The recent Defence Capability Review has endorsed in principle the provision of replacement tanks for the Army’s Leopard I fleet, the replacement since publicly announced to be an M1 Abrams variant. Since the campaign in Iraq, armour has again become an issue for land forces as, increasingly, armies confront the realities of 21st Century urban combat. The long running and bitter argument in the US over the force structure for light and highly deployable army forces brings this whole issue into focus. What direction should Australia be taking in provisioning the Army with armour over coming decades? The key questions revolve around the style of combat and the type of terrain on which the Army will have to fight. Will it be the open terrain of Middle Eastern deserts or Asian lowlands and steppes; will it be the complex forested and jungle terrain of the Asia-Pacific and northern Australia; or will it be complex urban terrain found globally?
Experience in recent urban campaigns has reaffirmed experience from the 1940s. Armour must be heavy enough to protect the troops and drive through buildings, and it must also be capable of fire control. But since the 1970s presents an armoured-centre land force with the reality that survival is contingent upon having air superiority or unusually good terrain cover like dense forests, jungle or dense urban terrain. Does this threat invalidate the tank and armoured infantry carrier as a vital land warfare asset? Far from it, as was demonstrated in Iraq earlier this year. While much has been said about the paucity of tank vs tank engagements in ISAF, the reality is that the 3 AD and 1 MEF tanks performed the critical role of an ‘avant’ against which all air power was called in support. The Army today operates a mix of obsolescent Leopard I medium tanks along with several hundred armoured personnel carriers and reconnaissance vehicles, a need for land patrol and infantry mobility in the far North of Australia defined in the Dibb era, and the perceived need for high road mobility in this role. Much has changed since then across the region and globally, with the collapse of the Soviet Bloc, the emergence of Islamic fascism, and ongoing regional instability. Australia faces the prospect over coming decades of ongoing peace-enforcement and peacekeeping missions, plus participation in coalition campaigns against rogue states or Islamic fascist terrorist haven States. Most of such opponents use dense forest, jungle or urban terrain to prepare hidden defensive positions, which can limit in current sensor technology can be extremely difficult to locate using airborne assets. Such defences may only be detected at tens of metres, and possibly only by exposure through defending fire. This can exact significant losses in dismounted infantry, observed in jungle combat against the Japanese, NVA/VN and urban combat with Chechen insurgents. Such tactics are designed to produce a stream of politically damaging body bags and add an important political dimension to the strategic play of such an opponent. Empirical experience shows that armour produces an enormous reduction in infantry casualties (Roman Legions used shielded ‘turtle’ formations to defend against projectile fire 2000 years ago). What composition would be most suitable for a future armoured fleet? Several test criteria can be applied to identify the issues:

* High strategic mobility to permit rapid global and regional deployment by airlift and regionally by sealift.
* High off-road ground mobility over soft and undeveloped terrain, especially for use in regional contingencies. This strongly favours tracked vehicles.
* High urban mobility in rubble and barricade rich environments. This strongly favours tracked vehicles.
* Minimal fuel burn to reduce the size of the supporting logistical train in theatre.
* Armour capable of resisting a wide range of armour piercing man portable weapons, guided and unguided, and guns of low and medium calibre.

* A weapon package capable of defeating opposing armour, bunkers/fortifications, and infantry, and able to produce intensive suppressive fire. Shorter barrelled main guns trade engagement range for mobility in complex terrain and may impose some limitations on usable munition types.

* Ability to fight at night, using thermal imaging and image intensifying sights.
* Effective air conditioning to improve crew endurance in hot/humid regional and desert environments.
* NBC filtering systems to protect the crew against radiological, biological and chemical agents on the battlefield.
* Fire suppression systems to improve survivability.
* High supportability using Australia’s industrial base.

The Guderian model saw tanks as the ‘Scherpunkt’ or spearhead of a manoeuvre force, rushing through a soft spot in opposing defences and then driving deep into enemy terrain to cut lines of supply and encircle defending forces. Supported by mechanised infantry and special forces, and with then new wireless communications, the Wehrmacht and Waffen SS Panzer and Panzer-Grenadier divisions demolished everything in their path. What is often forgotten about these archetypal land manoeuvre campaigns is that these were in modern terms ‘all arms joint campaigns’ with Luftwaffe Ju-87 Stukas hammering opposing strongpoints and supply columns, and Waffen SS special forces teams penetrating deep to disrupt opposing defences and secure key bridges – all under the protective umbrella of watchful Messerschmitt Bf-109 air superiority fighters. Air dominance created an environment in which the combination of accurate bombers, Panzers, mechanised infantry and special forces could not be challenged. The gargantuan Battle of Kursk in which thousands of German Panzer IVs, Panthers and Tigers slugged it out with Soviet T-34s remains like the Battle of Jutland – more a historical anomaly than the rule. Large tank battles have been infrequent occurrences since the beginning of tank warfare, but deep threats by combined manoeuvre forces – led by tanks and direct fire support for infantry assaults – remain the most frequent roles of the modern tank. Mobility and protection for infantry have seen armoured personnel carriers dominate build numbers in armoured vehicles since 1940s. The Battle of Bulge set the trend for the latter half of the last century. With the absence air power, the Panzer divisions were highly effective but once the weather cleared they were massed by allied air power. Iraq’s attempts at tank warfare in 1991 and earlier this year revealed how to shoot for coalition pilots dropping smart bombs. The evolution of nap-of-the-earth tank killing helicopters with IRST and TV sensors since the 1970s presents an armoured-centre land force with the reality that survival is contingent upon having air superiority or unusually good terrain cover like dense forests, jungle or dense urban terrain. The Abrams M1A1 chosen by the Australian Army to replace its Leopard I battle tanks will provide increased firepower and better force protection plus networked force capability. Force protection is critical to any future armoured fleet composition.
Tank options

In the post Cold War era the world is awash with used tanks, be they of NATO or SovBloc origin. Russian tanks even of very late vintage are available very cheaply. Not so cheap but with better maintenance histories and more advanced are surplus US and EU tanks. Public comments by Defence before the announcement indicated that the two contenders for the Leopard 1 replacement were the German Kraus-Maffei Leopard 2A5, a direct descendent of the ‘big cat’ Panzer family evolved from the 1977 Leopard 2 series, and the US M1A1/M1A2 Abrams series operated by US Army and Marines.

As a fire support platform both types are an over-kill, as they have 120 mm main guns, and both are in the main battle tank category designed primarily to kill other tanks at long range using saber rounds like the 120mm, improved alloy M829 series. Both weigh around 60 tonnes and are impractical to airlift unless a whole C-17A or C-5B aircraft is committed to a single tank, so selflift is the only real option for deployment. The only recently designed fire support vehicle that is airlift friendly is the M8 Armoured Gun System (AGS), a replacement for the troubled M551 Sheridan. The M8 never made into production but retains some very vocal advocates in the US. While both tanks are very different designs, in cardinal specifications they both reflect the same design aim of killing Sov Bloc armour in the Fulda Gap. The biggest single distinction in design concept is the powerplant, the Leopard 2 being diesel and the Abrams gas turbine powered.

During the late Cold War around 3,200 Leopard 2 tanks were built for Germany, Holland, Austria, Denmark, Switzerland, Norway, Sweden, and Spain. A good number of late variant 2A4 and 2A5 hulls have been upgraded to the latest 2A6, 2A6-EX configurations. Late model Leopard 2A5s typically use a longwave thermal imaging sight and laser rangefinder, and Germany’s NATO ISLE/GPS/inertial nav system. Older Leopard 2s are armed with the Rheinmetall L44 ‘short’ 120 mm gun (later models the ‘long’ L55 gun) designed for the DM53 KE penetrator round, with a coaxial 7.62 mm machine gun. Most Leopard 2s are powered by variants of the 1,500 SHP MTU MB 837 diesel engine.

Of the many Leopard 2 variants the most interesting configuration is the Strv 122 variant of the 2A5, with a short barrel version of the 120 mm gun, improved armour, and a comprehensive STN ATLAS Electronic command and control package permitting its use as a C3 node for an infantry assault force. The M1 / M1A1 / M1A2 Abrams is the best known of modern main battle tanks due to its extensive media exposure in Iraq since 1991. It is a contemporary of the Leopard 2 series, with early model Chrysler M1 Abrams entering production in 1978, armed with a 105 mm M68A1 rifled gun common to the late M60 tank, with a coaxial M240 7.62 mm gun. Around 2,500 were built, supplanted by the improved M1A1 in 1985, armed with the Rheinmetall M256 120 mm smoothbore gun, of which 478 were built by 1995. The current M1A2 is essentially a block upgrade, applied to M1 or M1A1. The M1A1ID is a digital upgrade to the baseline M1A1 systems. All variants are produced by the Lycoming Textron 1,500 SHP AGT-1500 / L-100 gas turbine, with the new L-100-5 planned as a retrofit. Weight is an issue for the later model Abrams, sharing a common engine. With combat weights around 70 tonnes for the M1A1 and M1A2, this 3.6 hp/ton weight ratio is well below the first generation 60 tonne Modernized M1 series used a stabilised main gun aiming system, a laser rangefinder, and subject to variant a range of thermal imager configurations. With a wide range of variants and subtypes, a multiplicity of upgrade packages, and the varying conditions of different inventories of surplus vehicles there is no simple answer as to which tank was technically more viable. The pragmatic reality is that the perception that the M1 is easier to support in coalitions operations was likely to have been the decisive factor.

In terms of numbers, two factors come into play. With modern ranging main guns the Leopard 2 and M1A1 / M1A2 can cover a much larger footprint than the Leopard 1 in open country, permitting replacement with smaller numbers. This runs contrary to a need for minimal ‘critical mass’ force numbers to have enough units in enough places at once, and the reality that in urban and jungle combat main gun range is not a factor.

Conclusions

The key issues for Australia’s armour in the nearer and longer terms will be suitability for urban/jungle combat and strategic mobility. The reality of the Leopard 1 replacement will be a main battle tank simply because that is where the best surplus deals are to be found. Australia needs a cohesive long term ‘roadmap’ for its armoured fleet. The relatively sedate rate of technology evolution in this area facilitates longer term planning of upgrades and support. The reality is that the armoured vehicles we will see built in 2020 are likely to differ from current designs mostly in systems. Since the collapse of the tank-obsessed Soviets, there have been no new players in the market building thousands of tanks and pushing out new designs once a decade. It is perhaps one of the great paradoxes of our time that airpower has brought about a 120 mm armoured tank by driving opponents off open battlefields and into complex terrain such as urban areas and jungles. Evolution always seems to have its way.