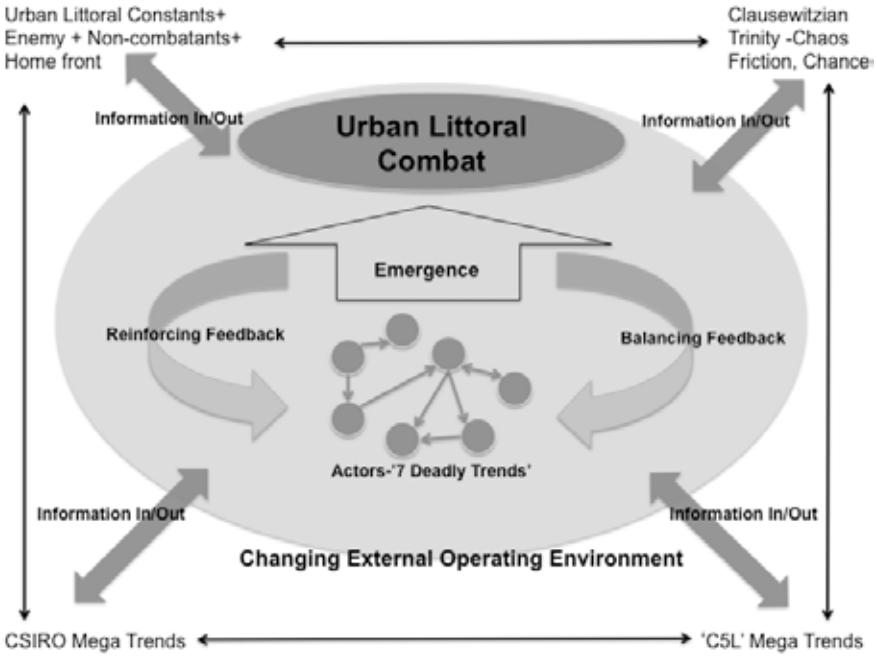

Figure 3. Urban Littoral Combat as a Complex Adaptive System

adaptive system. This feedback may be positive or negative, that is it reinforces or dampens a particular quality or interaction of the actors. As the paper discussed earlier with Alan Beyerchen's concept of non-linearity in warfare, the interaction between the actors and the environment will develop properties that are more than the sum of the component parts. As a result of all these interactions, inputs and context changes, regularities emerge to form a pattern that feeds back into the system and affects all the actors' interactions.

This is emergence and individually the actors – or the seven deadly trends in this example – present difficulty for any military force in their own right. Through on-going cycles of emergence and feedback, the seven deadly trends will continue to adapt and mutate in unforeseeable ways. So by way of example think of the interaction between two of these trends – integration of joint capabilities and strength of the defence. An infantry force seeks to advance through an urban environment after being lodged from an amphibious vessel. Cheap anti-aircraft weapons being down helicopters used for manoeuvre as well as forcing ground attack aircraft to keep clear. Instead of landing on the objective, the infantry must now be landed away

from the objective and move by foot supported by traditional artillery indirect fires. The longer ground advance incurs more casualties, and uses more ammunition; this has a reinforcing effect on the 'problem of logistics' actor. The use of artillery destroys infrastructure and kills some civilians. This has a reinforcing effect on another actor – 'the hyper-lethality of combat'. But the actors' interactions also impact on the environment. The home front may be horrified by images of dead civilians and puts pressure on the government to conclude the operation successfully or withdraw. The images of dead civilians may assist in the recruitment of more fighters to the adversaries' cause. This will have a dampening effect on force ratios from the friendly force perspective but will in time reinforce the agents of 'the strength of the defence' and the 'hyper-lethality of combat'. One may assume that all this will ensure that another element of the environment – Clausewitz's trinity – will adapt as well.

Through this simple interaction, the dynamics of the urban littoral complex adaptive system have changed and non-linear effects have manifested in the actors *and* in the environment. Imagine then the full operation of this complex adaptive system with all seven trends and the full scope of the environment interacting and adapting to and with each other constantly and persistently. Analysing the first, let alone the second and third order effects of operating within the complex adaptive system of the urban littoral will challenge militaries; but it is challenge that must be met and overcome.

Chapter 3: Insights and thoughts for the future

> *Tactical talent consists in causing the unexpected arrival, upon the most accessible and important position, of means which destroy the equilibrium, and give victory; to execute with promptness, movement which disconcert the enemy, and for which he is entirely unprepared.*[124]

Future Urban Littoral Combat

Urban littoral combat will require land forces to be projected strategically and inserted tactically with the element of surprise. Both the amphibious force afloat and the land forces ashore must protect themselves sufficiently in order to wrestle the initiative from the enemy. Simply put, any amphibious capability operating in the urban littoral must first *get* to the fight, in order to *conduct the fight*.

In the previous chapter, this paper introduced the overarching concept of urban littoral combat as a complex adaptive system that represents 'the worst of both worlds'. In thinking about the future and coming to grips with the complexity of the subject, two other concepts or narrative devices emerged, the first being that of the 'Poor Man's Wars,' that is the ability of our enemies – state or non-state – to use a variety of weapons and effects to fight war on the cheap. The second concept is that of 'A Tale of Two Cities'. It is one way to understand the projection of force from one city to another within a world that is increasingly urbanised within the littoral region.

It also attempts to illustrate the new connectedness of the battlespace with the home front. Together, these concepts provide a context for studying future urban littoral combat.

The poor man's war

Considered individually, amphibious and urban operations are difficult forms of combat. Based on the mega trends identified and the analysis of the future operating environment, either urban operations or amphibious operations conducted individually would be beyond the scope of the ADF. Combining the two into a model of urban littoral combat paints a vision where the ADF is numerically insignificant, its technology irrelevant and its doctrine and operational mind-sets unsuited. It posits a future where a conventional, hybrid or even a well-armed irregular force postured in defence accrues significant advantages for a relatively small cost. The attacker on the other hand enjoys no such benefits and in fact, suffers significant disadvantages with a likely high cost in blood and treasure. In short, it paints a vision of the 'poor man's wars'.

Pre-emptive actions in the region will be important. This is likely to be a whole of government effort. If the 'fragile' city is the most likely crisis location of the future, Australia has a vested interest to ensure that cities in the Indo-Pacific do not become fragile. This would suggest the whole of government focus on the ecology of cities, urban planning, and understanding the life cycle of a city. It may also mean ensuring fragile cities have Internet connectivity so that they may join the globalised, networked economy. If this forms a part of foreign aid efforts, it should also form a fundamental component of military knowledge for armies aspiring to operate in cities.

Currently, defensive capabilities afforded by the proliferation of relatively cheap A2/AD technologies in the littoral and anti-armour/anti-aircraft weapon systems in the urban environment favour the defence and provide non-state and hybrid actors a competitive edge. The assumption in this paper is that the Australian Army will be acting in an expeditionary role and so it will not enjoy the benefits afforded to the defender. The challenge for Western militaries will be to develop technologies, systems and capabilities that negate this advantage. At its extreme, this may include turning these defensive advantages to one's own favour: pre-emptively deploying to an archipelagic location affording control of a key, contested littoral and placing one's own A2/AD systems down first. In this way, an amphibious force could partake in the advantages afforded in the 'poor man's wars'.

But any subsequent discussion must include cyber warfare capabilities at both the tactical and strategic levels. Cyber-warfare also provides the 'poor man' with a capability that must be defeated if Australia is to operate in the future urban littoral. There is certainly enough evidence to suggest that engaging enemies (and their societies) within the cyber domain will be a staple element of the future operating environment. This goes well beyond the traditional scope of electronic warfare and may include denial of service attacks, informational warfare and attacking key defensive weapon systems. It will surely include capabilities to protect the 'home front' and bolster public opinion. Such is its importance that we may scarcely envision how all-encompassing cyber warfare capabilities within the ADF and joint agencies may become.

Even though this paper has dealt with high-end component of urban combat, the propensity for crises in a 'fragile' city to mutate, and for stability and peacekeeping missions to move into urban combat, is high. A robust urban combat capability is a pre-requisite even if the ADF only wants to conduct stability operations in the future. Moreover, previous chapters have demonstrated that within the future operating environment the delineation between 'war and peace' and 'stability operations and combat' will be arbitrary and misleading.

A tale of two cities

In the urban littoral environment, an amphibious operation is a 'tale of two cities' – the first city is the point of embarkation and the second, the city comprising the objective. The cities are very likely to be dissimilar in most aspects but linked by the sea as the common passageway between them. This passageway may be contested; if not the immediate region surrounding the objective is likely to be. As it stands, an amphibious capability has multiple points of failure. Achieving true strategic surprise is now difficult. However control of the air and sea (meaning the immediate operational area) is a necessary precondition for amphibious operations. This has ramifications in force design, equipment acquisition and doctrine. The projection of power requires:

- Ability to marshal sufficient troops, materiel and supplies in the first instance
- Ability to transport troops and supplies to objective safely (this includes capital ships, specialist amphibious vessels and the ability to

defend itself. It may also include ships taken up from trade [STUFT]). Inherent in this requirement are the cross-domain effects to protect the amphibious force en route and create the preconditions for a successful move into the urban littoral.

- Ability to land contested, whether directly on to an objective or to a build-up area for subsequent breakout. It may be assumed that if it is known that an amphibious capability cannot conduct forcible entry, but relies on securing safer areas to land, then the areas where it may land are more easily identifiable and thus targetable for counter attack.
- Ability to reinforce initial forces with follow-on forces. This also includes the ability to support subsequent manoeuvre with joint fires. This presupposes that air and sea assets are sufficiently capable in ensuring air and sea superiority to the force afloat *and* provide fires to ground forces. Conversely, it also suggests that land forces may be equipped with surface to air and surface to ship systems that support the manoeuvre of air and sea assets in the littoral. It also presupposes that mortars and/or artillery can be stored on the ships, moved by a ship-to-shore connector and inserted into the battle-space to support ground combat.
- Ability to sustain forces in extended operations. Logistics affect the rate of build-up and the ability to sustain operations. The more intensive the combat during force protection and force projection ashore, the more acute the pressures on logistics are. Inherent in this requirement is the ability of the expeditionary force to have the depth of manpower, as well as the will to commit such on-going manpower to operations in the urban littoral.

While amphibious doctrine is relatively established in many countries, what is less cogent are developing concepts such as ‘sea-basing’ (not pushing logistics ashore to be stockpiled, but rather conducting resupply directly to and from the ship afloat in the operational area to the ground forces deployed) and ‘ship to objective manoeuvre.’ As they stand currently, these concepts seem divorced from the realities of the modern littoral operating environment or the practical limitations of current sealift and ship-to shore connectors. The underlying issues these concepts are meant to address cannot and must not, be ‘wished away’.

The ‘tale of two cities’ highlights the radical departure the investment in the amphibious capability represents. Previously Australian forces were ‘expeditionary’ in the sense of serving overseas from a staging point and being supported by allies, thus allowing a small and discretionary commitment. This is markedly different to the notion of projecting power into the urban littoral from the Australian mainland. There can be no half measures – a country cannot have an ersatz amphibious capability. No amphibious capability exists without the ability to project, survive, conduct forcible entry, supply and reinforce forces.

Ramifications for an Australian Maritime Strategy

Any future Australian maritime strategy will be a key influencer of the Australian amphibious capability, guiding how it might be used and how it works within a broader exercise of national power. Conversely, the national will, military power and technical capacity embodied in an amphibious capability will fundamentally alter the character and scope of the overall maritime strategy.

This paper has demonstrated that the future urban littoral operating environment prohibits the notion of a truly self-reliant Australian amphibious capability able to act unilaterally, except in the most permissive of environments. The paper has also demonstrated that an amphibious capability unable to conduct forcible entry lacks credibility and therefore is not an amphibious capability at all: it is simply a collection of force elements afloat. Therefore, any future amphibious capability must work within the US alliance, coupled with sustained engagement with regional allies to maintain access and ensure support while operating in the regional littorals.

The ADF must devote itself to developing force capabilities to operate in the urban littoral, not the open seas, blue skies and green fields. First, the ADF must commit to developing counter measures against the pervasive A2/AD systems. This suggests a need to discover kinetic and non-kinetic counter measures and/or guarantee localised air/sea superiority; develop innovative ship to shore connectors and formulate and prove new doctrine to facilitate littoral manoeuvre. Second, the ADF must be prepared to operate in cities, which has ramifications for doctrine, manning and organisations, and equipment. It also means embarking on a scholarly journey to discover the means by which to influence and control cities with a small force; in effect seeking a form of military acupuncture to affect key pressure points in a city to achieve a holistic result. This suggests a quantum leap in capability and a

marked change in the operational mindset. Such a capability will be costly to develop and sustain. Funding a credible amphibious capability is the price of admission to be an active participant in the future operating environment of the Indo-Pacific littoral: anything less results in an amphibious capability unable to contribute to the Australian maritime strategy.

A maritime strategy should seek to incorporate the elements of national power to assure a country can exist and prosper in its maritime environment. In this way, a maritime strategy is the stated means which a nation uses its maritime power. To this end, Vijay Sakhuja posited a variation of Cline's 'perceived national power calculus' for 'perceived maritime power':

(G+E+M+T)(S+W), where:

- G=Geographic factors (littorals have high traffic density, fishing and other economic activity, piracy, confluence of river systems, may be more susceptible to climate change, archipelagos canalise movements)
- E=Economic capability (natural resources, manufacturing base, education, international connectedness with international economy, levels of workforce participation)
- M=Military Capability (for example, the ADF as a whole and the potency of the amphibious capability in particular)
- T= Technological Capability (the influence of technology on all aspects of the economy, on education, on research and development)
- S=Strategic Purpose (what does the harnessing and exercising of Australia's national power hope to achieve in its immediate maritime environment?)
- W= Will to use a maritime strategy ('maritime-ness'). (The critical element –this is the national will, ability to harness national resources and the will to commit forces.)[125]

Sakhuja's calculus is elegant and simple; it is also stark and confronting. The first chapter of this paper dealt largely with the geographic factors (G), the economic factors (E) and the effects of technology (T). The second chapter focused on the military capability (M), strategic purpose (S) and will to use a maritime strategy (W). The current and future Defence White Papers will largely determine the strategic purpose and will guide subordinate

decisions. If the Australian maritime strategy (S) is based on a more active and interventionist stance, it may have the possibility to draw Australia into more potential conflicts. A strategy underpinned by an amphibious capability, marks Australia as a participant in the contested space of the Asia Pacific urban littoral. Any Australian amphibious military capability (M) operating in the urban littoral must contribute to the fulfilment of the maritime strategy. This can only be achieved by ensuring the amphibious capability's contribution to the maritime strategy is cogent. For the Army, it must ensure that not only its own contribution, but also those of the other services, are manned, equipped and trained to succeed. In short, the Army must prepare to survive, fight and win in the urban-littoral. But the stated intention and theoretical capability to exercise a maritime strategy in the urban littoral also requires the will to *execute* the strategy and *use* the capability (W). This will be the crucial element. Does the Government have the will to commit forces into the urban littoral? Does it have the will to harness the national resources required for sustained operations? Is it willing to signal that things are 'no longer business as usual'? Is the home front resilient enough to deal with Australian casualties as well adversary actions across the different spectrums?

Conclusion

Urban littoral combat will combine the technical complexity of amphibious operations with the brutality and human cost of urban operations. It will be conducted in an environment of increased urbanisation, globalisation and strategic interest in the world's urban littorals. Viewed as an ever-emerging complex adaptive system, urban littoral combat incorporates Clausewitz's trinity of chaos, friction and chance. This adds potency and unpredictability to an already dynamic system. With the majority of the world's population residing there, and with war being a human endeavour, it will be increasingly difficult to avoid fighting in the urban littoral. Indeed the ADF, with its new amphibious capability has committed itself to operating in the immediate region's urban littoral.

The combination of the constants and trends were portrayed through the narrative devices of the 'Poor Man's War's and the 'Tale of Two Cities.' This paper has argued that operations in the urban littoral are much more than the sum of the already bloody, dangerous and costly parts of urban and amphibious operations. To this end, this paper concludes with the reaffirmation that future urban-littoral combat represents 'the worst of both worlds.'

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