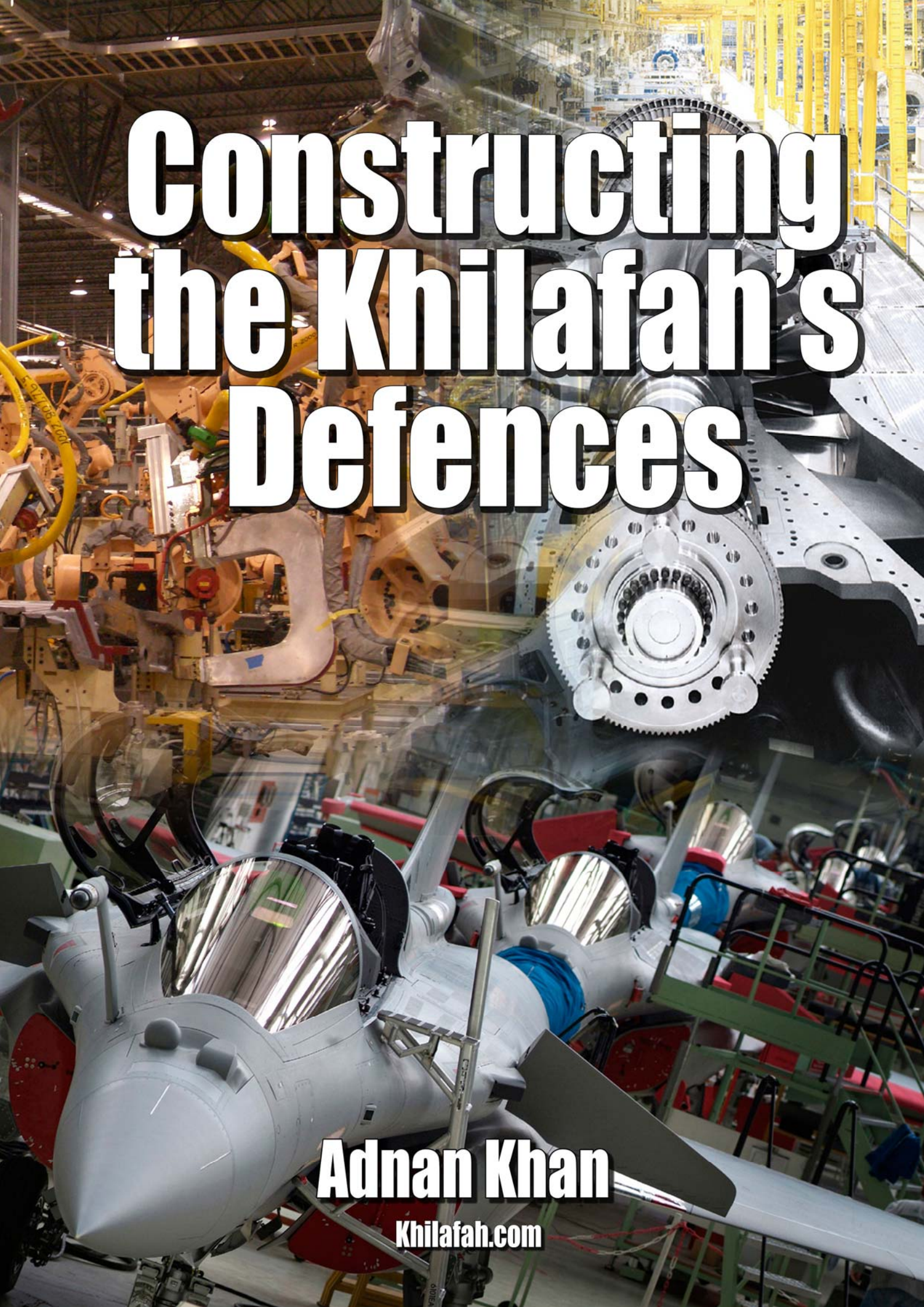
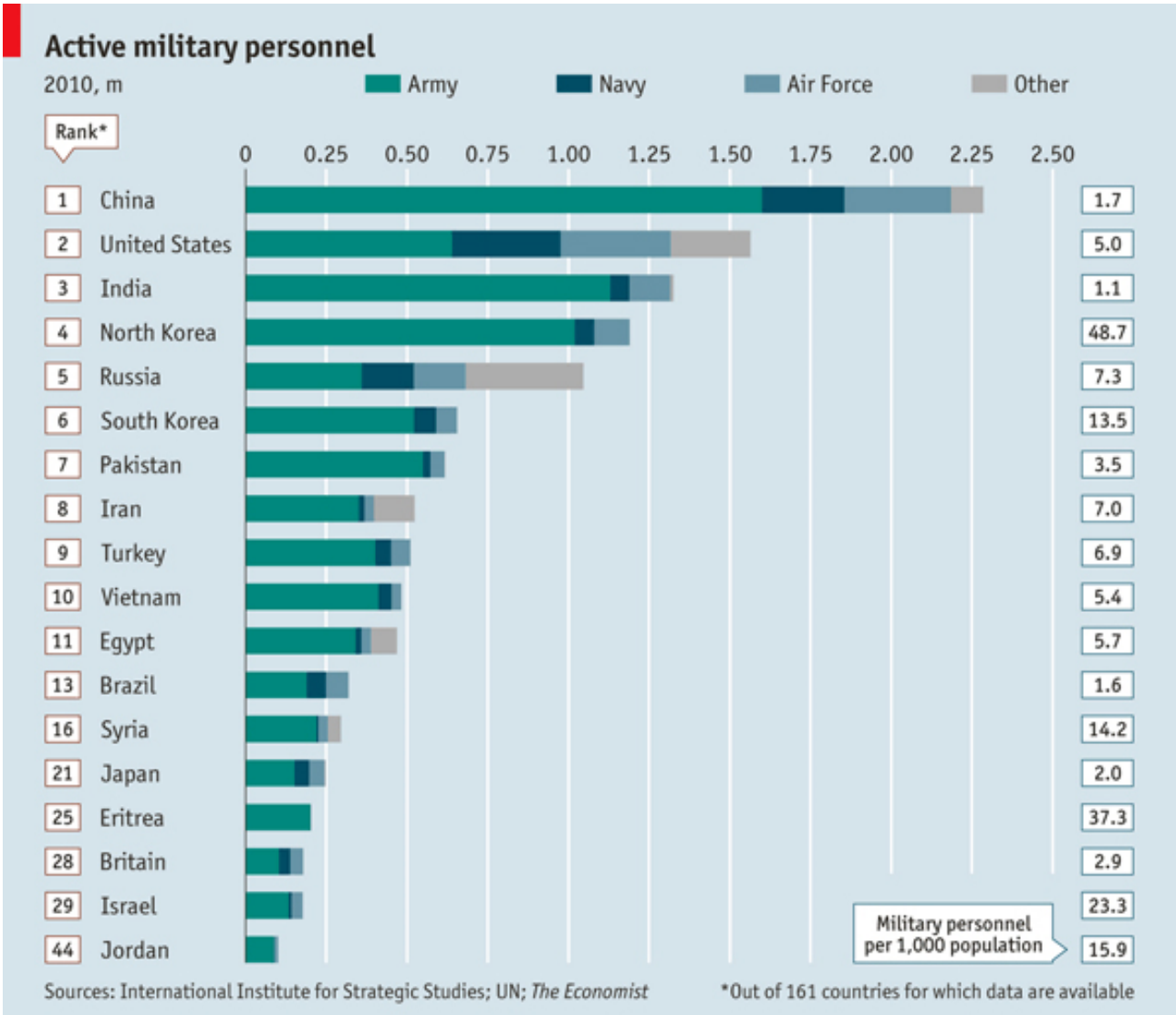


Constructing the Khilafah's Defences

Adnan Khan

Khilafah.com

"The rise and continued success of great powers hinges upon the strength of their economic base, of which the defence industrial base is a key, if not the most critical, component."



"[The] historical record suggests that there is a very clear connection in the long run between an individual Great Power's economic rise and fall and its growth and decline as an important military power… Technological and organizational breakthroughs...bring greater advantage to one society than another."

Paul Kennedy. *The Rise and Fall of Great Powers: Economic Change and Military Conflict from 1500 to 2000*

Content

Introduction

The ability of any nation or people to defend its borders from foreign threats has been part of human existence from the very beginning of time. For a nation to be considered independent, protecting its territorial integrity is essential otherwise its very existence comes into question. A nation that is able to secure its territorial integrity can then focus on internal development and prosperity, not having to worry about external interference. This situation is achieved through the development of an industrial base that manufacturers military equipment. This then makes a nation capable of defending its borders and also makes it self-sufficient in this endeavour. This deterrent capability also gives a nation power projection capabilities, this then allows it to play a role in the world well beyond its borders.

Throughout history civilisations, nations, tribes and empires constructed armies to defend their lands, they built weapons industries of varying types and harnessed whatever technology was possible in their era to defend their lands and project power. A cursory glance at history shows world powers all possessed armies, advanced weapons and a cutting edge over their competitors. The Roman Empire, the British empire, the USA, Bonaparte's France, Nazi Germany, Imperial Japan, the Soviet Union, China as well as the Khilafah, all constructed military industries and armies so they could defend their borders and project power globally.

It is not surprising those nations that have advanced military industries are also the world's powers and have developed an international system that protects their interests. When we look at the Muslim world however we find most nations are not independent with their military requirements and most of them rely on the west for basic security, this is why it is not surprising that none of the Muslim nations influence the global balance of power.

Constructing the Khilafah's defences will be one of the most critical areas on its establishment as defending the Ummah and projecting power will be critical issues. This book is the fifth in a series looking at how the Khilafah would deal with critical areas of a new state. Industry, education, energy and foreign policy have been researched and analysed in previous publications. This book will analyse how a nation in the modern era secures its borders, projects power and create an image of strength. It will analyse the military strength of the world's powers in order to encapsulate the factors the future Khilafah state will need to consider. It will analyse the state of the defence-industrial base in the Muslim countries assessing where the strengths are and where development is needed. This book also analyses polices the Khilafah will need to pursue in order to defend the homeland and build its defences.

The views and opinions expressed in this book are the authors.

Adnan Khan
29 Ramadan 1435
27 July 2014

21st Century Warfare

The starting point for any nation's security begins with the development of a military-security doctrine. This doctrine shapes the nations posture, laying out clear aims and a nation's perceived threats. This will then determine the types of weapons systems that should be developed or acquired and how military forces should be structured.

A doctrine is a guide to action and not rules or regulations. A doctrine provides a common frame of reference across the military. It is a clear strategy and definable set of threats. It helps standardise operations, facilitating readiness by establishing common ways of accomplishing military tasks. A doctrine links theory, history, experimentation, and practice. Its objective is to foster initiative and creative thinking. A doctrine provides the military with an authoritative body of statements on how military forces conduct operations and provides a common lexicon for use by military planners and leaders. NATO's definition of doctrine, used unaltered by many member nations, is: "*Fundamental principles by which the military forces guide their actions in support of objectives. It is authoritative but requires judgment in application.*"[1]

Upon determining a nation's security doctrine, one can construct an industrial base that will allow for the aims of the doctrine to be achieved. A defence industrial base is the industrial assets that produce the equipment for a country's armed forces. Any nation will need to make a decision on what its industrial capacity is and where it should be, and what, if anything, should be developed or brought in from abroad. Any industrial base will be determined by a nation's strategic doctrine - this will clearly outline threat perceptions, deployment of forces, procurement priorities and technology systems. An industrial base needs the construction of infrastructure necessary to support nation's military-defence industries. Alongside this transport systems, power generation and transmission networks as well as mineral processing facilities need to be constructed, maintained and expanded as and when needed.

In order to defend any nation's homeland the land, air and sea needs to be secured. Infantry (ground forces) protect a nation's borders by securing territory. They will need to be armed individually and in structured units and transported to the battlefield. Mobilising ground forces is through them being mobile, which is achieved through the utilisation of Tanks, Personal Armoured Carriers (APC) and Artillery.

The airspace of a nation will also need to be secured from foreign aggressors. Fighter jets are the primary platform used to achieve this along with missiles.

The third theatre is the sea. Through a nation's navy, combat in and on seas, oceans, or any other major bodies take place. Dominating naval warfare requires ships – cruisers, destroyers and frigates. It also needs submarines and aircraft carriers which in the modern era gives a nation significant power projection capability.

These are the traditional theatres for warfare and have historically been the battle-space war has taken place in. There are other theatres that are developing such as outer space and information. Weaponising space has long been an aim of the world's powers. This is placing weapons in space that can target enemy assets on the planet. The development of Intercontinental Ballistic Missiles (ICBM) is what gave prominence to this theatre. Information warfare includes cyber warfare, sabotage, espionage and hacking. The need for military personnel to communicate in real time and ensure they are working in an integrated way led to rapid developments in communications, especially the internet, this area is now considered the electronic battlefield.

CAST STUDY: Russia's military doctrine: Past, Present and Future

Over the decades, Russia's military doctrine has shifted according to the perceived threats and types of war that Moscow believed it would face. The military doctrine and strategy under Josef Stalin following World War II was to create large land forces able to face a protracted, large-scale, years long land war. This military doctrine shifted under Nikita Krushchev because the Soviet Union's development of nuclear weapons made nuclear war more likely as the Cold war was well underway. Under Leonid Brezhnev, a more balanced military doctrine was put in place with broad concepts of war to account for various land and nuclear war scenarios. The aggressive military doctrines of these Soviet leaders started to falter in the 1980s, shifting to a more defensive state as the Russians realized that they overextended their military potential.

The military doctrines that followed the fall of the Soviet Union was an attempt to figure out how to sustain large military and military industrial complex during a time when Russia was feeling the looming threat of NATO and facing significant domestic separatist threats. The military and its industrial complex in the 1990s were chaotic, top-heavy and lacked any political will from the Kremlin to fix its problems. The Kremlin's focus on the Russian military and its doctrine started to take serious shape in 2000 under Vladimir Putin. His main focus was to reorganise the Russian military, purge the glut and shift to a tighter and smaller military. The 2000 Russian doctrine was meant to be a period of transition for the military and industrial complex. It set up the Russian military to be defensive in character during this period. By 2006, Russia had started to come up with a coherent plan for its future - one based on internal consolidation and a future push out into its traditional sphere of influence. This new mindset of a stronger Russia was reflected in its next military doctrine formalized in 2009 into the National Security Strategy to 2020 (NSS2020).

Making War

Since the dawn of time, war has been permanent feature of the human condition. Throughout the ages war has changed as new developments emerged, the use of gunpowder revolutionised war as well as industrial war in the 20th century.

Over the last few decades war has shifted from confined spaces with lots of troops and equipment, such as the tank battles in the Sinai in 1973. This has shifted to vast spaces that include cities and deserts with small numbers of combatants hidden inside them. Whilst killing the enemy was easy, finding him is what was difficult. The ability to locate him is what constitutes the real weapon of war. In the wars of the past, which were largely industrial wars it was just a matter of killing the enemy at its centre of gravity. In the 21st century there will still be state-to-state warfare. But for the past few decades what is defined as unconventional war or guerrilla war means a vast battle space with small numbers of combatants hiding inside that space.

Precision guided weapons in the 21st century are the weapons of choice. They were introduced in the 1970's by the US when they destroyed a critical bridge in Vietnam, which they had failed to do for years. Prior to this it took thousands of bombs to take out a target. This required hundreds of planes, large numbers of crews, steel factories, aluminium factories which all acted as supply lines. The industrial nature of war grew due to the imprecision of weapons. In WW1 it took 10,000 rounds of ammunition to kill one man as a result a large numbers of weapons were needed. With the introduction of precision-guided munitions a plane with one piece of munitions (e.g. missile) would able to destroy the enemy. Today one aircraft has the same lethality as hundreds in the past. Today a precision-guided munition, guided by satellites, no longer requires huge ordnance to do damage. A single drone firing a medium or small-size missile can do the same amount of damage as decades ago would take a whole wing of an air force to drop. In WW2 thousand-bomber raids that killed tens of thousands of people, took place just to destroy one factory. Such a target today can be attacked by a single drone.

The 1991 war between the US and Iraq precipitated a major rethink in military doctrine. Especially amongst those that relied upon the soviet doctrine which emphasised an extremely large number of ground forces who were generally poorly equipped, as guarantors against possible invasion by external powers. What became clear from the annihilation of the Iraqi army, which was similarly equipped and followed a similar doctrine to the Soviet military was that modern precision weapons could quickly obliterate soviet era equipment, and that the standoff afforded by these systems ensured minimal casualties to the military force using them

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The Revolution in Military Affairs (RMA), which continues today, has transformed warfare. This war theory proposed the use of revolutionary technology over personnel numbers. Large mechanised formations are easily neutralised by helicopters and fixed wing aircraft equipped with precision anti-tank guided munitions (ATGM). Furthermore situational awareness from C4i systems (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance) has a force multiplier effect, which allows relatively small armies to defeat much larger less sophisticated armies. C4i refers to the ability of military commanders to utilize cyberspace, computers and modern communications technology to direct forces in real time in a battle zone.

Platform development

The development of any military platform goes through a number of stages. From the initial design, a prototype is built and then tested to ensure all the different parts work individually and collectively together. Platforms go through simulated exercises and are thereafter tested in a real world setting, making adjustments and design improvements as issues arise. The design, engineering, and production of any complex system require special skills, tools, and experience. As there is no design handbook of practices to guide engineers and managers in developing complex platforms, engineers and managers must learn from trial-and-error experience. The large-scale integration experience gained from developing such complex systems is what leads to progress and the innovation of new platforms.

The F-22 Raptor was announced in 1991 to be the US militaries first 5th generation fighter aircraft. This would be the world's first aircraft that would integrate stealth, super cruise, advanced avionics, manoeuvrability and weapons in one platform. The first prototype was tested in 1997. Various issues arose from which design alterations were required – something common with new platforms. This development phase lasted until 2005 when the Raptor reached its Initial Operational Capability (IOC). In 2012 several F22's were deployed to the Middle East in the first real world deployment of the platform. As many platforms are complex machines they take years of design and even more years of testing and amendments to the hundreds and thousands of parts.

Any given military platform, from an armoured vehicle to an aircraft carrier, requires a lot of money in order to be ready for use at any time at its intended level of performance. These platforms require consistent use to maintain a certain readiness level because machines cannot sit idle for months to years and then operate effectively, especially if called on for immediate action. Moreover, the people that operate this equipment need to maintain their working knowledge and operational skill through continued use. This use causes wear and tear on the platform and requires constant maintenance. All of this is necessary just to maintain the status quo. In the end, there must be a

balance between a platform's readiness level and the amount of funding required for operations and maintenance, but if the money is no longer available there is no choice but to reduce readiness.

Also, upgrades are needed so platforms can stay up to date and useable within the system the military is using to move, shoot and communicate. This is a constant cycle that, when interrupted, has very long-lasting consequences. In the longer term, if new equipment is delayed this will put more pressure on existing platforms, requiring them to operate past their intended life spans, and will preclude or delay the introduction of better abilities into the military. Procurement cycles are very slow and take decades to implement; for instance, the Navy that the US wants to have in 20 years is being planned now.

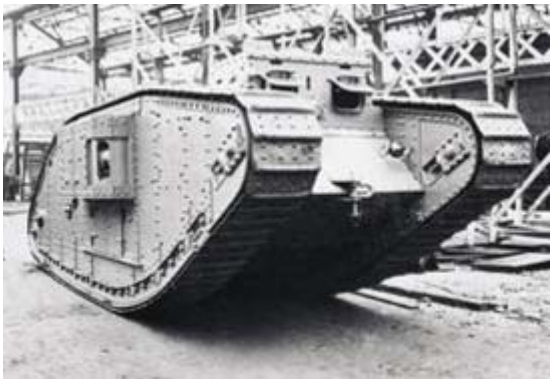
Infantry Warfare

Historically having a large standing Infantry was a competitive advantage. With the development of fighting tools, smaller mechanised infantry became the norm. Armed forces need to be armed and be highly mobile and deploy quickly. Tanks and Armed Personnel Carriers (APC) are central to this. A nations ground forces or infantryman will see the most fighting and the most bloody. In his comprehensive guide to modern warfare, James F Dunnigan outlined the life of an infantryman:

"Want to know what it's like to be an infantryman? Try this. You are in the outskirts of a largely abandoned town. The few remaining inhabitants take an occasional shot at you. A little more excitement comes from the seemingly random explosions caused by shells falling from the sky, or from earlier falling objects equipped with time-delay fuses. Your only protection is to seek shelter in half-wrecked buildings or dig a hole in the rain-sodden ground. You have not had a hot meal or bath for five weeks and are living on cold food out of a can or pouch. Your small groupof ragged companions waits for instructions to come over a radio. You will be told either to move towards an area experiencing more explosions, or in the other direction, where the mayhem level is a bit less. Your only escape from this nightmare is to be injured or killed."[2]

It is for this reason governments equip their infantryman as they are truly the front lines in any war and also the most likely to be on the receiving end of the enemies firepower. In addition to protective clothing the modern infantryman carries significant amounts of modern electronic equipment.

Tanks



Great Britain developed the modern tank in the early 1900s as a response to the rise of trench warfare**.** In the battles of World War I, opposing forces dug trenches to halt enemy advances. To advance any ground, soldiers had to storm the enemy's trench, sacrificing dozens of men for the chance that a few might make it through the mud and hail of bullets. An armoured 'land boat' was needed that could plough through mud, barbed

wire and heavy fire to clear a path for infantry troops. Tanks are tracked and the Main Battle Tank (MBT) today, serves the role of the main weapon system for a high intensity offensive or defensive land war. They are constructed to achieve three opposing outcomes: **firepower, protection, and mobility**.

Tanks today are constructed in industrial facilities on production lines. The armour of tanks is the most important and is first constructed through the use of a combination of materials and metals such as steel, aluminium, iron, titanium, uranium, plastic, ceramic and composite.

The hull, the bottom portion of the tank, is the track system and an armoured body containing the engine and transmission.

Tanks usually have Gas turbine engines which have a much better power-to-weight ratio than reciprocating engines. They provide a lot more power without adding a lot of weight. Turbine engines are also a lot smaller than comparable reciprocating engines, so you can do more with the available space on the tank.

CASE STUDY: Steel Armour plate Production

Steel armour plate production process is highly technical and complex. The **melting** stage is the first phase of steel armour plate production. Steel scrap comes from a variety of sources including demolished automobiles and buildings. The molten scrap metal is refined and purified in a furnace, and chemical elements such as chromium are added to create an alloy with the desired chemical properties. At the end of this phase, the molten metal is either cast as slabs or poured into ingot molds for thicker plates.

In the next phase, the slabs or ingots are heated to a specific temperature for **rolling**. The rolling process, aided by sophisticated computer programs, achieves the precise plate thickness and flatness.

Once the steel plate has been rolled, it is ready to be heat treated. **Heat treatment** is necessary for higher-grade steels, because it alters the physical properties to achieve the physical characteristics necessary to protect troops. The steel is heated and held at a high temperature, adding strength, and is then quenched (cooled rapidly) to make the steel even harder.

Since World War II, tanks have been a part of almost every major armed conflict. They helped secure victory for Israel in the many Arab-Israeli wars. These wars are considered some of the largest tank battles. Tanks fought in the Korean War, in the wars between Pakistan and India, in the jungles of Vietnam, and in the Iraq-Iran War of the 1980s, and they were a vital element of America's wars against Iraq.

Increasing protection by adding armour will result in an increase in weight and therefore decrease in mobility; increasing firepower by installing a larger gun will force the design team to increase armour. In the case of the Abrams Main Battle Tank (MBT) which has good firepower, speed and armour, these advantages are counterbalanced by its engine's notably high fuel consumption, which ultimately reduces its range, and in a larger sense its mobility.

Historically artillery was the king of the battlefield, producing more casualties than any other weapon. As the two world wars led to armed forces becoming more and more mobile and mechanised, the need for a way of transporting infantry to the front lines and around the battlefield without suffering from artillery became great and the armoured personnel carrier (APC) was born. Modern APCs face the same engineering challenges as the tank of having armour but remaining mobile. Unlike the tank APCs have wheels, giving them more manoeuvrability then a tank.

Logistics

In any military campaign, an appreciation of geography is key and getting your troops to where they should be and supplying them with various goods is critical. In James Dunnigan's guide to comprehensive warfare in the 21st century, the importance of logistics (or supply lines) was outlined:

"If the troops have no ammunition, they can't do much damage to their opponents. Without food and medical supplies, your soldiers will melt away without ever fighting the battle. Without spare parts and fuel for their vehicles and equipment, this gear quickly becomes inoperable. The task of supplying ammunition, food, fuel, spares and other items to the troops is called "logistics." It's not a very glamorous task and is often neglected, such lack of dedication normally leads to disasters. It's an ancient military maxim that 'amateurs study strategy and tactics, professional study logistics."[3]

Logistics is one of those topics that seldom gets headlines but is central to successfully wage war. In any war troops, weapons, equipment, supplies and many other items need to be shifted into the warzone and during the war be constantly moved again. As armies have become more mechanized more vehicles, more ammunition and more parts need to be supplied. A non-mechanized army requires 15-30 pounds of supply per man per day. Every 1000 ton of supply keeps 100,000 men in combat for a day. A railway, under war conditions moves around 50 or more carriages a day, which is equivalent to 20,000 tons a day. Trains are cheaper to utilise, but railways are not available all across the battle zone. Roads will also need to be used. Depending on the quality of the road around half of the traffic in trucks can be moved at even more expense. (More trucks, more breakdowns etc). Today's mechanized armies have more vehicles and weapons and require over 10 times as much supply per man. This is why it should be no surprise America's decade long wars in Iraq and Afghanistan will cost it $6 trillion.[4]

This is why all wars include the deliberate targeting of an opponent's supply lines, destroying a nations supply and transportation. The allies' blockade against Germany in WW1 succeeded in choking off German oil supplies. This was achieved by British forces systematically destroying the oilfields, dynamiting derricks, plugging wells, crippling pipelines, and setting storage tanks on fire.

With centuries of experience in warfare the West developed its views towards logistics. Today there are two different views towards logistics, the other was developed by the Soviet Union, which many of its clients also adopted. The Soviet system did not worry about spare parts, everything was expendable. If it breaks, the whole tank, jet, missile etc is just replaced rather than fixed. Lenin explained this as: *"Quantity has a quality of its own."* The Soviet military-industrial complex churned out military equipment in colossal numbers so when equipment broke down or was hit by the enemy it was allowed to fall by the wayside. In Soviet military thinking the priority was mainly munitions and fuel. Several days of reserves were maintained, food and other nonessential items in many cases would never reach most troops. Soldiers were therefore encouraged to live off occupied land.

CASE STUDY: Napoleons Logistical Nightmare

Not planning for logistics i.e. how supplies would be moved and planning for reserves, has led to many an army being crippled. In 1812, with his armies having swept all before them, Napoleon was at the zenith of his power. Yet within six months less than one in 20 of his soldiers would ever see their homes again. Gambling on a rapid victory against the Russian Empire and a campaign that would not last longer than three weeks he advanced with just 24 days rations. The Russians quickly fled when they faced Napoleons 'Grande Armee' of 400,000 troops in Ukraine, but they destroyed crops and supplies as they withdrew. When Napoleon entered Moscow after 4 months, he only had a quarter of his force as most had died of starvation, malnourishment or disease.

Napoleon had not planned for the most critical issues of war, namely logistics.

At the time, horses remained the chief means of moving men and supplies over difficult terrain until the Jeep was introduced by the US military in World War II. Winter horseshoes are equipped with little spikes that give a horse traction on snow and ice, and prevent it from slipping. Napoleons lack of planning on the logistical side resulted in his houses with smaller summer spikes, going into a war in winter. Without them, a horse can neither tow a wagon uphill, nor use them as brakes on the way down. It was a disaster from which he never recovered. When Jeeps were introduced, they were durable, reliable and flexible. They could be used for almost anything - towing, cable-laying, transporting casualties and supplies, and with the right wheels they could even drive on railway tracks. By the Vietnam war, the Jeep had given way to the helicopter.

Western nations have leaned towards high quality in their equipment and combat troops. A constant stream of replacement spares and other essentials keep combat troops constantly in action. The Soviet system, though pragmatic, always suffered from disruption and was prone to collapse. The Western system was flexible as it was based on on-the-spot decision making on parts and supplies and was thus able to adapt and survive the fluid nature of the battlefield. The increasing use of computers has made logistical planning more manageable, but has made supply lines the target of opposition armies in order to cripple any onslaught.

CASE STUDY: America's Afghan war and Logistics

Afghanistan is a landlocked nation with the centre of the country dominated by mountainous terrain with the exterior having flat terrain. With only Pakistan having access to the sea it became an important route for US supply lines along with Uzbekistan and Tajikistan. Afghanistan is approximately 700 Kilometres North and South and East and West. Supplies took two fundamental routes. Arriving by air and sea to Pakistan's Karachi port, supplies would then be placed in trucks and traverse Pakistani territory to Kabul and Kandahar. The Northern routes, which came to be known as the Northern Distribution Network (NDN) began in the Baltic Sea port of Riga, Latvia, where they were shipped from suppliers around the world. From there, they took about ten days to transit Russia, Kazakhstan, and Uzbekistan by Soviet era rail which could just about withstand the constant traffic, crossing into Afghanistan over the Friendship Bridge at Termez. Another branch of the route completely bypassed Russia, starting at the Black Sea port of Poti, in Georgia, snaking across Azerbaijan, the

Caspian Sea, Kazakhstan, then funnelling into southern Uzbekistan. The two routes come together at Termez, creating a bottleneck where supplies regularly languished for months. As a result most supplies were forced to be flown in. Until the US established bases in Afghanistan it was forced to use its transport Helicopters, which were limited to 240 kilometres. Without bases dotted around the country with the military's fuel, the campaign in Afghanistan may not have been possible

Asymmetric Warfare

In a conventional war, warfare is conducted by using military weapons and battlefield tactics between states in open confrontation. The forces on each side are well-defined, and fight using weapons that primarily target the opposing army, normally fought using conventional weapons. The general purpose of conventional warfare is to weaken or destroy the opponent's military force, resulting in eventual capitulation thereby negating its ability to engage in any war. In a conventional war the strength is superior firepower, resources and organization. This is why the modern armoured division, carrier battle group and fighter or bomber wing represent the optimized organization built around a platform designed to assault armies and societies. They remain the basic structure of modern warfare.

An Insurgency, sometimes called guerrilla warfare or irregular warfare, has been practiced for centuries across the world. One example of this was when Muhammed صلى الله عليه وسلم, conducted

asymmetrical military operations against the Quraysh, targeting their caravans and conducting hit-and-run attacks until he was able to amass the power necessary to conquer Mecca and expand the Islamic state to include all of the Arabian Peninsula.

The basic unit of guerrilla warfare is the individual and the squad. They are frequently unarmed - having hidden their weapons and when armed, they carry man-portable weapons such as rifles, rocket-propelled grenades or mortars. When unarmed, they cannot be easily distinguished from the surrounding population. They arm themselves at a time and place of their choosing - selected to minimize the probability of detection and interception. In the 20th century, insurgent theory was codified by leaders such as Russia's Vladimir Lenin, China's Mao Zedong, Vietnam's General Vo Nguyen Giap and Latin America's Che Guevara. At its core however, the theory is based on the historic concepts of declining battle when the enemy has superior forces and attacking at a time and place where the insurgents can mass sufficient forces to strike where the enemy is weak.

When a conventional force faces-off with an irregular force, as US forces did in both Afghanistan and Iraq, there are a number of factors that constrain the larger conventional force, whilst a number of factors propel the smaller irregular force well beyond its capabilities.

- **Mobility -** A conventional army lacks the mobility available to a much smaller irregular force. The sheer size of a conventional army, however small will never be smaller than an insurgent, this gives the insurgent the element of surprise, something not available to the conventional army. An armoured division in a conventional army would also have heavy weapons which further constrain its ability to be mobile. The insurgent on the other hand can blend into its host population and engage in guerrilla warfare as and when it chooses.

- **Supply lines –** The advantage of conventional militaries is their ability to amass a large standing force, with a wide spectrum of weapons systems on its enemy. When deployed, an air force, navy and ground force can overcome its enemy forcing it to capitulate. In any standing army each unit has a different purpose contributing to an overall objective. Infantry can be light or heavy or mechanized all of this requires secure supply lines. Supply lines are chains connected together and all it takes is one weak link, for the whole chain to fall apart. A technologically superior force has more vulnerable infrastructure which can be targeted with devastating results. This was something the Taliban successfully utilized against the Soviet invasion of Afghanistan. At the height of the fighting and the Taliban's ability to strike supply lines, 60% of Soviet forces were protecting vulnerable supply lines.

- **Centre of gravity -** Guerrilla war is extremely resistant to conventional military force because the massed systems that dominate mainstream operations cannot engage the guerrilla force. Even the mass annihilation or deportation of a population does not, in itself, guarantee the elimination of the guerrilla force. So long as a single survivor knows the location of the weapons caches, the guerrilla movement can readily revive itself. Because guerrilla warfare is organized in a decentralized manner this makes it difficult to cripple such a force as it has no critical nodes within its structure. A conventional force on the other hand is organized into units linked by supply lines, making each layer critical in the overall force. This why the Soviet Union and the US conducted mass slaughter on whole towns in

Afghanistan in the hope of eliminating the decentralized insurgent force. Due to this reality the counter-insurgency force has emerged as a direct result of this reality.

The advantage of the insurgent force over the invading army can be seen by taking the example of the Taliban in Afghanistan. The Taliban's objective like all insurgents was to survive. A domestic guerrilla group almost always has more staying power than an occupier, which is projecting force over a greater distance and has the added burden of a domestic population less directly committed to a war in a foreign, far-off land. The insurgent lives in the country. He isn't going anywhere, as he has nowhere to go. By contrast, the foreigner has a place to which he can return. This is the core weakness of the occupier and the strength of the guerrilla. The former can leave and in all likelihood, his nation will survive. The guerrilla can't. And having alternatives undermines the foreigner's will to fight regardless of the importance of the war to him. The strategy of the guerrilla is to make the option to withdraw more attractive. In order to do this, his strategic goal is simply to survive and fight on whatever level he can. His patience is built into who he is and what he is fighting for. If the Taliban can only survive as a cohesive and coherent entity until the US leaves Afghanistan, they will have a far less militarily capable opponent (Kabul) with whom to compete for dominance.

Air Warfare

Controlling one's airspace is critical in order to maintain a nation's security. In the modern era fixed wing aircraft, rotary aircraft and missiles are used to secure a nation's airspace. The beginning of World War I brought a sudden demand for thousands of aircraft. This meant that factories had to accommodate large-scale manufacture and assembly of aircraft components. Small companies grew into major manufacturers capable of producing many different types of aircraft in large numbers. By WW2 the aircraft industry had spread worldwide, and changed dramatically during the five years of conflict. Piston aircraft engines became larger and more complex and were produced in large quantities, while the jet engine was also being developed and tested. The development of radar and other sophisticated electronics also took place, eventually forming the large avionics (aviation electronics) industries of today.

Jet engine combat fighters are usually categorized by 'generations.' International norms generally use five or six categories, loosely based upon the prevalent set of capabilities at the time of the aircraft's development:

1st generation: 1945 to 1955, this generation includes the original jet fighters powered by turbojet engines.

2nd generation: 1955 to 1960, these fighters generally had a higher top speed and were outfitted with radar and guided air-to-air missiles.

3rd generation: 1960 to 1970, in addition to having increased overall capabilities, these fighters also were the first to be capable of both air defence and ground attack missions.

4th generation: 1970 to 1990, these multirole fighters were equipped with increasingly sophisticated avionics and weapon systems. A key area of emphasis was manoeuvrability rather than speed.

4th+ (or 4.5) generation: 1990–2000, a concept that not everyone agrees exists, implies some combination of advanced capabilities and upgrades to a normal 4th generation airframe.

5th generation: These fighters have a combination of stealth, high altitude, manoeuvrability, advanced radar, high-capacity data links, ''plug and play'' avionics, and super cruise capabilities.

Today, powerful fighter aircraft are basically flying computers that combine technology and stealth design to be invisible to enemy radar and attack their opponents without warning. Modern jets consist of engines, an airframe as well as the interior electrical and hydraulic components. Metal body work is added to the fuselage and wings and then the interior of the jet is kitted out with avionics. The fuselage, engines and avionics are constructed in separate large industrial assembly lines and then brought together to be integrated. The production of an aircraft relies on the precise and accurate alignment and mating of each part of the major subassemblies. What air forces do has not changed much over the last 100 years. Aircrafts take pictures, fight other aircraft, or carry supplies (cargo or bombs).

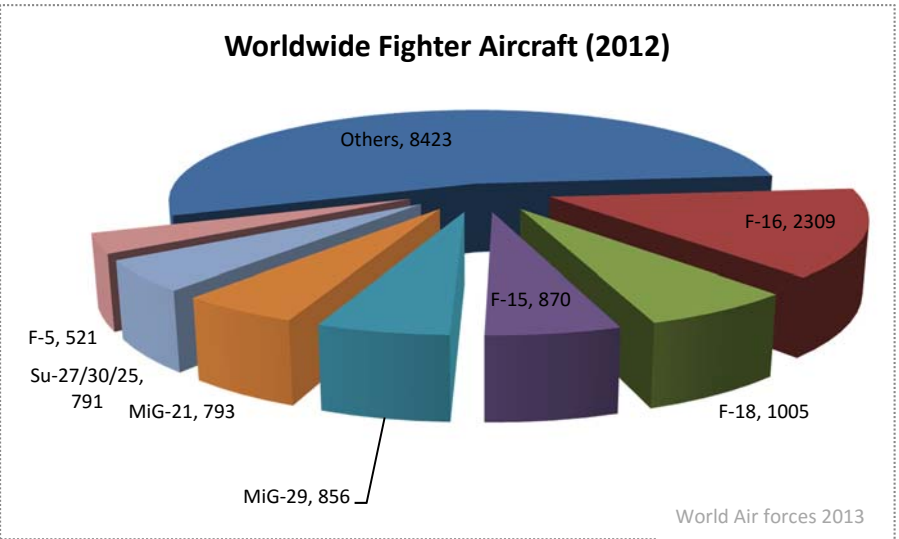
Modern aircrafts have been developed to engage in within visual range combat (dog fights) and detect and evade surface-to-air missiles. This required agile jets that could make crushing G-force turns and carry sufficient sorties to engage in enemy fire. With the development of stealth jets, making them difficult to locate, as well as jets which can fly at speeds far in excess of the speed of sound (Mach 1). Add to this advanced avionics and radar allowing jets to strike their adversaries well beyond visual range (BVR) the future of aerial warfare is moving from aerial dogfighting to engaging from distance.

Aircraft Types

Fixed wing aircraft are differentiated by type and by generation. Each generation led to new additions to fighter aircraft due to the developments in technology, fixed wing aircrafts are divided broadly into a number of types, with several variations between them which include:

Fighter Aircraft - Their main role is air superiority and in destroying enemy aircraft in air-to-air combat, offensive or defensive. Many are fast and highly manoeuvrable. Modern fighters can attack enemy fighters from great distance. America's F-15, F-16 and F-18 comprise 28% of global fighter aircraft fleet.[5]

Strategic Bombers - Bombers are normally larger, heavier, and less manoeuvrable than fighter aircraft. They are capable of carrying large payloads of bombs. Bombers are used almost exclusively for ground attacks and are not fast or agile enough to take on enemy fighters head-to-head. America and Russia dominate this category of aircraft.



Attack Aircraft – In the modern era the distinction between bombers, fighter-bombers and attack aircraft has become blurred. Many attack aircraft, even ones that look like fighters, are optimised to drop bombs, with very little ability to

engage in aerial combat. The most meaningful distinction is that a bomber is generally a long-range aircraft capable of striking targets deep within enemy territory, whereas fighter bombers and attack aircraft are limited to 'theatre' missions in and around the immediate area of battlefield combat. America's A-10 Thunderbolt dominates this category of aircraft.

Multirole – These types of aircraft can be a fighter or a bomber, depending on what the mission calls for. An example of a multirole design is the F/A-18 Hornet and the F16 Falcon. The F-16 remains the world's prized multirole jet, it makes up 15% of the world's military fleet.

Military Transport aircraft – These are large aircraft which deliver troops, weapons and other military equipment to any area of military operations around the surface of the planet. Strategic airlift and aerial refuelling aircraft dominate this type of jet. The US has a fleet of 1,795 transporters, which is 35% of the world's transport fleet. The Lockheed C-130 Hercules, a four-engine turboprop military transport aircraft designed and built originally by Lockheed Martin and the Boeing KC-135 Stratotanker aerial refuelling military aircraft, make up 31% of the world's transport fleet.

CASE STUDY: F-16 Fighting Falcon

The F-16 was designed as an air superiority day fighter, it however evolved into a successful all-weather multirole aircraft. Over 4,500 aircraft have been built since production was approved in 1976. Although no longer purchased by the US Air Force, improved versions are still being built for nations around the world.

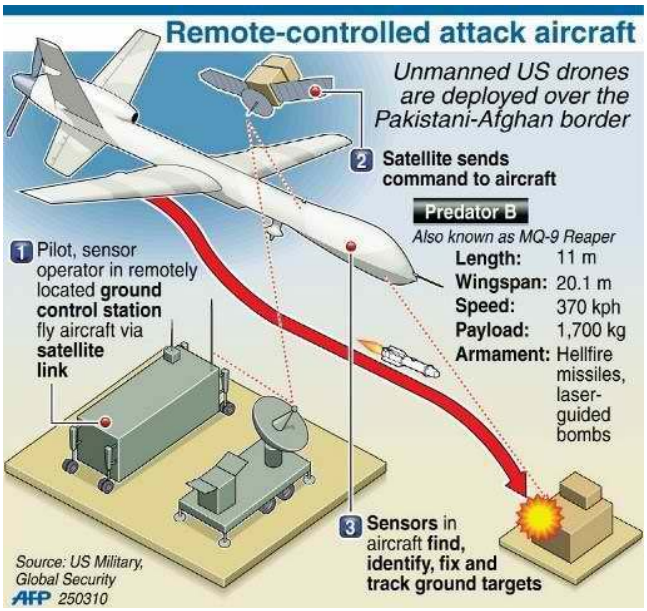
An F-16 has most of the elements one would expect on a jet plane. It has two wings that generate lift, it has rear vertical and horizontal stabilizers and rudders that balance and steer the plane, and it has twin turbofan jet engines at the rear of the plane that generate thrust.

The main difference is how these elements are balanced. The F-16's twin engines (Pratt & Whitney F100-PW-200 afterburning turbofan) have a very high thrust-to-weight ratio, meaning, they are relatively light for the amount of thrust they generate (they can generate almost eight times their own weight in thrust).

The F-16 also has very low wing loading, meaning it has a lot of wing area for its weight. Greater wing area means greater lift, which makes the plane more agile. It can take off, ascend and turn much more quickly than an ordinary plane, which has much more weight per square foot of wing space. The F-16 was the first operational fighter to employ fly-by-wire flight controls, relaxed static stability, high-g cockpit, bubble canopy, variable camber wings, blended wing-body design, modular construction, and integrated digital avionics.

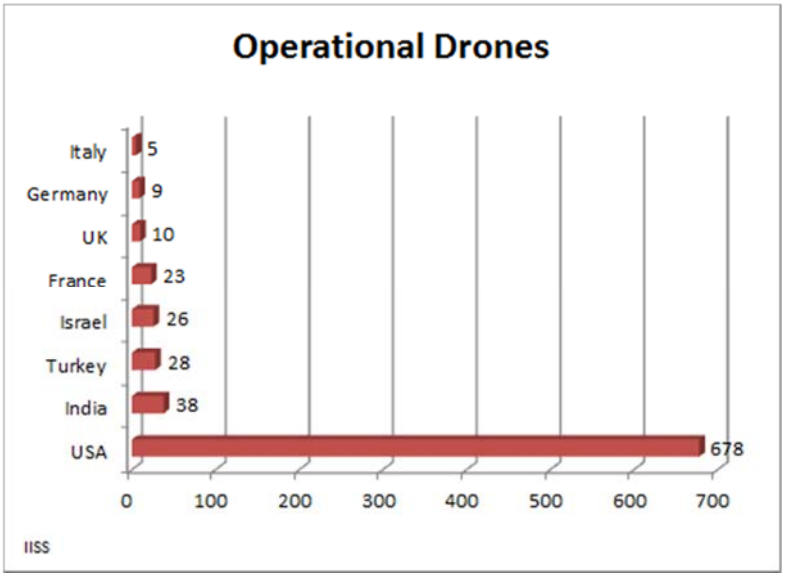
UAV's - Unmanned Aerial Vehicles

America's war in Afghanistan and Pakistan has seen the widespread use of Unmanned Aerial Vehicles (UAV), commonly known as drones. Whilst much debate continues on the moral aspect of their use, this military platform is now a critical component of America's global military footprint. UAV usage is rapidly increasing throughout the world and has doubled in just the last 5 years. This trend is set to continue, but all drones are not created equal. There is a huge variation in physical structure, capabilities and the systems used on these platforms. UAVs are a subset of the broader category of unmanned vehicles that operate on land, on and below the ocean, and in space. UAVs are currently the most prominent and advanced in military utility, but other subsets such as unmanned underwater vehicles are also being developed.



UAV operations are all about data. Everything its sensors see must be received by the controller, and every command the controller gives must get to the drone. Getting this data across space requires infrastructure. In its simplest form, this can be an advanced remote control, but this means you have a very limited operational range. In more advanced versions, portable ground stations can be set up with powerful transmitters and antennas that extend this reach. In the most advanced versions, complex data systems and space-based satellites can be networked and used to project data over vast distances. For all of this to take place these drones require logistical networks and access to airfields just like all aircraft. For all practical purposes any nation wanting to deploy drones will need forward bases and plenty of IT infrastructure to operate them. This is a big vulnerability as such facilities would need to be in close proximity to the battlefield making them susceptible to a strike, which would end their use.

Most UAVs are slow, easy to see and virtually defenceless. Lacking the agility of fighter jets, drones cannot operate well in hostile airspace. Gen. Mike Hostage, chief of the US air service's Air Combat Command, confirmed: *"the drones that have proved so useful at hunting al Qaeda are useless in nearly every other battlefield scenario. Predators and Reapers are useless in a contested environment today. I couldn't put [a Predator or Reaper] into the Strait of Hormuz*



without having to put airplanes there to protect it."[6] Despite their widespread use in Afghanistan and Pakistan, US drones have not faced any challenge in the airspace above both countries as their leaders have been in complete cahoots with the US and as a result US drones faced no opposition. In contested airspace, drones as a weapon system are near useless. Gen. Mike Hostage confirmed: *"MQ-1s and MQ-9s have limited capability against even basic air defences. We're not talking deep over mainland China; we're talking any contested airspace. Pick the smallest, weakest country with the most minimal air force — [it] can deal with a Predator."*[7] The development of stealth drones is an attempt to overcome such limitations.[8]

"MQ-1s and MQ-9s have limited capability against even basic air defences. We're not talking deep over mainland China; we're talking any contested airspace. Pick the smallest, weakest country with the most minimal air force — [it] can deal with a Predator." Gen. Mike Hostage

In an air war, an advanced aerial threat environment increases the likelihood of within-visual-range air combat, often referred to as "dog-fighting." Dog-fighting presents the most dynamic aerial environment conceivable. Survival requires both proactive and instantly reactive three-dimensional aircraft manoeuvring. Success requires critically outthinking an adversary while making split-second decisions, executing demanding manoeuvres under crushing g-loads, and firing weapons at an enemy. At present, these are critical tasks that only pilots physically engaged in the battle can do. Distantly controlled unmanned aircraft lack these capabilities. If ever caught in a dog-fight, they transition from lethal airborne assets to defenceless targets.

The biggest problem currently with drones is the GPS navigation system. GPS signals are weak due to the distance they travel and can be easily out punched (overridden) by stronger local signals from television towers and devices such as laptops or mobile satellite services. In a report on GPS Spoofing the C.S. monitor highlighted: *"The GPS navigation is the weakest point, by putting noise (jamming) on the communications, you force the bird into autopilot. This is where the bird loses its brain."*[9] A more pernicious attack involves feeding the GPS receiver fake signals so that it believes it is located somewhere in space and time that it is not. Former US Navy electronic warfare specialist Robert Densmore highlighted: *"Even modern combat-grade GPS [is] very susceptible to manipulation, it is certainly possible to recalibrate the GPS on a drone so that it flies on a different course. I wouldn't say it's easy, but the technology is there."* This was the method Iran reportedly utilised to 'trick' a US drone into landing in the country in 2011.[10] The US military continues in seeking alternatives to the GPS system of satellites. But fundamentally GPS signals travelling over long distances can be easily overwhelmed with a stronger local signal.

Whilst much of the debate regarding drones has centred on their moral use, their use in Pakistan, Afghanistan, Somalia and Yemen has only been possible due to the governments in these countries handing over their airspace to the US. As a platform, drones suffer from numerous inherent shortcomings which make it extremely unlikely they will replace manned flight. The US is planning to expand its use of drones to other theatres of war allowing for the orchestration of an entire battle group managed by a handful of people,[11] but all of this is predicated upon political support from the rulers of such countries.

Missiles

Projectiles (objects) were first used during WW2 when Nazi Germany developed the V-1 flying bomb and V-2, both of which used a simple mechanical autopilot to keep the rocket flying along a pre-chosen route. Subsequent missiles were all developed from the V-2 rocket. Whilst rockets lack a guidance system, apart from being pointed in the direction it is to go, missiles on the other hand have guidance systems and are thus more accurate. Missiles have today developed in shape and size and can fly across the world via space. Missiles today can be the size of a person and are constructed from titanium alloy, which provides high strength and low weight. The further the missile needs to travel the more fuel needs to be burned, similarly the heavier the missile the more fuel is consumed, thus in missile development - **weight, distance** and **fuel** are opposing factors that need to be overcome.

Missiles and rockets work based on a principle found by Isaac Newton that says 'each action has an equal or opposite reaction.' If one jumps from a small boat to the shore, the action will push the boat away from the shore. Rockets function on the same principle. The continuous ejection of a stream of hot gases in one direction causes a steady motion of the rocket in the opposite direction. Rockets contain all they need for propulsion, unlike jet engines, which must receive air to burn the fuel. That's why rockets can be closed, allowing journeys in the vacuum of space.

Developing missiles is a complex undertaking, even after decades of experience there can still be reliability issues. Like any complex machinery, missiles will only work some of the time. There destruction can reach hundreds of miles and this is what makes them a useful weapon for war. Prior to the development of rockets airplanes were needed to drop bombs over cities, now missiles can reach their targets from the other side of the world. In its simplest form engineers will have to pack a small cone shaped, titanium casing with enough fuel to reach its target, dealing with all the elements it may encounter on the way.

There are a number of key components and stages any nation would need to overcome in order to develop missiles:

- **Engine -** Thrust must be generated to move the missile. Once moving upward, thrust must continue to be generated to accelerate the missile against the force of the Earth's gravity. Engine fuel is burned and leaves the missile in one direction propelling it in the opposite direction. Rockets and missile motors can be of the solid fuel type for ease of maintenance and fast deployment, they also come in Liquid fuel which gives variable thrust as well as restart capability. Early Rockets and missiles were developed with Liquid fuel engines. These liquid fuel motors were in reality mechanical devices, with a heavy maintenance load and even higher probability of failure. Solid fuel is a slow burning explosive. Manufacturing these is a lengthy extracting process. Their biggest challenge is they cannot be really tested, one can probe, poke and double check them, but ultimately one would hope the rocket will work more times than not. Whist many principles of rocket science are widely known, missile engineering remains a challenging skill acquired only through direct experience, it cannot simply be studied and applied without much trial and error. There is tremendous complexity in finding the right formulation of solid propellants for a specific missile system.

Although the underlying rocket science has been reasonably well understood and publicly available for decades the predictability of how a solid rocket motor will perform depends on very subtle factors. This means that even after a propellant is formulated, the manufacturing of solid rocket motors still requires extreme reliability controls.

- **Guidance system** – A missile needs to be guided to its intended target. The missile's target accuracy is a critical factor for its effectiveness. Missile guidance systems are guided mainly by man-made electromagnetic devices, such as radar and radio devices. Missiles can also be guided by electromechanical devices or electromagnetic contact with natural sources, such as the stars, position on earth and are thus self-contained guidance systems. There are many different ways to control the flight path of a missile, but almost all modern missiles take advantage of homing guidance. Homing missiles come equipped with a seeker - an on board antenna sensitive to a specific energy source. That energy source could be any part of the electromagnetic spectrum, but one of the most easily detectable forms of energy is infrared, or heat. An infrared seeker is able to lock on to the enormous heat produced by an aircraft's engine or the exhaust from a missile with accuracy and guide the missile to its target. The guidance system is a particularly complex piece of electromechanical precision and it has to guide the missile and its warheads anything from 50 kilometres to 10,000 kilometres and hit to within a few hundred meters of a target. This requires testing of missiles and their re-entry vehicles, which produces data from which mathematical models can be developed, further tested and fine-tuned.

- **Flight system –** A missile will need to manoeuvre in flight, allowing it to counter a moving target. Vectored thrusts are used for missiles that are powered throughout the guidance phase of their flight and aerodynamic manoeuvring can also be used such as wings, fins and canards. Any flight system will need to be able to counter the earth's magnetic field, gravity and whether. These factors are also different when a missile goes from East to West (or West to East) and over the North Pole.

- **Warhead -** The warhead of a missile provides its primary destructive power. The warhead is miniaturised in order to be integrated with a missile, which can be sub-munitions, incendiaries, nuclear, chemical, biological or radiological weapons or kinetic energy penetrators. Warheads are constructed in a laboratory environment, in a concrete tunnel, where there is no G-loading, no vibration, and no temperature extremes. They have to be miniaturized for the nose cone of the missile and still be able to handle vibrations, extreme temperatures and g-force. All of this takes a lot of technology, it takes a lot of work, and it takes a lot of time. The miniaturisation of a nuclear warhead is considered the most significant challenging endeavour in this regard.

- **Rocket structure** – All of these systems need to be held together in a shell which can be the size of a human or the size of a building. It must be strong enough to hold all of this weight, but light enough to not require too much fuel. It must be able to handle the vibrations and pressure that come with flying though the atmosphere and in some cases outside the Earth's atmosphere and be able to successfully make re-entry if it does. The further a missile has to travel the more complex it will become. This is because a missile will consist of multiple

stages, that is 2 or 3 missiles stacked upon each other. The first section or stage is the largest and contains a large rocket motor. The second stage is another motor and the third stage is the warhead, guidance system and a smaller rocket. So there is not one stage but three. The longer range missiles which travel over 3,500 km and Intercontinental Ballistic Missiles (ICBM) are reliant upon the different stages and the entire process is intolerant to any failure, otherwise the whole missile is lost. From the time a ballistic missile lies dormant in its silo or launch vehicle to its actual launch, various errors can begin to accumulate. A systematic and rigorous testing regiment of all the component parts can help reduce as much as possible, but such errors cannot be eliminated entirely. Ballistic missiles are today organised in to the range they can travel from short, medium, intermediate and Intercontinental ranges.

CASE STUDY: Guidance Systems

Beam Guidance - A beam of radar signals or a laser beam is aimed at the target. The missile picks up signals from the beam, and electronic devices work the steering mechanisms so that the missile follows the beam to the target. This method is accurate only over short ranges.

Command Guidance - The missile is tracked (followed) with radar from the ground. The target is also tracked. The missile is guided to the target by radio signals broadcast from a ground station. These signals are picked up by a receiver in the missile and operate the controls. Like beam guidance, command guidance is accurate only over short ranges.

Homing Guidance - With this system, the target itself guides the missile. In passive homing, the missile has instruments that can detect radiations (heat, light, or noise) from the target. Information from these instruments is fed into a computer that steers the missile. The disadvantage of this system is that the target can "confuse" the missile by sending out decoy radiations.

Semi-active homing guidance systems – This system does not rely on the target's own radiation, but on radar signals sent out by a ground transmitter. These signals bounce off the target, creating radiation to guide the missile. Missiles with active homing devices send out their own radar signals and are thus independent of ground controls. The disadvantage of these methods is that the enemy may be able to detect the signals and take countermeasures.

Preset Guidance - The missile's control system is set before launching to carry it to a specific target. The target's exact location must be known. If the missile swerves off course, an automatic pilot will make the necessary-correction.

Inertial guidance system – This type of guidance system once set, is entirely automatic and does not need outside sources for navigational check points. A typical inertial guidance system contains a small on-board computer, gyroscopes, and devices called accelerometers. The use of accelerometers, each perpendicular to the other, provides a measurement of the missile's acceleration and missile speed. This information, together with information provided by the gyroscopes, allows the computer to continually calculate the missile's course.

Television Guidance - A small television camera mounted in the missile's nose is aimed at the target prior to launching. The television picture is observed by the launch operator, who locks the camera onto the target electronically just before launching. After launching, the missile is guided by signals from the camera, which continues to point directly at the target. This system is used mainly over short ranges for air-to-surface missiles.

Terrain-matching – This is another complex method of preset guidance. Along the missile's course, ground-scanning radar in the missile's guidance system provides ground-elevation information to a small onboard computer. By comparing data from the radar with map data stored in the computer's memory, the computer can accurately determine the missile's location and can order the automatic pilot to make course corrections if necessary.

Missiles are constructed of varying types, which include:

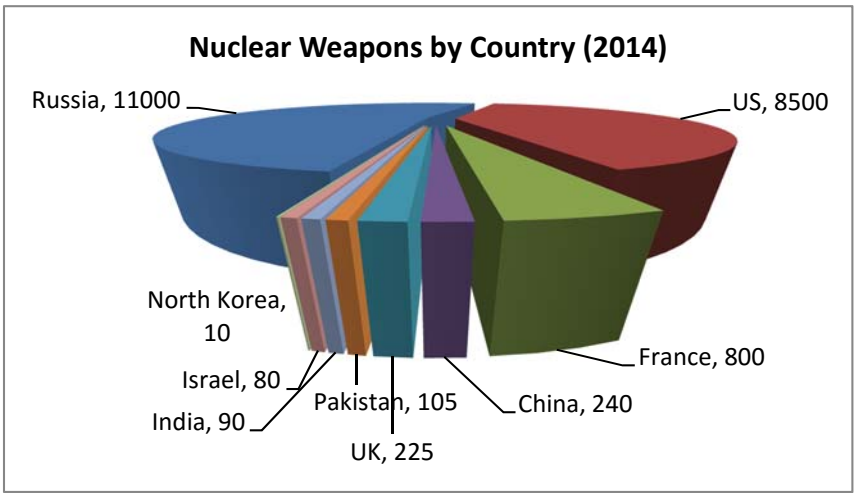
Scud Missiles – These are of Russian origin and were the first widespread short range ballistic missile. The baseline Scud missile has a range of approximately 300 km and a warhead of 500 kilograms. Scud missiles are the most widely proliferated ballistic missile in the world and are found in many countries. As a tactical weapon, Scud missiles were ineffective and inaccurate. They are more an instrument of terror and are better suited when targeting ports and large facilities.

Cruise Missile - A cruise missile is a small guided rocket pilotless airplane. It is powered by turbofan engines and can fly 500 to 1,000 miles. A cruise missile's job is to deliver a 1,000-pound (450-kg) high-explosive bomb to a precise location. The missile is destroyed when the bomb explodes. Since cruise missiles cost between $500,000 and $1,000,000 each, it is a fairly expensive way to deliver a 1,000-pound package. Unlike ballistic missiles, that have a high trajectory and are easy to see on radar and fairly easy to target. In contrast, cruise missiles fly low to the earth and are much more difficult to detect by ground-based radar, so they are much more difficult to shoot down.

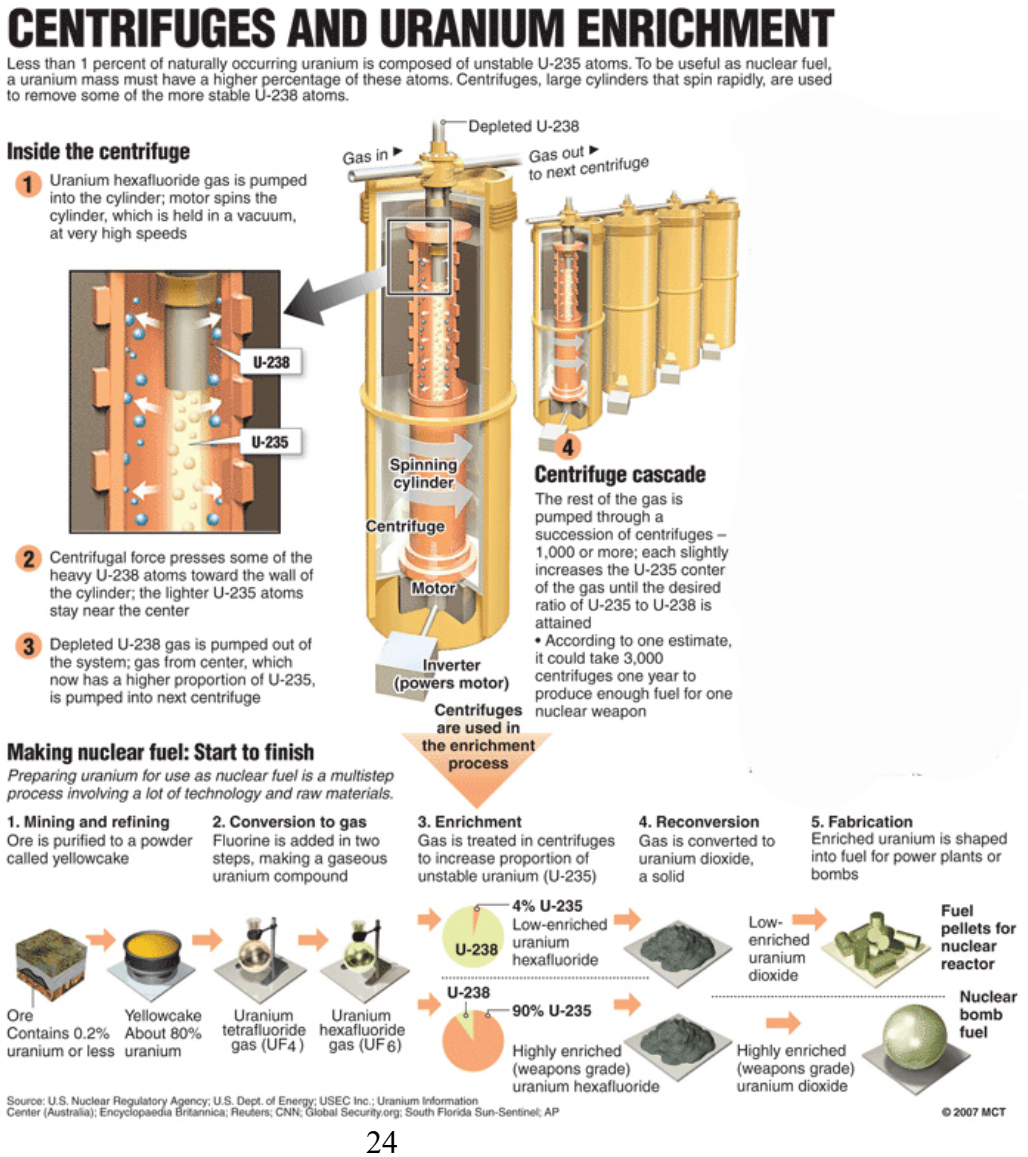
Ballistic Missiles - This is a missile that follows a ballistic flight path with the objective of delivering one or more warheads to a target. What makes this missile unique is after the initial launch phase Ballistic missiles follow their trajectory with no additional help unlike a rocket which needs to burn fuel to reach its target. Ballistic missiles can reach the other side of the world as they travel through space, thus making them difficult to counter. Today the ballistic missile represents the only strategic weapon in that there is virtually no way to counter this weapon, aside from another missile intercepting it. Ballistic missiles are primarily surface launched from mobile launchers, silos, ships or submarines. Anti-Ballistic Missile (ABM) systems have been developed to counter such missiles. Intercontinental Ballistic Missiles (ICBM) cannot be intercepted even if within range because an incoming ICBM travels at 4 miles a second and would thus be moving too fast for anyone to counter

Missile Types	Range
Tactical ballistic missile	Between about 95 – 185 miles
Battlefield range ballistic missile (BRBM)	less than 60 miles
Theatre ballistic missile (TBM)	Between 185 - 2,200 miles
Short-range ballistic missile (SRBM)	620 miles or less
Medium-range ballistic missile (MRBM)	Between 620 miles and 2,200 miles
Intermediate-range ballistic missile (IRBM) or long-range ballistic missile (LRBM)	Between 2,200 miles and 3,400 miles
Intercontinental ballistic missile (ICBM)	Greater than 3,400 miles

Weapons of Mass Destruction (WMDs)



The development of missiles also led to the development of explosives that could cause damage to large areas. The term "weapons of mass destruction" usually refers to chemical, biological radiological or nuclear weapons (CBRN). A weapon of mass destruction is a weapon that can kill and bring significant harm to a large number of people or cause great damage to man-made structures (e.g. buildings), natural structures (e.g. mountains), or the biosphere in general. The most lethal is the nuclear weapon. Weaponising the atom remains one of the most challenging endeavours any nation can undertake. 65 years after the US remote tested the world's first atomic bomb only a handful of nations have successfully developed a nuclear device. A nuclear weapon is a reliable miniaturised warhead that can be delivered with a reliable delivery system. This can only be achieved when a series of developments are overcome.



Contrary to their popular portrayal in Hollywood, nuclear bombs are actually both difficult to manufacture and challenging to effectively deploy. A nuclear device requires a nuclear chain reaction through fission or

fusion. Both reactions release vast quantities of energy from relatively small amounts of matter. In fission weapons, a mass of fissile material - enriched uranium or plutonium is assembled into a supercritical mass – the amount of material needed to start a nuclear chain reaction. This is achieved by shooting one piece of sub-critical material into another or by compressing a sub-critical sphere of material using chemical explosives.

Contrary to their popular portrayal in Hollywood, nuclear bombs are actually both difficult to manufacture and challenging to effectively deploy

Enrichment through the fabrication of fissile material is probably the most complex aspect of building a nuclear device. It presents significant challenges for any nation in developing a nuclear programme. The concept requires separating a heavier isotope of uranium from a lighter isotope of uranium in order to enrich the stock to higher than 80% U235 - sufficient for use in weapons. Whilst separating something heavier from something lighter in a gaseous state takes place across the world every day, doing it on a sufficiently refined level to separate two isotopes differentiated by only a few subatomic particles is an extremely difficult and complex process. This is achieved through the use of centrifuge technology. A Centrifuge creates a force thousands of times more powerful than the force of gravity. Cascades of centrifuges carry out the delicate task of separating isotopes, these are finely tuned machine components, able to spin at high speeds while fully containing, separating and conveying highly corrosive gas. Not only do the centrifuges spin incredibly fast, but each one in a cascade of 100 or more centrifuges must be capable of minute calibration, calibration that becomes more fine and essential as the level of enrichment increases. It is the combination of appropriate calibration and rotational speed that allow for enrichment to take place, low-quality bearings just would not do the job. Uranium concentrated in gas form is spun thousands of times in centrifuges in order to have enough enriched U-235 uranium.

Thereafter fabricating fissile material and developing either a gun-type device or implosion device is a process only 9-10 nations in the world have accomplished. South Africa has since renounced it, whilst North Korea is still working on it. After all of this a delivery system needs to be constructed taking account of payload and ensuring it is appropriately tailored.

CASE STUDY: Nuclear Warheads

Today, nuclear warheads sit in missiles and place considerable challenges on any nation pursuing nuclear weapons. A major problem with Uranium bombs is the fact that the material happens to be the world's heaviest naturally occurring element (twice as heavy as lead). A nuclear bomb needs about 33 pounds (15 kilograms) of enriched uranium to be operational. The weight and bulkiness of other bomb materials make it extremely difficult to fit such a warhead into a missile. The components of the bomb that actually initiate a nuclear explosion must be significantly miniaturized in order to be placed in a missile. Modern missiles are shorter than a human being weighing only a few hundred pounds. Getting a warhead down to this size is no easy task. It requires, among other things, precision manufacturing, exceptional quality control and a good understanding of nuclear physics. Then there are the decades of testing and practice necessary to ensure detonation upon delivery, National command authority controls and the like. Hans Kristensen, director of the Nuclear Information Project at the Federation of American Scientists outlined: *"Warheads are complicated little machines, the entire detonation process happens within a tiny fraction of a second so the hard part is constructing a warhead with reliable separation capabilities throughout the various stages."*[12]

The most significant challenge in developing chemical and biological weapons is the need to manufacture and transport quantities in sufficient to yield. Nerve gas which is a chemical weapon is difficult manufacture, store and deliver in any effective form. As military commanders learned on the battlefields of Europe during World War I, and during the Iran-Iraq war, chemical agents are volatile and quick to vaporise, and they tend to dissipate quickly

A nuclear device is the higher end of the destruction ladder, although less destructive, but equally lethal are biological, chemical or radiological bombs. There is an important and stark distinction between a nuclear device and Chemical, biological and radiological weapon. The distinction lies in the measure of potential lethality.

The most significant challenge in developing chemical and biological weapons is the need to manufacture and transport quantities in sufficient to yield. Nerve gas which is a chemical weapon is difficult manufacture, store and deliver in any effective form. As military commanders learned on the battlefields of Europe during World War I, and during the Iran-Iraq war, chemical agents are volatile and quick to vaporise, and they tend to dissipate quickly. As a result, deadly concentrations can be difficult to amass in a real-world setting. Difficulties arise when one attempts to take a rudimentary substance and then convert it into a weaponised form - a form that is potent enough to be deadly and yet readily dispersed. Even if this weaponisation hurdle can be overcome, once developed, the weaponised agent must then be integrated with a weapons system that can effectively take large quantities of the agent and evenly distribute it in lethal doses to the intended targets.

Space

Space represents the 4th frontier after land, sea and air and for nearly half a century epitomized an important arena for dominance and superiority. Over 800 satellites orbit the earth every day for purposes such as weather monitoring, help in search and rescue, help in potential natural disaster detection, coordinating efforts on detecting and dealing with issues of space debris and minimising harmful impacts on Earth and research in sciences. Many satellites also have military use, from reconnaissance to guiding weapons systems. Satellites remain the main focus of military space activities. They are widely used to provide support for military or security related activities such as verifying compliance with arms control treaties. There are over 270 military satellites as well as 600 civil, commercial and multi-purpose satellites orbiting the earth and many satellites are increasingly ‘dual-use’ (can be used for both military and non-military purposes).

An increasing, ongoing presence in space is essential for civilian and military communications. Satellite functions include navigation systems such as GPS, weather data and communications relays. But the significance of space goes beyond satellites. Throughout history, research done to advance space exploration has found a way into everyday life, from something as simple as Velcro to advanced composite materials that can withstand immense heat. Research currently targeted for space also has the potential to improve earth-based technologies. Ongoing development in space has already had tangible benefits, including increased cellphone coverage (and ease of international calls), improved weather and GPS coverage and improved mapping technology.

Space has always been a phenomenally expensive place in which to operate. It took years and immense national efforts on the part of the Soviet Union and the US to put men and material into orbit. Underlying this was the need to operate effectively in a set of harsh environments, from launch to outer space. Even today, only 9 countries and a conglomeration of European states have the ability to launch a payload into orbit. Because they were so expensive, the first space-based platforms were put in place to support national strategic needs.

Space-based assets provide the intelligence, surveillance and reconnaissance that help enable the use of precision strike weapons. These and other assets in orbit have come to play a central role in a variety of military operations around the globe. Continued advancements in space-related technology is enabling many nations, especially China to compete on the commercial and military fronts as more activity becomes dependent on space-based infrastructure. Prior to satellite communications, surveillance and detection abilities and communication were limited by line of sight and by the atmosphere, which can reflect signals and can distort and dilute their strength. Space-based infrastructure enables more efficient communications.

"The United States will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space. Proposed arms control agreements or restrictions must not impair the rights of the United States to conduct research, development, testing, and operations or other activities in space for U.S. national interests."
US national space policy, October 2006

The trends for space are to place weapons outside the Earth's atmosphere. Successive governments since Reagan have long made it clear the US wishes to expand its military capabilities and have weapons in space and therefore also be dominant in this fourth military arena. This new "ultimate high ground" would provide further superior military capabilities for the US.[13] In April 2005, Gen. James E. Cartwright, who led the United States Strategic Command, told the Senate Armed Services nuclear forces subcommittee that the goal of developing space weaponry was to allow the nation to deliver an attack *"very quickly, with very short time lines on the planning and delivery, any place on the face of the earth."* The US has taken such a hard-line stance due to threats it perceives from adversaries, this has resulted in the US voting against a number of treaties, which propose the banning of weapons in space. This was confirmed in the national space policy of October 2006 which states *'The United States will oppose the development of new legal regimes or other restrictions that seek to prohibit or limit U.S. access to or use of space. Proposed arms control agreements or restrictions must not impair the rights of the United States to conduct research, development, testing, and operations or other activities in space for U.S. national interests.'*[14] The US has continued the development of technology which would allow it to place weapons in space. In 2004, the US Air Force issued a document called 'Transformation Flight Plan' which envisaged a whole array of space weapons both offensive and defensive. They would include anti-satellite systems and even things called "hypervelocity rod bundles" that could be hurled down on a target from space.[15]

Satellites

A satellite is basically any object that revolves around a planet in a circular path. The moon is Earth's original, natural satellite, and there are many man-made (artificial) satellites. Artificial

satellites generally are not mass-produced. Most satellites are custom built to perform their intended functions. Exceptions include the GPS satellites (with over 20 copies in orbit) and the Iridium satellites (with over 60 copies in orbit). Although anything that is in orbit around Earth is technically a satellite, the term 'satellite' is typically used to describe a useful object placed in orbit purposely to perform some specific mission or tasks, such as weather satellites, communication satellites and scientific satellites.

The Soviet Sputnik satellite was the first to orbit Earth, launched in October 1957. The Sputnik was a 23-inch, 184-pound (83-kilogram) metal ball. Although a remarkable achievement at the time, compared to today's satellites it was relatively meagre, its contents included a thermometer, Battery, radio transmitter and nitrogen gas. On the outside of Sputnik, four whip antennas transmitted on short-wave frequencies above and below what is today's Citizens Band (27 MHz). Sputnik is a good example of just how simple a satellite can be. Today's satellites are far more complicated, but the basic idea remains the same.

Satellites are launched into orbit by riding on a rocket. Several countries and businesses have rocket launch capabilities, so a country doesn't necessary need a rocket programme to launch satellites.
Satellites come in all shapes and sizes and play a variety of roles, which include navigational satellites that help ships and planes navigate.

There are around 270 military satellites orbiting the earth gathering intelligence using high-tech electronic and sophisticated photographic-equipment. Applications also include relaying encrypted communication, nuclear monitoring, observing enemy movements, early warning of missile launches, eavesdropping on terrestrial radio links, radar imaging and photography (using what are essentially large telescopes that take pictures of militarily interesting areas). Despite the significant differences between satellites, there are a number of common technological hurdles all nations need to overcome to put a satellite in space.

1. All satellites consist of extremely delicate instruments, which will be going to the harshest of environments – space. The Satellite will need a casing for its body and frame that will hold everything together in space and provide enough strength to survive the launch.

2. Satellites need to be powered. This is a significant challenge as power on most satellites is precious and very limited. Today arrays of solar cells provide power to charge rechargeable batteries. The power system need to be constantly monitored, and data on power and all other onboard systems need to be sent to Earth stations in the form of telemetry signals.

3. An onboard computer needs to be developed to control and monitor the different systems.
   A radio system and antenna needs to be developed. At the very least, most satellites have a radio transmitter/receiver so that the ground-control crew can request status information from the satellite and monitor its health. Many satellites can be controlled in various ways from the ground to do anything from change the orbit to reprogram the computer system.

4. An alttitude control system needs to be integrated with the satellite. This ensures the satellite is always pointed in the right direction. The Hubble Space Telescope has a very elaborate

control system so that the telescope can point at the same position in space for hours or days at a time (despite the fact that the telescope travels at 17,000 mph) The system contains gyroscopes, accelerometers, a reaction wheel stabilisation system, thrusters and a set of sensors that watch guide stars to determine its position.

Satellites are essential to the coordination of a global military presence. Modern global warfare requires the acquisition of data and ability to move and utilise data in real time. This need is highly dependent on satellites, which provide the necessary sensors to 'see' what is happening and the transmission capabilities to distribute this data.

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The defence of satellites remains difficult. Anti-satellite missiles have been developed to target such strategic assets. Given the imbalance between the US and the nearest competitors when it comes to space-based technologies (and reliance on these technologies), the disabling or destruction of US satellites would be a bigger blow than a similar retaliatory response. In addition to the expense and time of getting a satellite in orbit, there is the satellite's inherent vulnerability; it is out there for everyone to see and generally follows a well-established path, and thus is targetable. Most of all, the absolutely essential communication links between ground-based users and space-based platforms are vulnerable to jamming.

The US and Russia lead on military space activities. The US operates around half of all military satellites and spends over $20 billion a year on military space activities. Russia owns around 85 military satellites. These satellites include GLONASS, which is the alternative to America's GPS system, having both civil and military applications. As of 2013 around 45 countries had launched a satellite. As of 2013, only nine countries in addition to one inter-governmental organisation (ESA) have a proven orbital launch capability and are able to send objects into orbit using their own launch vehicles. While the current motivation for an increased space presence is satellite technology, continued progress in space is leading to resource acquisition, which will be a priority for future space exploration. The US, Russia and Europe are all continuing in their efforts to expand space activity, though the US is increasingly looking toward the private sector for further space development.

Naval Warfare

Controlling ones sea's and oceans has historically been critical and remains so in the modern world. The British Empires navy and control of the world's sea's is what allowed it to remain the worlds superpower and America's control of the world's oceans today allows it to respond to global issues.

Most western Navies have long naval traditions. Russia has a much shorter and less distinguished experience at sea. The development of large capacity, sail-powered ships carrying cannon led to a rapid expansion of European navies, especially the Spanish and Portuguese navies which dominated

in the 16th and early 17th centuries, and helped propel the era of colonialism. England emerged as a major naval power in the mid-17th century. Its uncontested supremacy saw the development and refinement of tactics which came to be called the line of battle. The industrial revolution saw the introduction of metal plating along the hull sides. The increased mass required steam-powered engines, resulting in an arms race between armour and weapon thickness and firepower.

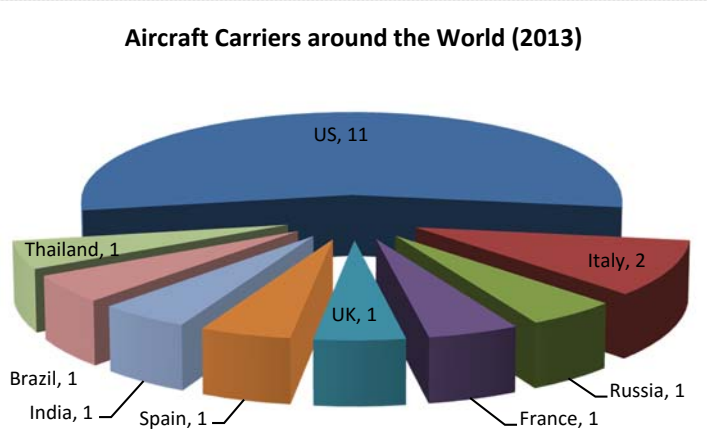
Submarines were first developed in the late 19th century and by the end of World War I had proven to be a powerful arm of naval warfare. During World War II, the German Navy's submarine fleet of U-boats almost starved the British Empire into submission and inflicted tremendous losses on US coastal shipping. The last major paradigm shift in naval warfare occurred with the introduction of the aircraft carrier in 1940.

Three classes of sea goings ships exist today, namely:

1. Surface combat ships - cruisers, destroyers, frigates and corvettes
2. Aircraft carriers
3. Submarines

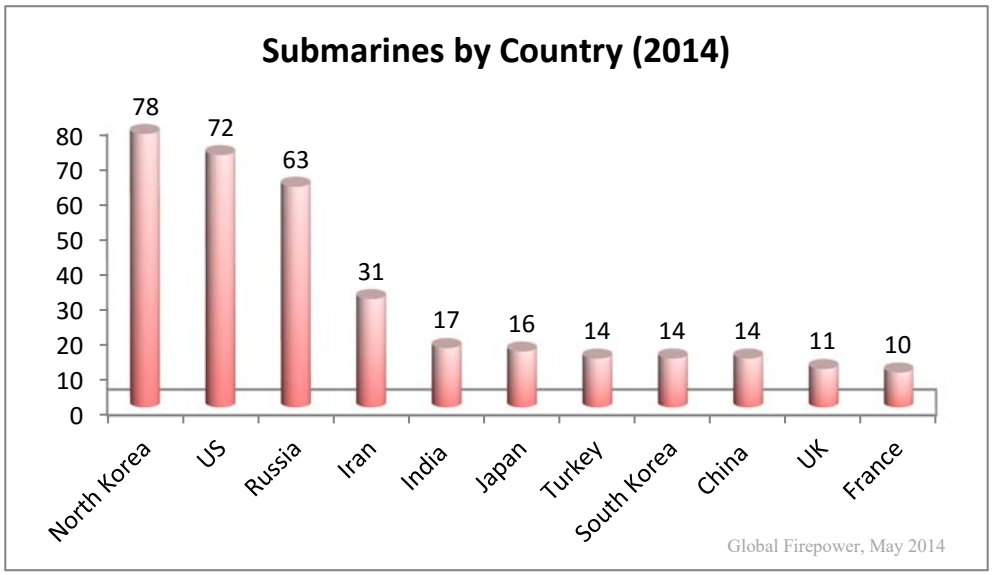
When any nation is developing its navy it in reality turns into a game of compromises as no nation will ever have enough money to have every ship or every ship design.

Half of a military ships weight comes from the metal used to construct the Hull and structure. Metal costs money, as does the labour to construct it. This is 40% more than a normal merchant ship. As combat ships require more speed they need more powerful engines. Combat ships also have more equipment to run and thus require more power. Whilst a merchant ship will carry food and goods as cargo, a military ship will have heavy weapons, sensors etc, which make the cost of a military vessel much more expensive than a normal cargo ship.



An aircraft carrier at its most basic level is a ship outfitted with a flight deck, a runway area for launching and landing airplanes. One of the major obstacles of using air power in war is getting the planes to their destination. To maintain an air base in foreign regions, special arrangements with a host country are needed and such agreements need to be adhered to which could change over time. Under international Freedom of Navigation laws, aircraft carriers and other warships are recognised as sovereign territories in most of the ocean. As long as a ship doesn't get too close to any nation's coast, the crew can carry on just like they're in their own country. There are 21 aircraft carriers in service around the globe; 11 belong to the United States. A few other nations - Britain, Spain and India have plans to build aircraft carriers.

Submarines very quickly became a naval weapon of choice when they were first developed. A submarine is capable of moving and fighting underwater. They are designed around a pressure hull – a steel tube which is strong enough to withstand water depths of 1,000 meters or more. Submarines have water tanks that are filled and emptied to lower and raise the sub in water. Submarines differ in various ways from their size, to their propulsion as well as weapons.



Submarines try to hide in the dark and murky waters of the world's oceans and the larger it is the easier it is to find. Before the development of nuclear powered submarines diesel-electric powered submarines were the norm. Even today most submarines are the old diesel-electric powered, which use diesel engines for surface cruising and batteries for underwater work. Aside from using lots of fuel, the batteries are heavy, dangerous and require recharging on the surface at least 6 to 8 hours a day. Newer versions have the capacity to run silently underwater for up to 72 hours.

The challenge for any nation developing their own submarines is the fact that the engine, crew and weapons all have to be cramped into a confined space. If the submarine is nuclear powered a reactor has to be squeezed into this cramped space. Even more space will be taken up if the sub carries a nation's nuclear deterrent. No-one wants to reside anywhere close to a nuclear reactor on land, crew members will need to sleep, eat and work next to a nuclear reactor and other toxic chemicals and weapons.

Alongside this every submarine has to survive underwater warfare and detect other ships before they are detected. Submarines use sensors such as sonar (powerful microphones) to detect enemy submarines. Similar to radar, sonar broadcasts a signal, in this case sound and listens for it to bounce of objects. As the ocean is thicker and 'busier' than air a computer is required to sort out returning signals. However in the ocean varying temperatures and the salinity of different layers of water distort and misdirect signals. Each layer is basically a hiding place.

Information Warfare

The enormous growth of electronic devices in the last two decades has led to the emergence of a new battlefield - information warfare. Keeping the many military networks safe from enemy interference, crashing and listening into enemy networks is the new electronic battlefield.

This battlefield in reality has been around for over a century, except for one element, the internet. Controlling information and communication first came into use during the US civil war in 1861 when messages were sent over the wire. Telegraph was used for forces to communicate with each other hundreds of miles apart on an almost instant basis. In some cases wire was strung throughout a battlefield so a commander could instantly receive reports and issue orders instead of relying on messengers. In WW1 small units and selected aircraft were using wireless telegraph. By WW2 infantry units were carrying their own wireless telephones (radios). Most aircraft and tanks had radios by the time WW2 started. By the time the 21st century started around 30% of all soldiers operated some sort of electronic device, the US army was nearly 100%. Today's electronic devices are not all radios but are also sensors as well as computers.

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The emergence of the internet in the early 1990's has only added to the importance of the information battleground. It was the US military that created the internet which allowed US personnel to be connected by a whole host of servers. The proliferation of the internet to civilian use gave rise to Cyberwar, the use of all available electronic and computer tools to shut down an enemy's electronics and communications, whilst keeping one's own going. The first Cyber-attack was in 2000 when a number of 'distributed denials of service,' (DDOS) were undertaken. This is the sending of millions of bogus requests to a website leading it to crash. Whilst the websites in question were not penetrated they were overloaded and shut down by the flood of bogus visitors. Ever since, the military has become even more dependent on the internet for communications. The nets computers (the servers that hold the websites) were designed in an open and flexible manner, which is also its biggest weakness and vulnerability as a malicious user can get onto other servers and do what they want. Engineers who maintain the servers are in a constant battle to plug these loopholes and the military leaders are in a constant struggle to keep net-savvy troops from leaving for the private sector. Information-war weapons depend on software flaws that are constantly being discovered and fixed. So the more software engineers and hackers a nation's military has they can fix their networks and exploit others.

The expansion of electronic devices gave rise to Command, Control, Communications and intelligence (C^3I). The implication was if a commander had sufficient quantities of communications and intelligence fed to him electronically he could communicate with his units electronically and with unprecedented efficiency. The US military spent most of the 1990's 'digitalising' the battlefield, this involved placing computer displays in combat and command vehicles, which showed where enemy and friendly units were. C^3I systems would in theory give its user an information advantage as the battlefield has already been plotted out for them. Military leaders received real time date on the movements on the battlefield of the enemy as well as the hundreds of reports that go up the digital ladder help to dissipate the fog of war for generals. As computers have become more and more powerful they sort out the data quickly and connect all battle tanks,

warplanes, artillery and infantry. So a recon aircraft points to a heat-sensor camera at enemy territory, this picture is sent, via satellite, back to the US were targets found by powerful computers. The target location is sent back, via satellite, to a US bomber in the vicinity. The bomber then enters the location of the target into a GPS-guided bomb which then strike sits target, all in minutes.

In this war information has become not just a weapon but ammunition. If you can find and hit the enemy quicker then he can find you, you would have an immense advantage in any war. Collecting more information, quicker, analysing it faster and acting upon it long before the adversary would mean the crippling of the enemy. This dependence on electronics is what has given rise to Electronic warfare (EW). Communicating instantly with your own forces was once thing, but the more electronic this gets, this will lead to adversaries to cripple your networks too.

War, Politics and Ideology

The most neglected part of warfare is the role of ideology. Whilst nations, empires and tribes have developed army's to wage war throughout history, such forces were not created to merely defend ones territory, but where usually constructed as one tool for ideological domination or supremacy. Carl Clausewitz, the German-Prussian soldier and military theorist is famous for stating *"War is the continuation of Politik by other means,"*[16] Ideology and values play a central role in global politics. They are the basic glue that binds the various strategies, plans and styles ideological nations embrace. Today it is the Capitalist nations that dominate global politics through global institutes that preserve their ideology. Whilst there exist many Capitalist nations around the world and on many ideological issues they work together, Capitalist powers such as Britain, France, the US and Germany all compete with each other to have their nation as the global power over the others. These nations get weaker and stronger based on their economic, military and political relations, but their ideology dominates the world. Whilst these nations embrace the same ideology there competition means they undermine each other in order to shape the world in a manner which fulfils their interests.

An ideological nation would make the conveying of this ideology the basic aim of its foreign policy. Such a nation would construct numerous plans and adopt multiple tools to make this plan a success - in order to spread its ideology. It is in this context the Colonial West expanded across the world. Whilst secular liberalism was evolving European nations developed their shipping industries allowing them to propagate their new beliefs. Europe became very rich, became engaged in very far-flung empire-building that redefined the human condition and became very good at making war. In short, Europe went from decline to the engine of the world. At home, Europe's growing economic development was exceeded only by the growing ferocity of its conflicts. Abroad, Europe had achieved the ability to apply military force to gain economic progress. The brutal exploitation of wealth from some places, such as South America, the thorough subjugation and imposed trading systems in places such as East and South Asia created the foundation of the Capitalist order. The Capitalist ideology is the reason why the US has developed histories largest military industry.

There are two fundamental reasons why international struggle and competition exists between nations and these reasons will always remain the case. These are either for supremacy or competition over resources. Supremacy can be for the people or the nation as was the case with Nazi Germany. It can also be for the propagation of ones values in order to make them supreme as was the case of the Khilafah and Communist Russia. The competition for resources is what has dominated most of Capitalist history. Competition between America, Britain and France continues to take place across the world over resources as can be seen in Africa.

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Developing a capable military takes decades of research, requires significant capital investment – which can also bankrupt a nation. Why should any nation undertake such actions? The driving factor, be it ideology or strategic interests are as important as war itself as this gives a nation purpose to develop a military capability, which is used as one tool amongst many to spread its values, make itself supreme or dominate other ways of life. Today the Capitalist powers are unified in their opposition to Islam as this represents an alternative way of life at complete odds with their ideology. This is why they utilise their traditional approach of subverting other ideologies in order to defend their own.

CASE STUDY: America and Ideology

The US today conveys different aspects of its ideology such as Human rights, the Free Market and individual Freedom through plans such as creating economic dependency, installing dictators, supporting royal families and military intervention. It used tools such as its military might, Foreign Direct Investment (FDI) opening up foreign markets to its companies and the utilisation of its media to make such plans a success. All these plans have a basic aim of achieving the ideals of the Capitalist ideology.

The US today is the world's superpower. Whilst many nations embrace the same ideology as the US, it is America who has been able to unify its populace and excelled economically, politically, intellectually and socially, more than other nations. But it is the adoption of Capitalism that is at the centre of its domestic and global power. The United States of America is the world superpower, it is the nation all other powers compete with. The US dominates the world economy, the US economy is larger than the combined economies of China, Japan and Germany. Militarily the US creates more military platforms than any other nation, it also has a military budget larger then the next 13 countries combined. Technologically the US drives global innovation, it is no accident the internet, IPhone, GPS, Nanotechnology and the F-22 all originate from the US. Excelling in so many different areas requires an industrial base, strong educational institutions, research and development. What unites America's 330 million population in undertaking so many different acts to achieve the same goal is the fact they have all embraced the same ideology. This unity domestically allowed the US to project power globally – despite periods of conflict at home such as the US government shutdown.

Global Military Balance

1. United States of America

The USA is the world's superpower and not surprisingly it has the most advanced military industry in the world. It is able to field a large technologically advanced military across the globe, aided by the world's largest fleet of aircraft carriers, each containing up to 90 of the worlds most advanced fighter jets. Its ships, jets and ground forces personnel, which includes the world's largest estate of forward military bases are connected by the worlds most advanced command and control system consisting of satellites, optical fibre and cyber infrastructure.

The US from its inception faced significant challenges to its security because it emerged in an era when European colonialism was entrenched in both North and South America. The 13 states that originally formed the United States of America faced Britain, France, Spain, Mexico as well as the indigenous red Indians. The continent was surrounded by the Pacific and Atlantic and within the continent there were a number of strategic water ways which all needed to be secured for security purposes. This is why the US remained in relative isolation from world events and even the Monroe Doctrine in 1823 that asserted that European powers would not be allowed to form new colonies in the Western Hemisphere was in line with this posture. Once domestic security was achieved through the expulsion and defeat of the Europeans, US domination of the American continent allowed the expansion of US power across the globe.

Doctrine

America's doctrine throughout its history has been shaped by securing its homeland, colonial expansion and threats posed by other powers. America's initial focus was on extending its control of the North American continent, after independence, the US was postured for continental defence, with its limited forces positioned where they planned to fight on the Atlantic coast to repulse European aggressors and on the western frontier to subdue Native American tribes. The British invasion during the War of 1812 made it clear that the US needed to improve its ability to defend itself against invading European armies

As the US grew more powerful, it adopted a more forceful foreign policy that resulted in the creation of an overseas empire. It transitioned from a station posture focussed on defending territory to oceanic and expansive posture. By the turn of the 20th century, the US had obtained a small empire in the Caribbean and the Pacific, for the first time significantly investing the nation in areas beyond the continent.

The interwar period saw a massive expansion of US ordinance in both the pacific and the Atlantic and propelled the nation to the world's superpower replacing Britain. The attack on Pearl Harbour dispelled the past assumption that the US would be safe if it remained aloof from world affairs. US military planners concluded that the US must not allow any country to dominate the Eurasian continent and that the nation's armed forces must be kept in a state of readiness, capable of interdicting threats far beyond America's borders. Consequently, military officials determined that the US needed to develop a network of overseas air bases to serve as the nation's 'strategic frontier.'

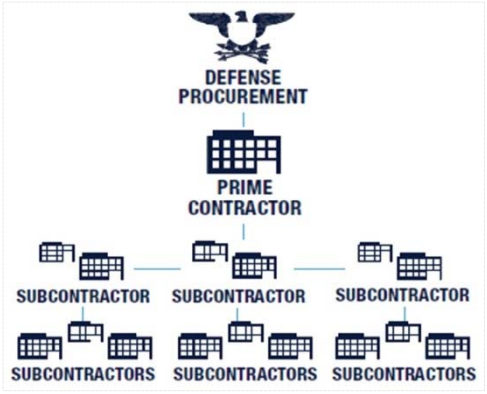
The US then spent decades in ideological struggle with the Soviet Union. This consolidated defence in depth posture was characterised by hundreds of thousands of US troops stationed primarily on bases in Western Europe and Asia, especially in Germany, the UK, Italy, Turkey, South Korea, Japan, and the Philippines. After the end of the Cold War and the disappearance of the Soviet threat, the US significantly reshaped its defence posture by closing many of its bases abroad and significantly reduced the number of forward-stationed US troops. Nevertheless, both the administrations of George H W Bush and Bill Clinton concluded that the US needed to maintain a significant forward presence to deter aggression and preserve global prowess.

The events of 9/11 led to a massive expansion of US military assets and offensive operations took place leading to permanent US personnel to be stationed in countries at the centre of US global plans. As the US wrapped up its decade of wars in Afghanistan and Iraq it laid out a new security doctrine – 'The National Security Strategy,' in May, 2010, in summery its core components were:[17]

- The institutionalisation of irregular warfare capabilities
- The preservation of air supremacy
- Maintain dominance at Sea
- The expansion of Ballistic Missile defence (BMD)
- Dominate space
- Expand US information infrastructures in cyber space

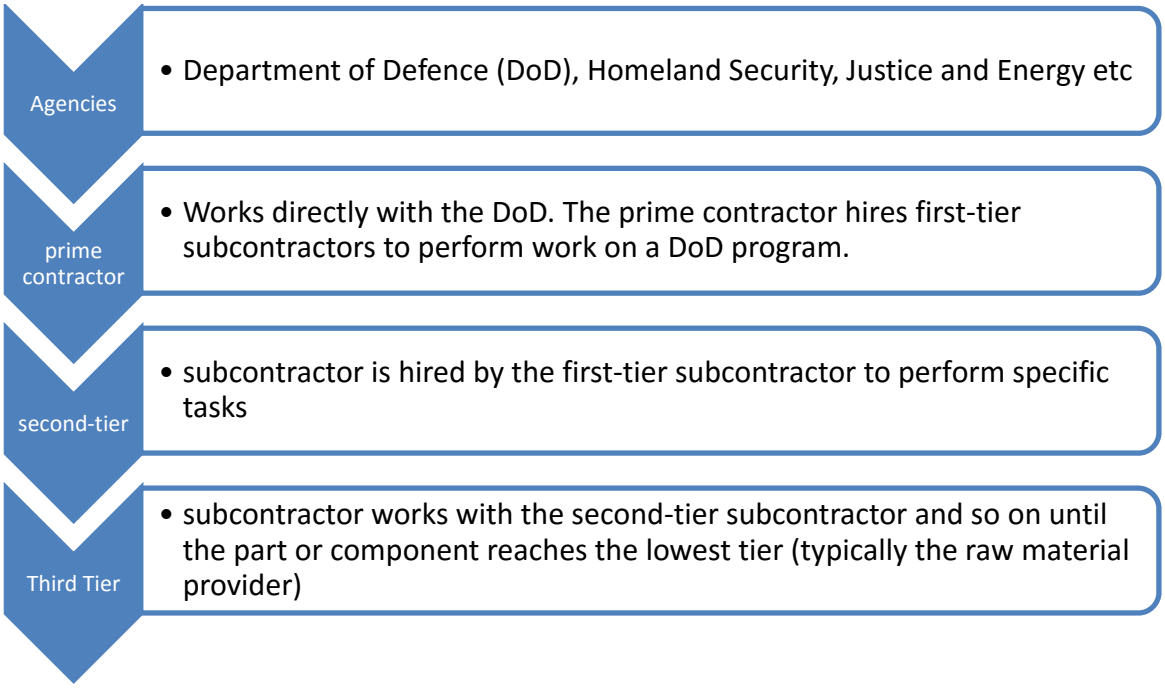
US military posture is to maintain the global architecture it has developed since WW2. The US plans to achieve this by ensuring it dominants key battlegrounds and ensuring no power, group, state or groups of states ever reach a position to challenge US dominance in any part of the world. All of this means the US needs to have more military capability then every other nation in the world and it must constantly prepare for the worst case scenario (which gets worse by the day) so US dominance is not degraded. The US pivot to Asia is to deal with a potential threat to its influence in the Asia-Pacific region by China.

Industrial Base



The US defence industrial base is comprised of an extremely diverse set of companies that provide both products and services, directly and indirectly, to national security agencies, including the military. The defence industrial base is dominated by 5 prime contractors - companies who design and build the platforms that are the backbone of the US military. Then there are companies of all shapes and sizes that act as suppliers, subcontractors, and service-providers in a value chain that leads to prime contractors. Whilst unique items are produced solely for the military, these items themselves usually rely upon a complex and integrated supply chain giving the US a diverse and deep industrial base. Thus in reality there is not a single defence industrial base in the US. There is a defence market serviced by a diverse selection of companies that span, and often reflect, the greater global economy for goods and services.

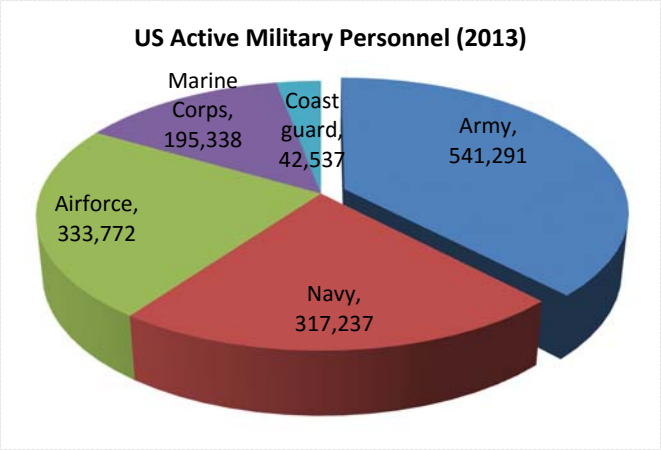
US Military-Industrial Complex



This set-up for a military-industry is unique in that private companies own public arsenals. In almost all countries in the world central government's own, maintain and operate significant aspects of military industry. After World War 2 the US stayed permanently mobilised because of the Cold War. There was then a continuing business in military equipment for contractors. As more and more work went to contractors, when there were downturns in defence budgets as after Korea and Vietnam the US government closed government arsenals. Since the end of the Cold War, there have been five base realignment and closure (BRAC) commission reviews, which further eliminated government owned facilities. Today, the military cannot design or build warships or aircraft without

relying on a handful of private companies. In the shipbuilding sector which is comprised of six state of the art yards, they are ultimately owned by just two firms that build large ships for the Navy and that essentially have no other customers. This mutual dependency defines the US military industrial base.

Ground forces

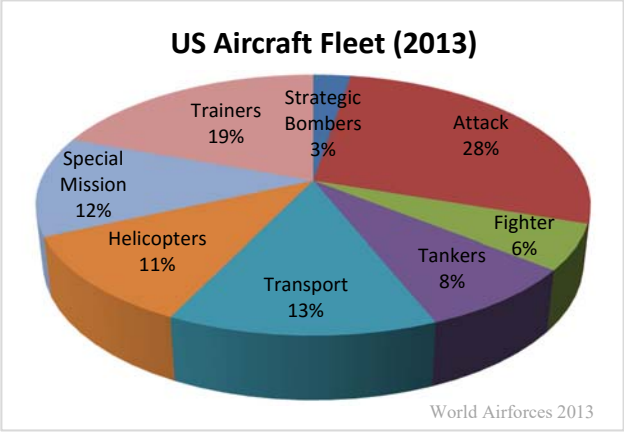


The US has ground forces of 1.1 million, composed of 566,000 reserves. US ground forces are well equipped with a large military industry supplying a range of modern weaponry. The US in the last 20 years has been conducting expeditionary overseas operations. The US military has excelled in the logistical requirements of overseas deployments, and the rotations and training cycles required for sustaining expeditionary forces. The US Army model of readiness is based on highly trained personnel, equipped with advanced communications, transportation, and weapons systems, with significant time dedicated to complex training scenarios, capable of worldwide deployments lasting up to 6 month or longer.

Individual US soldiers are equipped with modern accessories such as Kevlar vests and advanced fabrics. Alongside this the US defence industry has produced modern rifles such as the M4 and M16 rifles. A number of units are supplemented with a variety of specialised weapons designed by US defence manufacturers such as M110 Semi-Automatic Sniper System.

The US operates over 700 military bases globally, giving US armed forces the flexibility to respond to events around the world alongside modern Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance systems. The US can transport its ground forces with modern vehicles which include over 160,000 Humvees and the words preeminent tank M1 Abram's. General Dynamics, the maker of the M1 Abrams tank has produced 8325 for America's armed forces.

Air force



The US air force is the most capable in the world possessing the world's modern and largest fleet of aircraft. The US air force operates 5,484 aircraft, 450 ICBMs and 63 satellites. America has since WW2 led in every generation of aircraft and continues to lead in every category of aircraft. The US B2 stealth bomber is a world leader in strategic bombers, America's B-52 Stratofortress airframe is over 60 years old, and

is scheduled to remain in service for another 30 years, which would keep the airframe in service for nearly 90 years, an unprecedented length of service for any aircraft.

The US remains a world leader in attack aircraft. US attack aircraft are also the choice for most of the world's air forces. Lockheed Martin's F15, F16, F18, F22 fleet comprise the backbone of US offensive strength and comprise 1,681 aircraft.

The US has significant airlift capability and is able to transport troops, equipment and fuel with a transport fleet of 823 aircraft and a tanker fleet of 508 aircraft. The US also has a fleet of 32 Boeing E-3 Sentry aircraft, which are airborne early warning and control (AWACS) systems providing all-weather surveillance, command, control and communications.

Over the next two decades the US plans to replace all of its fighter aircraft fleet with the F35, which will be the only fifth generation combat-ready jet in service after the F22 in the world. The aircraft will give the US air force all-aspect stealth even when armed, Low Probability of Intercept Radar (LPIR), advanced avionics features and highly integrated computer systems capable of networking with other elements within the theatre of war for situational awareness. America's sixth generation jet which is expected to be produced by 2030-2040 is now going through its concept test stage. Boeing unveiled the F/A-XX sixth-generation fighter concept in April 2013, it is expected the sixth generation jet will have greatly increased range and offer far superior kinematic performance compared to existing tactical aircraft.[18]

CASE STUDY: F-35

The $400 billion, multi-national F-35 Joint Strike Fighter program is the largest single military program in history. The US is attempting to develop a fifth generation airframe capable of replacing a variety of dedicated fighter and fighter-bomber types in the US inventory. For the moment the F-35 is not a proven fighter design, with a demonstrated baseline of performance in service. It's a developmental aircraft in the early middle of its test program, which is now scheduled to continue until 2022, if there are no further delays.

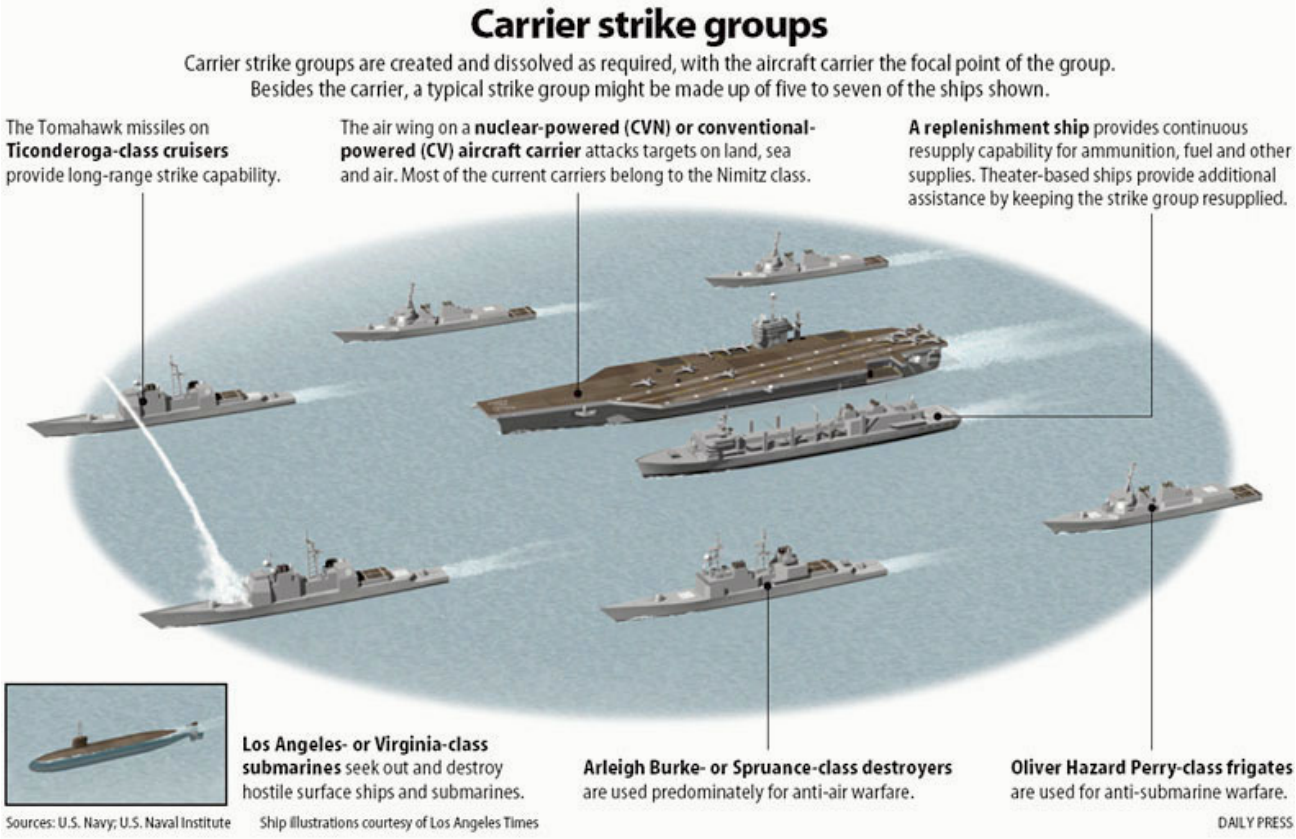
In 1997, Lockheed Martin was selected as one of two companies to participate in the Joint Strike Fighter concept demonstration phase. In October 2001, the Lockheed Martin X-35 was chosen as the winner of the competition and teamed with Northrop Grumman and BAE Systems to begin production. The F-35 variants are intended to provide the bulk of its manned tactical airpower for the US Air Force, Marine Corps and Navy over the coming decades, the Pentagon now plans to spend $391.2 billion on 2,443 aircraft, with each plane costing a staggering $160 million. The F-35 will have three models; the F-35A will be a conventional take-off and landing variant, the F-35B will be a short take-off and vertical-landing variant, and the F-35C will be an aircraft carrier based variant. The first production F-35 rolled out of the assembly in Fort Worth, Texas, in February of 2006. In December of 2006, the F-35 completed its first flight.

The Lockheed F-35 incorporates new and learned stealth technology and practices with advanced computer processing and systems through a 'budget-friendly' modular approach. The aircraft has embedded antennas, aligned edges, internal weapons and fuel and special coatings. Along with radar-absorbent paint applied with micro-level accuracy using lasers for stealth missions. It is equipped to fly at supersonic speeds and outfitted with elaborate software. The F-35 resembles a flying computer through the visor of a hi-tech helmet linked up with cameras on the plane, the pilot can see through the floor of the cockpit to the ground below - providing the pilot an unprecedented 360-degree picture. Airspeed, heading, altitude and targets are all projected on to the visor of the pilot's helmet instead of a display in the cockpit.

The project has been plagued with problems which continue to cause numerous delays. As the jet is being built from scratch many of its technologies are still being developed, which then have to be integrated with other technologies, also yet to be invented, but will be used on the jet. The main cause of the delay was the decision to start building the plane before testing was finished. As a result, bugs and other technical glitches keep forcing repairs and redesign work, slowing down production. The 24 million lines of code for the plane's software have posed a persistent headache, and the jet has yet to attain the level of performance and reliability expected. This is why the project is 70% over its initial cost estimates and years behind schedule.

Navy

America controls the worlds Sea's through the words largest sea fleet. It is larger than the next 13 navies combined in terms of battle fleet tonnage. The US navy operates 285 ships as well as 3,700 aircraft. What sets the US apart from the rest of the world are its 11 nuclear powered aircraft carriers, 10 of these are the nuclear powered Nimitz-class super carriers. All US ships are constructed in 5 shipyards by Huntington Ingalls industries (HII) and General Dynamics. The 11th carrier is the Gerald R. Ford-class aircraft carrier intended to eventually replace the current Nimitz-class carriers. The new vessels will implement new technologies to improve efficiency and running costs, including a reduced crew requirement. A carrier is typically deployed along with a host of additional vessels, forming a carrier strike group (CSG). The supporting ships, usually include three or four Aegis-equipped cruisers and destroyers, a frigate, and two attack submarines tasked with protecting the carrier from air, missile, sea, and undersea threats as well as providing additional strike capabilities.



Amphibious assault ships (AAS) are also the centrepiece of US sea-land warfare and fulfil the same power projection role as aircraft carriers except that their striking force comprises land forces instead of aircraft. For amphibious operations Amphibious Ready Groups (ARG) are centred on three amphibious warfare ships, with a Marine Expeditionary Unit embarked.

The US Navy operates three types of submarines - ballistic submarines, guided missile submarines, and attack submarines. Ballistic missile submarines carry and launch the nuclear Trident missiles. Four Ohio class ballistic missile submarines were converted to guided missile submarines, which have a primary mission of attacking targets on land. Attack submarines have several tactical

missions, including sinking ships and other subs, launching cruise missiles, gathering intelligence, and assisting in special operations.

The US submarine fleet is by far, the most advanced and effective force in the world. With deployments around the world and with the need for an ocean-going fleet capable of securing far-flung sea lanes and trade routes, the US active fleet does not include any diesel-electric submarines. Instead, the US maintains the largest fleet of long-endurance nuclear attack submarines in the world (which, at 54 boats, is about the same size as the Chinese conventional submarine fleet). However, US submarines are dispersed around the world in support of US global interests.

The US has made big strides in harnessing technologies related to both passive acoustic detection and submarine silencing. These advances have made the nuclear submarine the pre-eminent anti-submarine weapon in the US arsenal. The disparity is especially prominent when comparing US nuclear submarines such as the Virginia - or Seawolf-classes to the comparatively very noisy Chinese Shang-class nuclear submarine.

With America's pivot to Asia in full swing, its navy will play an important role as US air bases are sparse in the region. Enhancing the navy's carrier wing capabilities is currently in progress to counter future threats in the Far East. The US Navy took an important step in its ongoing efforts to upgrade its carrier air wing in May 2013 when the X-47B demonstrator became the first unmanned aerial vehicle to complete a catapult launch from the flight deck of an aircraft carrier. The X-47B itself is not a combat drone; rather, it is a model on which future carrier-based combat drones will be fashioned. These carrier-based combat drones will be members of a new class of carrier air wing.

WMD's

The US maintains a large and modern stockpile of nuclear weapons and delivery systems. Two decades after the end of the Cold War, the United States continues to deploy nuclear forces of extraordinary size and power. Thousands of nuclear weapons remain available for use, with enough ready for launch in minutes to destroy any country on earth, these weapons have been maintained since the middle of the twentieth century by a vast complex of laboratories, factories, and test facilities spread across the US. Soon after the collapse of the Soviet Union the US stopped developing new nuclear weapons and now devotes most of its nuclear efforts into stockpile stewardship, maintaining and dismantling its now-aging arsenal.

The US has produced approximately 850 tons of highly enriched uranium (HEU). Most was made for use in nuclear weapons; the rest has been used or stockpiled for naval nuclear reactor fuel. The US continues to modernize its nuclear bombs and warheads, the submarines, missiles, and aircraft that carry them and the laboratories and plants that design them.

US nuclear arsenal is deployed in three ways:

- **Land-based Intercontinental Ballistic Missile (ICBM)** - The US currently operate 450 ICBMs, located primarily in the northern Rocky Mountain states. These are all of the Minuteman III ICBM variants. In addition to this, the US armed forces can also deploy

smaller ‘tactical’ nuclear weapons either through cruise missiles or with conventional fighter-bombers. The U.S. maintains about 400 nuclear gravity bombs capable of use by F-15, F-16, and F-35. Some 350 of these bombs are deployed at seven airbases in six European and NATO countries.

- **Sea-based, Nuclear Submarine-Launched Ballistic Missile (SLBMs) -** The US Navy currently has 18 Ohio-class submarines deployed, of which 14 are ballistic missile submarines. Each submarine is equipped with a complement of 24 Trident II missiles.

- **Air-based heavy bombers** - The US Air Force operates a strategic nuclear bomber fleet. The bomber force consists of 94 B-52 Stratofortresses and 19 B-2 Spirits. The B52’s operational life ends in 2035, studies are also underway to identify options for a new bomber to replace it beyond that point. The air force further intends to replace its current air-launched cruise missiles (ALCMs) with a new long-range stand-off nuclear missile, beginning production around 2025.

CASE STUDY: The Rest of the world Vs America

America's military capability is unique from the perspective that today's military might of the world is completely out of balance. The worlds military might combined still does not equate to America's military capability. If China, Russia, Iran, the UK, France, Germany, Israel, India, North Korea and every other country came together to invade the USA there are numerous obstacles that would need to be overcome.

Firstly, the rest of the world would need to disable America's nuclear capacity. America's nuclear arsenal is based on a triad of land, air, and sea delivery systems designed to provide a counterstrike capability. The submarine-launched ballistic missiles in particular are widely accepted as the most survivable element of the US nuclear deterrent as a portion of it is always at sea. The land-based missiles too are difficult to eliminate, as they are in hardened silos in the middle of the country. Any adversary facing the US would need to either be willing to absorb a nuclear attack or develop a ballistic-missile defence system currently beyond the scope of anything technologically feasible. Thus it is virtually impossible to eliminate America's nuclear arsenal.

Secondly, if somehow the rest of the world could disable America's nuclear arsenal it would need to get its forces across the pacific and Atlantic to the US continent. The challenge here is the US is the sole country in the world that has the capability to project force across the globe on a large scale. The combined military air-and sealift capability of the rest of the world would is insufficient to get a foothold on the continental United States. The amphibious assault capability of the world's militaries, excluding the United States, is just too small. If they managed to go undetected, and acquire some beachheads on the US coast (a virtually impossible feat in light of modern surveillance capability) the rest of the world will still be unable to build up a force of any size before being pushed back into the sea. Any adversary would have to seize and use civilian aircraft and ships not designed for non-permissive environments. These ships would require secure bases in Canada and Mexico, since they lack the capability to deliver forces onto unimproved shores. Thus, any attempted invasion of the US would first look like a caravan of vulnerable civilian ships and aircraft. If these forces managed to avoid US attacks and build up, they could then launch an attack over the mainland.

Thirdly, a land invasion would have to come via a land border, with the terrain of the southern border (Mexico) being most conducive to military operations. This is also where the largest US Army armour base happens to be in Texas, which would hinder such an attack. Going through the Northern Canadian border will require this land force to go West, to avoid the Great Lakes and St Lawrence Seaway - and concentrate forces and target population centres and other important strategic points. The issue then is, are the combined forces of the world enough to defeat the US? The challenge here is whilst the rest of the world would outnumber America's forces it still has to project this to America's shores and this will require logistical resources that the rest of the world just doesn't have.

Fourthly, the primary problem here is geography. Just as the vast Russian steppe swallows armies, so would the oceans that surround the US. No matter the manpower or armament, it must be delivered across the Pacific and Atlantic in order to be brought to bear. This is where US naval and air power would destroy most adversaries, far before they reached the US shore.There are not enough aircraft carriers and amphibious warfare ships in the combined navies of the world to force an entry past the US Navy. There are not enough attack fighters to gain air superiority against the US Air Force.

Fifthly, the solution for the invading world armies would be to negate the importance of geography and technology. This means not relying on armies and navies and air forces but instead targeting the US in space and cyber domains. By defeating US satellites and attacking US networks, one bypasses geography and eliminates technology, both that of the military and within the industrial base that is at the core of Americas military might. Putting aside the fact that the US leads in these areas one still does not conquer US soil. So we arrive at the same conclusion: as the world military balance stands today, even in the unlikely case that the entire world aligns against the US, America can be defeated but it's very unlikely it can be conquered.

America's biggest challenge is actually internal. This is why America has treated foreign ideas so seriously, as these have the possibility of causing a facture within the US populace. This is why Communism was not allowed by the US to even settle on the South American continent. This explains Abraham Lincoln's statement that: *"America will never be destroyed from the outside. If we falter and lose our freedoms, it will be because we destroyed ourselves.*

Conclusions

The US has managed to develop advanced military capabilities which allow it to spread its influence across the world. Its control of the sea's and the Sea Lines of Communication (SLOC) through its aircraft carriers allows it to respond to any threats to its interests across the globe at a moment's notice. US superiority in space has been due to developments in ballistic missiles, its air force and communications. This fourth theatre ensures the US will remain ahead of all its adversaries.

Whilst the US continues to develop Special Operations Forces (SOF) to deal with asymmetric warfare, America's defence industry has failed to develop technologies and systems to alleviate some of the most pressing challenges of ground combat, such as jungle warfare, urban combat, guerrilla or irregular warfare and peacekeeping. More than 80% of all US military personnel killed in combat during the last fifty years have been in the ground forces of the Army and Marine Corps. This vulnerability was exploited in Iraq and Afghanistan and has weakened US military prowess around the world.

America has dangerous reliance on foreign nations for the raw materials, parts, and finished products needed to defend the American people. In addition, the US is not mining enough of the critical metals and other raw materials needed to produce important weapons systems and military supplies. America's defence industry has a large dependency on China, with many aspects of America's defence industrial base reliant upon the rising power. Specialty metals are used in countless ways, including high-strength alloys, semiconductors, consumer electronics, batteries, and armour plate, to name a few. The US currently imports over $5 billion worth of minerals annually, and is almost completely dependent on foreign sources for 19 key specialty metals.

The wars in Iraq and Afghanistan have shown bigger is not better and technological superiority can still be exploited. Despite a decade of shock and awe tactics in both Iraq and Afghanistan, despite the coordination between the US air force and ground forces, despite precision strikes with an array of advanced missiles the US possesses, the US was unable to defat insurgencies in both countries. In Afghanistan the US is now negotiating with the enemy. The sheer size of America's military footprint lost it the element of surprise whilst the small nature of insurgencies in both Iraq and Afghanistan gave them the element of surprise.

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Similarly high-tech magnets, which are made from rare earth elements (REEs) and used are in advanced weapons systems and military vehicles, they are uniquely able to maintain their magnetic properties in extreme heat and perform other vital functions. Although rare earth magnet (REM) technology was developed in the US, 60% of SmCo magnets and 75% of NdFeB magnets are currently fabricated in China. 70% of machine tools used in US manufacturing are imported, mostly from Germany and Japan.[20]

2. Russia

The Slavic tribes that settled around Muscovy (modern day Moscow) were constantly invaded from the steppes of Central Asia and the North European plains. This area counts no rivers, oceans, swamps or mountains to defend itself. As a result the Mongols invaded from central Asia and various Europeans invaded from the West. To deal with this the Grand Duchy of Muscovy expanded from present day Moscow in all directions using the territories around it as buffers against enemies. The Grand Duchy became the Tsar and the Russia Empire was born – expansion to defend its core tertiary of Muscovy also continued. In the 20th century the Soviet Union achieved the Russian people's greatest territorial power by expanding well into Europe and gaining direct oceanic access, which allowed it to project power globally. The basic security problem the grand duchy of Muscovy, the Russian Empire, the Soviet Union and Russia under Vladimir Putin has been defending itself with no natural barriers from foreign influence, invasion and threats.

Doctrine

The US and the Soviet Union emerged the world's premier powers from WW2. They competed with each other for decades over the post of the world's superpower. Both competed in the arms race in order to produce the most powerful missiles and the Space race to place the first man on the moon. This competition eventually consumed the Soviet Union and in 1990 after various revolutions the Soviet Union disintegrated.

The disintegration of the Soviet Union resulted in the newly independent states dividing up the military's assets. The Russian Federation inherited the largest and most productive share of the former Soviet defence industry, employing as many as 9 million workers in around 1,500 research, design and production facilities. Most Russian defence enterprises steadily lost their best workers to Western companies. In 1997 the Russian defence industry consisted of some 2.5 million workers. In dealing with this situation, the Kremlin came to rely on its nuclear arsenal as the guarantor of territorial integrity. Russia's nuclear weapons were its trump card in all defensive scenarios. Until Vladimir Putin came to power the Kremlin had no offensive capabilities or ambition.

The military doctrines that followed the fall of the Soviet Union was an attempt to figure out how to sustain large military and military industrial complex during a time when Russia was feeling the looming threat of NATO and facing significant domestic separatist threats. The military and its

industrial complex in the 1990s were chaotic, top-heavy and lacked any political will from the Kremlin to fix its problems. The Kremlin's focus on the Russian military and its doctrine started to take serious shape in 2000 under Vladimir Putin. His main focus was to reorganize the Russian military, purge the glut and shift to a tighter and smaller military. The 2000 Russian doctrine was meant to be a period of transition for the military and industrial complex. It set up the Russian military to be defensive in character during this period. By 2006, Russia had started to come up with a coherent plan for its future - one based on internal consolidation and a future push out into its traditional sphere of influence. This new mind-set of a stronger Russia was reflected in its military doctrine formalized in 2009.

Industrial Base

Russia's current Industrial base consists of 1,700 enterprises and 1.5 million employees, many of them in single industry towns. The majority of the defence industrial base in Russia is state-owned and is regarded as an inherent part of the overall military infrastructure. It is currently not in a position to develop all modern weapons and mass produce these for the country's military needs on time. Russia inherited the Soviet Union's large nuclear arsenal and also its huge conventional arsenal. However up to 90% of this equipment has not been maintained or can no longer be used.[21] The decade after the collapse of the Soviet Union led to economic and financial chaos leading to the deterioration of arms and equipment due to inadequate servicing.

A wide ranging plan for equipment modernisation and reform was introduced in 2005. This led to the creation of the Military-Industrial Commission (MIC), who then began the centralisation of state-owned industry. This began with disparate industrial assets being consolidated within specific sectors into state-dominated holding companies, these were:

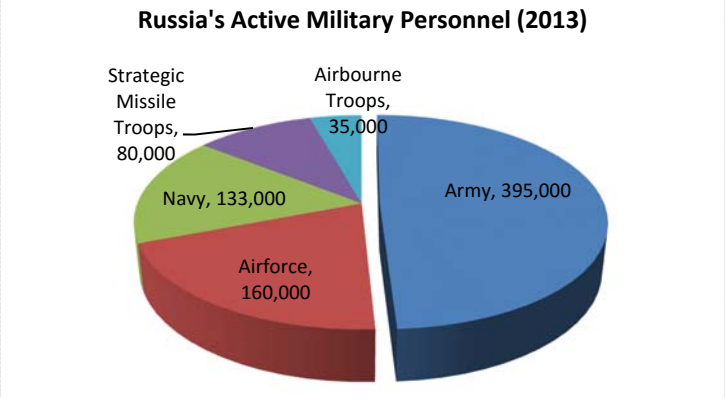
United Aircraft Corporation (UAC) - All the industries involved in the design and manufacture of civil and military fixed wing aircraft assets, the largest company is Sukhoi.

United Shipbuilding Corporation (USC) – The amalgamation of Russia's shipyards and design bureaus for surface ships.

Russian Technologies (RT) – Amalgamation of industrial, technological and financial companies in weapons industry, including Rosoboronexport.

Ground Forces

Whilst Russia has total troop strength of over 2 million personnel, as of 2013 766,055 officers formed Russia's active force. Russia's ground forces have very large stockpiles of materiel left from the Soviet Union. This equipment however has not been well-maintained and requires significant upgrades. The bulk of the

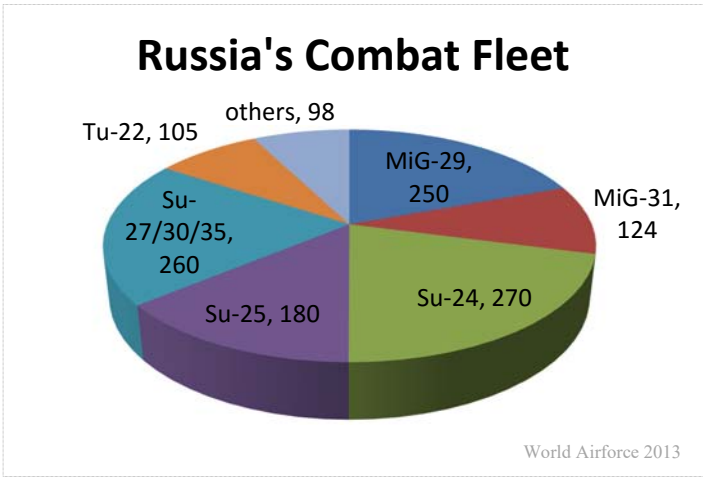


equipment used by the ground forces is obsolescent, most of the army's current equipment was designed or built by Soviet engineers. The army particularly lacks precision-guided munitions and modern Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance systems.

The Soviet Union's posture and orientation towards a large scale land war led it to develop a large arsenal of tanks, which today, remains the largest fleet of battle tanks in the world. Russia possesses over 23,000 tanks, more tanks then the whole of NATO combined. These platforms are ageing, with 80% of them built in the 1960's and 1970's (T-55, T-64 and T-72 models). These armoured fighting vehicles are also in storage and considered non-operational. The remaining 20% are from the T-80 series commissioned in the late 1970's. The most modern tank - T-90, in Russia's inventory is a Cold war design, which began production in 1993 and only 300 units have been delivered to the ground forces. The T-90 is in essence an evolution from Soviet-designed vehicles and not a new design.

Air Force

The Russian air force has over 4,000 aircraft in active service, but as with the army overall, its equipment consists of vast numbers of ageing platforms first built during the Cold War. Much of these fleets have been badly serviced. In 2008 a MiG-29 crashed as subsequent investigations brought to light the plane suffered from metal corrosion. All of the MiG-29's were grounded and checked for air-worthiness and it was found 70% were not operational.[22]



The air force is placing considerable emphasis on producing new equipment, with a flagship design being the new fifth generation stealth T-50. The Russians are also seeking to produce a number of the effective Ka-52 and Mi-28 attack helicopters to supplement the existing force of Mi-24 gunships. These modernisation programmes underway to develop new platforms and designs, based on current production rates will not be enough to prevent a gradual decline in the inventory of fielded aircraft overall. The Russian air force is slightly better off than the ground forces in terms of the levels of modernized equipment available, but the more technologically advanced aircraft are slowly entering service in low numbers.

CAST STUDY: Sukhoi T-50

Russia's Sukhoi T-50 5th generation fighter is the country's first new major combat aircraft designed since the fall of the Soviet Union, it will also be the Russian air force's first stealth aircraft. The T-50 is intended to be the successor to the MiG-29 and Su-27 in the Russian inventory and an export version, called the fifth-generation fighter aircraft (FGFA), is also under development in a joint project with India for its country's air force. In the late 1980s, the Soviet Union outlined a need for a next-generation aircraft to replace its MiG-29s and Su-27s in front line service. In late January 2010, the T-50 made its maiden flight and is expected to be inducted into the Russian air force by 2016.

A number of innovative solutions have been implemented in the jet, including stealth technology, new construction materials and coatings, artificial intelligence and the element base. The latest polymer carbon plastics have made their debut on the T-50. They weigh 50% less than titanium or aluminium of comparable rigidity, and they are 20-25% lighter than steel. New materials cover 70% of the fighter's surface. Its weight has been reduced to just a quarter of that of a fighter made of conventional materials, allowing the designers to increase its combat load. Its radar, complete with an active electronically-scanned array (AESA), can "see" everything that is going on in the air or on the

ground at a distance of hundreds of miles. The T-50 can take off and land from a runway that is only roughly 1,100 feet long. Going forward, it will serve as a basis for a navy variant. Weapons will be stored completely in internal compartments, to meet the stealth technology's requirements.

The T-50, for Russia is not merely a combat aircraft but an investment in technology and engineering that has implications for Russian industry, and has economic implications for Russia. The T-50 is the most expensive and complex defence project Russia has undertaken since the collapse of the Soviet Union, with many former Soviet customers prolonging the life of Soviet platforms success with this aircraft could potentially aid Russia's military modernisation.

Navy

The Russian navy is not as powerful as it used to be. The decay of the 1990's affected vast numbers of ships that suffered from lack of maintenance and upkeep. The Russian navy has not played any role in Russia's post-Soviet wars – Chechnya and Georgia. The shortage of finance in the 1990's led to the shipbuilding to largely discontinue until early 2000's.

Russia currently maintains a sizable number of warships, but most of these are old Soviet platforms and now obsolescent designs. The Admiral Kuznetsov - Russia's sole aircraft carrier, all the cruisers and at least half of Russia's destroyers were first launched by the Soviet Union. The Russian conventional attack, nuclear attack and cruise missile submarine forces are in better shape than the surface fleet in terms of levels of modernization. However, the Russians have encountered considerable problems in developing and building Lada and Yasen class submarines, which are supposed to replace older conventional attack and nuclear attack submarines.

The Russians have not built a large surface vessel for the military from scratch in more than 20 years. The refurbishment of India's INS Vikramaditya aircraft carrier, at the shipyard in the Russian city of Severodvinsk, has been beset by constant delays and obstacles, highlighting Russia's

declining ability to work on large military vessels. While Russia's navy regularly announces plans to construct new aircraft carriers, concrete plans have yet to materialise, the Russians are exceedingly unlikely to construct a fleet aircraft carrier within the next decade.

WMD's

Russia continues to maintain a sizeable nuclear arsenal and delivery systems. Russia has approximately 1,499 deployed strategic warheads, and another 1,022 non-deployed strategic warheads and approximately 2,000 tactical nuclear warheads. Russia's Strategic Rocket Forces controls its land-based nuclear warheads, while the Navy controls the submarine based missiles and the Air Force the air-launched warheads. Russia's nuclear warheads are deployed in four areas:

1. Land-based immobile (silos), like R-36.
2. Land-based mobile, like RT-2UTTKh Topol-M and new RS-24 Yars.
3. Submarine based, like RSM-56 Bulava.
4. Air-launched warheads of the Russian Air Forces' Long Range Aviation Command

Russia's nuclear forces have not escaped the military decline of the post-Soviet years. Many of Russia's nuclear weapons and their delivery systems have exceeded their design life, with some estimates suggesting that increasingly obsolete capabilities form some 62% of the Russian strategic missile force.[23] Going forward many of Russia's existing delivery systems are due to be decommissioned. Efforts to replace those capabilities have had mixed success

Conclusions

Russia possesses a very sizable arsenal, which suffers with deep structural problems associated with age and the lack of maintenance. As the equipment continues to age, maintenance becomes more expensive, taking up more of the defence budget. The equipment will also be retired at an ever-increasing pace as it becomes obsolete. The Russian military therefore is dependent on increased military funding if it wishes to maintain its current combat potential, much less increase it. At the current rate, and even if funds were increased, Russia will have to make choices about which military sectors to prioritise.

Russia has made small amounts of advanced weaponry, which has been widely acknowledged. In the last few years, the air force has taken delivery of the Su-34 combat aircraft, the Iskander theatre ballistic missile system, the S-400 air defence system and the BMD-4 airborne combat vehicle. These platforms are considered amongst the best in their category.

Despite all the stories of a run-down and demoralised military that regularly appear in the Western media, Russia's armed forces remain the most powerful and effective land force across all of Eurasia. Whilst Russia lacks modern weapons in most categories, what it does possess is still significant and as was seen in the war with Georgia in 2008, Russia is still a power to be feared.

3. China

The rise of China continues to dominate global balance of power. The nation's annual double digit growth, global export machine and military ascent are leading to potential shifts in the global balance of power. China as a nation has existed for over 4000 years. Most of Chinese history consists of internal struggles between various dynasties fighting to rule over the nation. Modern China emerged after WW2 when the Japanese who occupied large parts of China were defeated. The resultant vacuum led to civil war between the Chinese nationalists supported by the West and Chinese Communists supported by the Soviet Union. The communists led by Mao Zedong emerged victorious and the Communist party has ruled China ever since.

In China's 4000 year history it has never been a superpower and has never influenced the global balance of power. Even when it adopted Communism it never carried this beyond its borders and never influenced any of the regions of the world. Much of China's 4000 year history is composed of internal wars and struggles in order to unify the homeland. Maintaining internal unity, maintaining control of the nation's buffer regions and protecting its coastal waters is the basic security threat China has always faced as a nation and as a result China's military has always been a land power.

Doctrine

During the period of Mao's rule the People's Liberation Army (PLA) was oriented towards a protracted total and nuclear war which was based on the premise of a Soviet invasion of China. The PLA would compensate for its technological inferiority with its geographic space, manpower and by luring the enemy deep into Chinese territory. In the 1970's the PLA remained alert to major total war with the Soviet Union but sought to defeat any adversary close to its borders and adopted the defence of its cities combined with mobile warfare, thus making any conflict less protracted.

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By the end of the 1980's, PLA strategists concluded that local, limited wars triggered by disputes over maritime and land territories were more likely than a massive foreign invasion of China. The more likely war scenario for the PLA would be a medium-sized local war.

The 1990's witnessed the collapse of the Soviet Union and the first Gulf war. The result of 1991 war between the US and Iraq led to a major rethink in Chinese military doctrine. China's forces lagged far behind most of the world in military development and was utilising platforms developed in the 1950's. The annihilation of the Iraqi army, which was similarly equipped and followed a similar doctrine to the Chinese military proved to Chinese leaders that modern precision weapons

could quickly obliterate soviet era equipment, and that the standoff afforded by these systems ensured minimal casualties to the military force using them.

As a result China's armed forces underwent modernisation in order to bring them on par with the world's powers. Mao's doctrine of 'human wave attacks' - having more soldiers than your enemy has bullets was replaced with a relatively smaller armed force emphasizing new technologies. Recognising the need to reform China has ever since been undergoing a Revolution in Military Affairs (RMA), which emphases a C^4ISR (command, control, communications, computers, and intelligence) communications, characterised by the wholesale shift to digital, secure communications via fibre-optic cable, satellite, microwave, and encrypted high-frequency radio. Since the 1990s, China has focused on and invested in a major reorientation of its military from a massive land army focused on territorial defence to one that emphasizes naval and air capabilities to protect China's interests in the East and South China seas and beyond into the western Pacific. This has included expanding China's reach and a focus on anti-access and area-denial capabilities. China's military modernisation includes acquiring and developing advanced weaponry, improving information technology and communications, heightening capabilities on sea and in the air, and developing capabilities in new theatres such as cyber warfare and outer space. It also entailed improving Chinese forces' mobility, rapid reaction, special operations forces and ability to conduct combined operations between different military services.

Today, China's leaders have sustained this ambitious and broad-based military modernisation program intended to transform the PLA into a modern force. China's current military doctrine can be encapsulated as minimum deterrence – i.e. having the minimum military capability to ensure it cannot be blackmailed.

Industrial Base

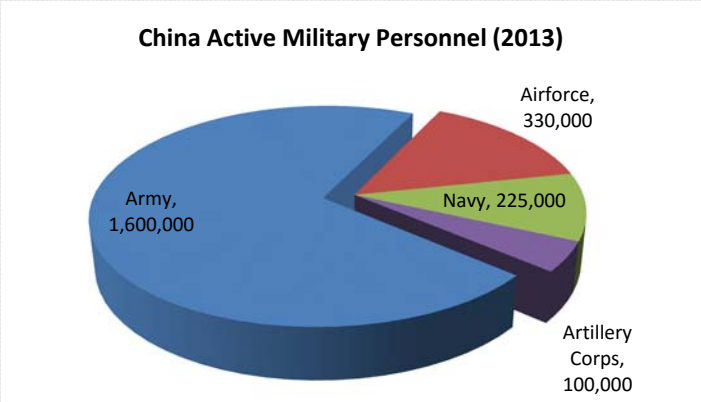
China's defence industry is comprised of 11 state-owned enterprises related to ordnance, aviation, space, shipbuilding, nuclear weapons and electronics production. Following two decades of defence-industrial reforms each of these ministries was transformed into corporations, which concentrate on selling civilian and military-related goods to both domestic and international markets. Unlike most countries China's defence industry is completely distinct from the People's Liberation Army (PLA), which include:

1. China National Nuclear Group Corporation
2. China Nuclear Engineering and Construction Group Corporation
3. China Aerospace Science and Technology Group Corporation
4. China Aerospace Science and Industry Group Corporation
5. China Aviation Industry Group Corporation I
6. China Aviation Industry Group Corporation II
7. China State Shipbuilding Group Corporation
8. China Shipbuilding Industry Corporation
9. China North Industries Group Corporation
10. China South Industries Group Corporation
11. China Electronics Technology Group Corporation

Since the early 1980s, China's defence firms diversified away from exclusive military production to producing civilian goods for domestic and international markets. Current estimates of the amount of civilian production in each of the eleven large defence corporation ranges from 65% to 90% depending on the particular firm. Thus, even though these enterprises are officially considered by the government as defence industrial firms, they are also primarily involved in producing civilian goods and services, and thus are intertwined with China's huge civilian economy.

China's industrial base is now in its third decade of military modernisation. After attempting to domestically produce all of the weapons needed to equip the country's military for much of the 1960s and 1970s. China then turned to purchasing weapons systems and related components and technologies from the major military equipment producers of the world in the 1990's. Since the 1990's China has attempted to improve design and manufacturing processes so as to produce better-quality weapons domestically while importing key systems to fill short-term needs.

Ground Forces



China fields the world's largest armed forces, with a standing army of over 2.2 million personnel. China's ground forces constitute the largest branch of 1.7 million active personnel – 70% of China's combined forces. China's ground forces continue to undergo significant modernisation and re-structuring to deal with potential threats and enhance its land warfare capabilities. Front line troops such as special-forces, marines and paratroopers are being given priority in receiving modern weapon systems and equipment. Other areas of improvement are its battlefield C^4ISR capabilities, (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance) with the introduction of satellite communications, wireless networks, and digital radios, army commanders are now able to maintain constant communications with their front-line units while on the move.

China's ground forces are transitioning from a static defensive force deployed across seven internal military regions (MRs) oriented for positional, mobile, urban, mountain offensive campaigns, coastal defence campaigns and landing campaigns to a more offensive and manoeuvre oriented force organized and equipped for operations along China's periphery. China's ground force modernisation programmes include production of new tanks, armoured personnel carriers and artillery pieces.

Currently China's ground forces possess 7580 tanks, 56% of this inventory is the type 59 tank and its variants. The first vehicles of this type were produced in 1958, with serial production beginning in 1963. This

tank was based on the Soviet T-54A. Approximately 9,500 of the tanks were produced by the time production ended in 1980 with approximately 5,500 serving with the Chinese armed forces. The tank forms the backbone of the ground forces, with an estimated 5,000 of the later Type 59-I and Type 59-II also still in service.

The sheer size of China's ground forces make it essential its inventory consist of modern tanks. The most advanced tank currently in front line service is the Type-98, with significant improvements in the key areas of armour, mobility and firepower. This third generation tank led to further development of Type-98 and has resulted in Type – 99. The Type-99 is based on the Russian T-72 chassis and has modern features in every aspect of tank building. While other countries have experience with laser dazzle device, the PLA is the first country to operationally deploy such a system on both, MBT's Type – 98 and Type – 99.

However China's ground forces still faces significant challenges in shifting from internal security to external expansion. China's army is primarily configured as a domestic security force, which has been a necessity due to the counties history of internal tensions. Having been designed for internal security, China's ground forces are doctrinally and logistically disinclined toward offensive operations. Using a force trained for security as a force for offensive operations leads either to defeat or very painful stalemates. The PLA was built to control China, not to project power outwards.

China's ground forces have moved towards smaller and more mobile forces. It has disbanded dozens of heavy divisions and created smaller brigades – producing a core of mobile mechanised forces and motorised functions. China has also inducted 'special mission battalions' for quick-reaction missions and rapid deployment. The integration of the civilian transport network into ground forces logistical infrastructure has provided efficient troop transport and dramatically increased the mobility of ground formations.

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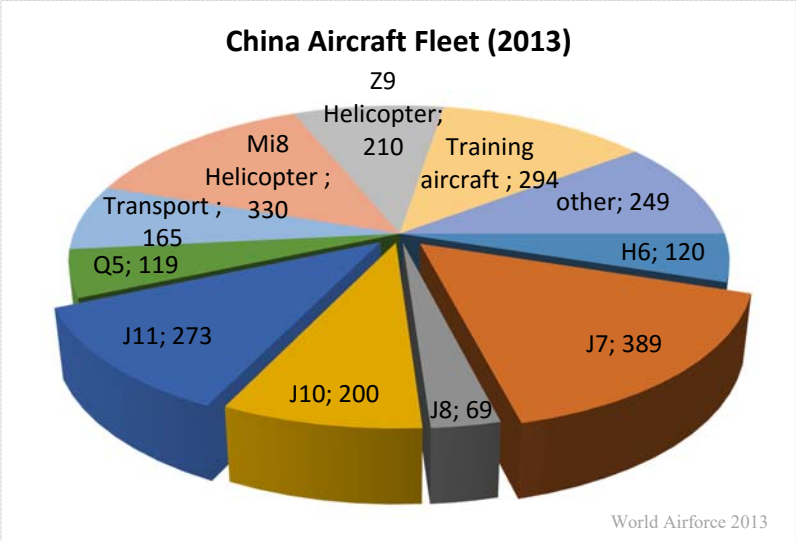
Air Force

China's air force remains in transition from two decades of modernisation. The sheer size of China's geography requires a large fleet of modern fighters, bombers and significant airlift capability. China has focussed on reducing the size of its air force and focusing on quality and capability. Each of China's aviation manufacturers belongs to one of two large holding companies

that make up China's aviation industry: China Aviation Industry Corporation I (AVIC I) and China Aviation Industry Corporation II (AVIC II). Between them, these two companies control over 100 industrial enterprises, 33 research institutes, 42 other subsidiary companies and institutes, and 450,000 employees. Today, AVIC I companies are focused on producing fighters, bombers, and transporters; AVIC II companies are attempting to produce attack aircraft, helicopters, and transports. Both conglomerates produce aircraft for military and civilian use.



China's fleet consists of both older aircraft fielded in the 1980s, and newer designs introduced in the 1990s and later. The thousands of J-6 fighters that once made up the fighter fleet have been retired. The current inventory is composed primarily of third and fourth generation fighter jets. Most of the military products of China's aviation sector are obsolete by western standards. Some fighters and attack aircraft still produced in China are based on 1950s-era Soviet designs. Whilst these are inexpensive to maintain and relatively fast and agile, the performance of these aircraft fall well short of those being produced in the US, Russia, Europe, and Japan in terms of acceleration, rate of climb and weapons load.

Since the late 1990s, China has begun producing progressively more-advanced aircraft in a strategy to replace its ageing fleet with indigenously developed platforms. China has increased the number of its modern, fourth-generation aircraft from 50 to 600 since 2000, even as it has reduced the size of its overall air force from 3,000 combat aircraft to around 2,000. Military modernization is about smaller but more up-to-date force structures and this is what China has been pursuing. Over the next decade the following platforms will predominantly make-up China's fleet:

Chengdu J-7 – The J-7 and J-10 are the most advanced domestically produced military aircraft China possesses and had long development cycles lasting two decades. The J-7, represents China's first completely indigenous airframe design although based on the Soviet MiG-21. Whilst this jet is being replaced with more modern ones it remains the largest stock of jets the Chinese air force possesses. The MiG-21 entered service with the Soviet air forces in 1958 and was copy-produced in China beginning in the 1960s. The project is still dependent on jet engines imported from Britain.

Chengdu J-10- The J-10 is China's first fourth-generation aircraft. The fighter were formally introduced in 2005, as of October 2011 at least 210 were produced. The J-10 has just entered mass

production, despite the fact that the program was initiated in the early 1980s and the basic design is largely derived from Israel's cancelled Lavi fighter program.[24]

Shenyang J-11 - is the Chinese Multirole air superiority fighter. As of 2012, 164 have been constructed. Largely reverse engineered from the Su-27, the J-11 has a single pilot. It can fly up to Mach 2.25.

Chengdu J-20 - is a purported stealth fifth-generation fighter aircraft. It first flew in January 2011. The Deputy Commander of the People's Liberation Army Air Force foresees the J-20 to come out in 2017 or 2019. That's similar to the F-35 roll out for the US.

For the moment China lacks the long range and air lift capability needed for a nation the size of China. The bombers that China produces are medium bombers that are based on a 1950s-era Soviet design. China does not produce long-range heavy bombers. To date, China has also been unable to produce and indigenously design a jet transport. The main reason why China does not produce heavy bombers or jet transports is because it has been unable to produce an indigenously designed and developed jet transport engine. Turbojets lack the power and fuel efficiency needed to propel large aircraft over long distances. No Chinese-produced engine has yet been accepted for installation on a long range and heavy plane.[25]

Navy

Since the late 1980s, China has been seeking to develop a 'blue water' navy force capable of operating in the regions beyond its offshore waters. The modernisation of its navy has become all the more important as China relies on the sea lines of communications (SLOC) to secure the country's global network of energy resources and trading activities. China is aiming to develop a relatively modernised naval force that can operate within the first island chain, a series of islands that stretch from Japan to the north, to Taiwan, and Philippines to the south. In the second step, the Chinese navy aims to develop a regional naval force that can operate beyond the first island chain to reach the second island chain, which includes Guam, Indonesia, and Australia. In the third-stage, the navy plans to develop a global naval force by the mid twenty-first century.

China's shipbuilding industry is dominated by the China State Shipbuilding Corporation (CSSC) and the China Shipbuilding Industry Corporation (CSIC). Both state owned enterprises operate the

bulk of new building, repair, and conversion shipyards that comprises over 1,200 shipyards that produce a wide range of vessel sizes and related marine-production facilities capable of building the largest classes of merchant vessels to the smallest river boats. China's shipbuilding industry has gradually modernized since Deng Xiaopings's reform and openness policies. It rapidly engaged international markets in the 1980s and, as a consequence, gained consistent access to foreign shipbuilding equipment, capital, and know-how. China is now the world's third-largest shipbuilder. China's shipbuilding industry now produces a wide range of increasingly sophisticated naval platforms using modern design methods, production techniques, and management practices. China's shipyards are now producing more-advanced naval vessels more quickly and efficiently than in the past. These improvements are best reflected in the serial output of several new classes of military ships in recent years.

During the 1980's China modified first-generation, Soviet-designed vessels using newer naval technologies and then built second and third generation ships based on indigenous designs whilst incorporating mainly foreign weapon systems. This led to the development of the Jianghu-class frigates. The period also saw the upgrading of the Wuhan-class conventional submarines and modification of several Luda III–class destroyers. In the 1990s China purchased four Sovremenny-class destroyers from Russia and put into service 10 new classes of indigenously built destroyers and frigates (some of which are variations of one another) that demonstrate a significant modernization of PLA Navy surface combatant technology.

China since the mid-1990s has acquired 12 Russian-made Kilo-class non-nuclear-powered attack Submarines (SSs) and put into service at least four new classes of indigenously built submarines, including a new nuclear-powered ballistic missile submarine (SSBN) design called the Jin class, a new nuclear-powered attack submarine (SSN) design called the Shang class, a new SS design called the Yuan class and another (and also fairly new) SS design called the Song class. The Kilos and the four new classes of indigenously built submarines are regarded as much more modern and capable than China's aging older-generation submarines.

China has recently commissioned into service its first aircraft carrier—the *Liaoning,* which isa refurbished ex-Ukrainian aircraft carrier, previously named Varyag, that China purchased from Ukraine as an unfinished ship in 1998. During the next decade China is likely to fulfil its carrier ambitions, becoming the last permanent member of the UN Security Council to obtain a carrier capability.

Although China is designing and building increasingly sophisticated warships, Chinese naval shipbuilders still need to import key components or modules, such as propulsion systems, navigation and sensor suites, and major weapon systems, to outfit these vessels. Such a reliance on imported subsystems creates systems-integration challenges, as well as security concerns stemming from dependence on foreign suppliers.

WMD's

China is considered to have an arsenal of about 180 active nuclear weapon warheads and 240 total warheads. Its nuclear deterrent is primarily based on land based intermediate range missiles and a small fleet of Submarine-Launched Ballistic Missiles (SLBM). Approximately 55% of China's missiles are in the medium range category, targeted at regional theatre targets.[26] It also consists of a small range of ICBM's. Most of China missiles are stored in huge underground tunnel complexes. The submarine-launched ballistic missile (SLBM) stockpile is believed to be relatively new. China launched its first second-generation nuclear submarine in 1981. The navy currently has a Xia class submarine at roughly 8000 tons displacement. The Type 092 is equipped with 12 JL-1 SLBMs with a range of 2150–2500 km.

The missile sector in China has a proven record of capability and has consistently been a priority for the political leadership. Over the past several decades, China has consistently produced a wide range of missiles and over the past two decades steadily improved its missile technology. Compared with other developing nations, China's missile-production capabilities in some areas approach those of modern Western militaries. Nonetheless, key weaknesses remain in important areas.

China's missile industry has long benefited from having access to the missile systems and related equipment, and the materials and technologies, of other countries. Most of China's current missile systems are based on foreign systems or incorporate foreign missile technologies. During the 1950s and 1960s, China's missiles were based largely on Soviet designs. By the 1980s, China began to design its own systems, but even these incorporated substantial amounts of French and Israeli missile technology. Beginning in the early 1990s, Russia provided complete SAM (surface-to-Air), AAM (Air-to-Air), and ASCM (Anti-Ship Cruise Missile) systems. China absorbed these foreign technology systems and has been able to develop its own indigenous systems and make them operational. Historically, it took China about 15 years to reverse engineer a weapon system, from the time samples of a system were acquired to the time-series production of that system was initiated.[27]

China's missile sector has a wide breadth of the products it produces. China churns out numerous types of ballistic missiles, ASCMs, SAMs, AAMs, LACMs (Land Attack Cruise Missiles), and precision ground-attack missiles. China's SRBM (Short Range Ballistic Missiles) arsenal is its strength providing it with a capability in addressing the perceived needs of deterrence and coercion with regards to Taiwan.

While China has produced an impressive array of missiles in all categories, the capabilities of these systems are limited - many are short-range systems, and lag well behind those of the most advanced militaries. China's short-range SAM systems are also quite capable, but China lacks a modern, high-altitude SAM capability comparable to early versions of the US Patriot or Russian S-300 system.

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C⁴ISR - Command, Control, Communications, Computers and Intelligence

China is recognized as having one of the most advanced cyberwarfare capabilities in the world. An untold number of intrusions and attacks on military, government and corporate systems have been traced back to mainland China. The Chinese military is in the midst of a C^4ISR revolution, characterized by the wholesale shift to digital, secure communications via fibre-optic cable, satellite, microwave, and encrypted high-frequency radio.

Information technology is now universally recognized as the core of future warfare, sometimes labelled the Revolution in Military Affairs (RMA). China quantitatively and qualitatively lags behind the US and Russia and whilst rapid advances are being made China remains a number of generations away from a military capability that can go beyond its region. China still maintains a reliance on Russian weapons systems and still cannot make reliable engines. In light of its generational deficiencies cyber warfare provides China with an asymmetric advantage to deter aggression from stronger military powers as they catch up in traditional military capabilities.

CASE STUDY: Developing C^{4}ISR Capabilities

Throughout its history, the PLA has suffered from inadequate and outdated information technology, characterized by limited capacity and lack of security. In the past, these weaknesses severely limited the military's ability to transmit and process large amounts of information or coordinate activities among the various military regions, thereby reducing military effectiveness. For example, a number of observers believe that inadequate communications were a major factor in the heavy losses suffered by the PLA during China's invasion of Vietnam in 1979.

After the capitulation of the Iraq army in 1991, in the face of US precision strikes and use of C^{4}ISR systems, China also followed a similar doctrine as the Iraqi forces from the Soviet Union of having more men then weapons. China's civilian and military leaders decided to embrace the Revolution in Military Affairs (RMA), which continues today, leading to a wholesale modernisation from Morse code to fiber-optic cable, satellite, microwave, and encrypted high-frequency radio.

To overcome these deficits, the PLA embarked on a well-financed effort to modernize its C^{4}ISR infrastructure. In broad terms this was facilitated by a combination of a national development strategy, high-level bureaucratic coordination, and significant fiscal support from national five-year plans and state science and technology (S&T) budget programs. China began with the acquisition of advanced telecommunications equipment from abroad, based on the premise that the technologies of the information revolution provided China with the opportunity to vastly improve capabilities by 'leapfrogging.'

The enormous competition among Western telecommunications firms to get a share of the relatively backward but rapidly expanding Chinese telecommunications market, which is the largest market in the world, lured every major player at the time - Lucent, Nokia, Ericsson, Nortel - and countless others.

After a decade of learning, China started to move beyond importing Western technology to co-developing technology with foreign firms and then subsequently developing indigenously near-state-of-the-art technology. Significant players in the Chinese telecoms market, such as Huawei and Datang, maintained deep co-development relationships with the world's top information-technology powerhouses, whilst maintaining ties to the Chinese military, which eventually became both a research partner and a valued customer for their IT products.

China then moved to microelectronics, shifting to designing and producing its own semiconductor's. This then provided the PLA with access to secure supplies of advanced integrated circuits for use in sensors and weapon systems. The result has been significant levels of military access to cutting-edge information technology, fuelling the C^{4}ISR revolution

The increasingly advanced information-technology system in the military has improved the handling of information, and the benefits can be seen in the communications and information security arenas. The benefits of the C4ISR remain to be seen in practical operation i.e., the practical application of these technologies to actual war fighting capabilities in battle as China has large conventional forces.

Conclusions

Although the People's Liberation Army (PLA) is undergoing mechanisation, it remains largely a light-infantry force. It consists of approximately 200 combat brigades, operates about 7,700 Main Battle Tanks and about 5,000 Armoured Personnel Carriers (APCs) and infantry fighting vehicles. The remainder of the PLA Army consists mostly of foot soldiers or motorized infantry. The majority of the weapon systems operated by the PLA Army are still based on obsolete designs, but some (e.g., the Type 98/99 main battle tanks) are comparable in capability to the most-advanced systems used by the militaries of other countries

China's navy operates around 60 submarines (most of which are conventionally powered), 30 destroyers, 45 frigates, and a large number of smaller combatants. China's navy has no operational aircraft carriers but maintains around 800 shore-based naval aircraft. As is the case with the army, the majority of platforms operated by the navy are outdated, but a few are modern systems comparable in capability to those operated by the U.S. military

China's air force operates approximately 1,800 combat aircraft, fewer than 20 strategic-transport aircraft, fewer than 100 theatre airlift aircraft, and 10 aerial-refuelling aircraft. As is the case with the Army and the Navy, the majority of these platforms are outdated, with only a few modern systems comparable in capability to those operated by the US military.

China has made significant progress in modernising its armed forces but the balance of military power between the US and China is still predominantly in favour of the US. Unless the US develops a whole new generation of weapon systems, in the next decade this lead will in military terms become insignificant, as the technology gap will not be sufficient to negate tactics and numerical superiority. If tensions escalate across the Taiwanese straits, US intervention cannot be guaranteed to succeed or even to occur. The shifting military balance has made the possibility of war between China and the US a remote possibility. The more important consequence of the modernisation of the Chinese military is the proliferation of advanced weapon systems to third parties which complicates the hitherto gunboat diplomacy that has characterised US foreign policy in the previous century.

4. France

The French established a strong state at the centre of Europe in 1789 and ever since it has been a key player in European history and politics. Its policy for decades was centred on creating influence across the world through its colonies, French culture and through its economic strength. The French attempted to conquer Europe under Napoleon and was itself conquered by Germany in two world wars. France established colonies across the world and divided the Middle East with the UK through the Sykes-Picot agreement in 1916. The German occupation doing WW2 brought an end to the French Empire. Both Britain and France were replaced by the Soviet Union and the US as the world's eminent powers.

Throughout the cold war the French saw their country as a key world power that did not need hefty alliances and needed to stand apart from the US. Under President Charles de Gaulle, who perceived the NATO alliance to be dominated by the US and Britain, France pulled its forces out of NATO in 1966 to pursue more independent policies. France always maintained a sizable military force, developing its own platforms to keep itself relevant in global affairs, to be taken serious in global issues and to influence global politics.

When Nicolas Sarkozy took office in 2007, Paris grew closer to Washington, ending its Gaullist period. French leaders always viewed German economic power as a threat to French ability to be a European power. Sarkozy made France America's ally on the continent, thereby assuring that Germany and other possible competitors would not challenge France's relevance or security

France's basic challenge is to secure the Northern European plains from potential adversaries. It needs to monitor the threats from the East, which has been the traditional route of invasion, be it Germany or Russia. France main challenge is to maintain a credible political, economic and military force in order to maintain influence in Europe and beyond.

Doctrine

The French defence posture is undergoing fundamental shift from its cold war paradigm to a much smaller, mobile and robust posture which will be much cheaper to maintain and will focus on the threats France faces in the 21st century rather than the threats of the cold war.

When Nicolas Sarkozy assumed the French presidency, he shifted the cold war doctrine away from the Gaullist attitude Paris has held since the end of WW2. Following the publication of the white paper on French defence and security policy in 2008, Sarkozy reversed decades of French security policy, which has focused on a Cold War-style invasion scenario as the nation's primary challenge. He moved to return France to NATO's integrated military command structure, from which de Gaulle withdrew in 1966. He has also deployed additional troops to Afghanistan and made overtures to the US, emblematic of a French shift toward a more cooperative role in global military affairs. The military structure was refined and its disposition which included reduced armour and artillery units, which are closely associated with the Cold War paradigm. The French military doctrine now makes counterterrorism, intelligence and European security its main concerns.

Throughout the Cold war the French military doctrine was determined by Charles De Gaulle, often termed Gaullism, where France viewed itself as a power in global affairs, independent from either side during the Cold War. The French military was postured for state-to-state warfare, (due also to occupation during the two world wars), large formations were maintained and weapons systems were designed for conventional warfare. The French navy and air force were also designed primarily for defence against conventional attack. Central to this was the development of nuclear weapons, which was the ultimate security guarantee for the French. The end of the Cold war, did not see the end of this cold war posture. This cold war was carried on by Jacques Chirac.

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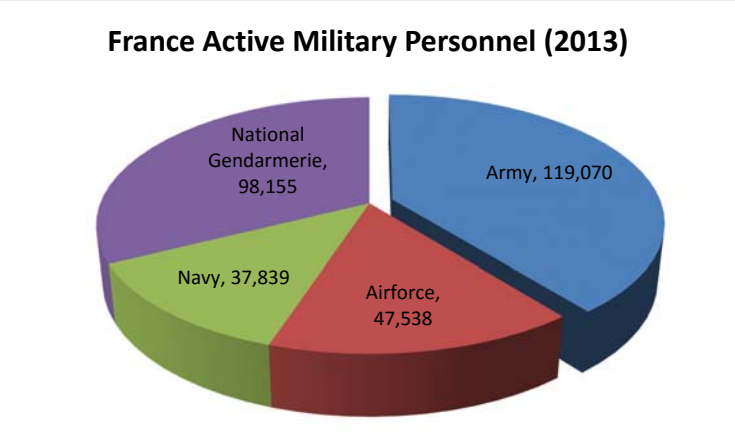
Industrial Base

The French defence industrial base develops several platforms. These include multirole combat aircraft, multirole and attack helicopters, armoured vehicles and mobile artillery, advanced infantry protection and communications systems, air defence frigates and missile systems, as well as the third Mistral-class amphibious force projection and command ship. Its defence base has also developed submarine-launched ballistic missiles and nuclear weapons. Today the French defence industrial base consists of 5,000 companies and 400,000 personnel. Its sheer size means it must export to survive, French defence companies have been forced to group together because the investments they have to make are colossal and the state is not be able to provide for all their needs. Defence is France's third-largest industrial sector with annual sales of 17.5 billion euros ($23 billion).

Over the past 10 years the French state privatised and reorganized the country's defence industry, but kept significant shareholdings in key companies in a bid to protect an industrial base it viewed as essential to national security. European aerospace giant EADS - co-builder of the Eurofighter Typhoon, is now the biggest minority shareholder in Dassault Aviation, builder of the Rafale, the European fighter's main competitor. Dassault, in turn, controls a blocking minority stake - through its holding in electronics supplier Thales - in shipbuilder DCNS, a mostly state-owned company essential to the French nuclear deterrent. A blocking minority gives the minority shareholder rights to reject certain transactions voted by the majority.

Ground Forces



The French armed forces consist of an active armed force of 228,000 personnel with reserves of 97,000. 119,070 personnel form the ground forces of the country. Similar to Britain the French have struggled with maintaining a large force since WW2 and have been reducing the size of their overall armed forces to a smaller more technologically advanced force. From 1996 to 2003, the French Army went from a strength of approximately 266,000 soldiers and reserves of whom about 25,000 could be deployed overseas, to a force of about 166,000 soldiers and reserves, of whom approximately 100,000 could, in theory, be deployed.

The basic infantry weapon is the FAMAS - Fusil d'Assaut de la Manufacture d'Armes deSaint-Étienne assault rifle. The bullpup-styled assault rifle is designed and manufactured in France. The countries Main Battle Tank (MBT) is the indigenously created AMX Leclerc. In production since 1991, the Leclerc entered French service in 1992 and with production now complete, the French army has a total of 406. This 3rd generation tank has little experience in true warzone environments, but has seen deployment on multiple low-intensity conflicts, including 15 Leclerc stationed in Kosovo and others in Lebanon. The French ground forces Armoured Personal Carrier (APC) is mainly the Véhicule de l'AvantBlindé (VAB). This ageing platform entered service in 1976 and all 3,200 units in service have seen action in French foreign deployments.

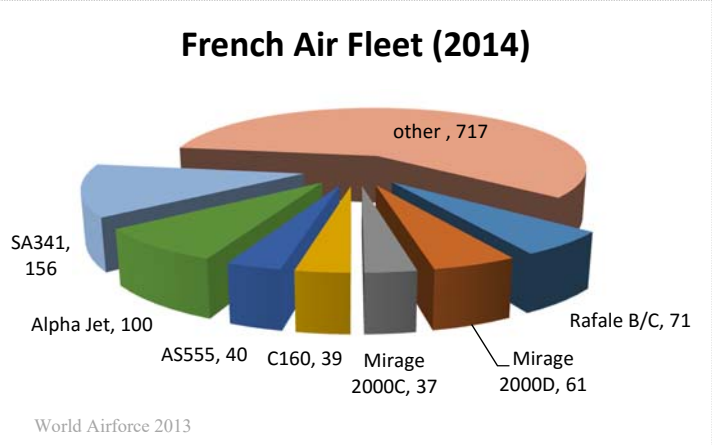
Whilst France has a small ground force a significant portion of the French Army is continuously deployed in a domestic-security role. Soldiers augment paramilitary and civilian law-enforcement and security personnel.

Air Force

The French defence industry indigenously produces much of France's aircrafts. The French combat aircraft are dominated by the Dassault Mirage 2000. This aging platform developed in the 1980's was designed as a lightweight fighter based on the Mirage III in the late 1970s for the

French Air Force. The Mirage 2000 evolved into a multirole aircraft with several variants developed.

Over the next decade the French air force plans to replace its ageing fleet with the newer Dassault Rafale. These jets will come with a high level of agility, which are capable of simultaneously performing air supremacy, interdiction, reconnaissance, and airborne nuclear deterrent missions. The Rafale is distinct from other European fighters of its era in that it is almost entirely built by one country, involving most of France's major defence contractors.



WMD's

The French nuclear deterrent rests upon a fleet of nuclear-armed submarines and strike planes - and more than 300 warheads. The current French nuclear force consists of four Triomphant class submarines equipped with submarine-launched ballistic missiles. In addition to the submarine fleet, France has an estimated 60 ASMP air-delivered cruise missiles with nuclear warheads, of which around 50 are deployed by the Air Force using the Mirage 2000N long-range nuclear strike aircraft, while around 10 are deployed by the French Navy's Super Étendard Modernisé (SEM) attack aircraft which operate from the nuclear-powered aircraft carrier Charles de Gaulle. The new Rafale F3 aircraft will gradually replace all Mirage 2000N and SEM in the nuclear strike role with the improved ASMP-A missile with a nuclear warhead.

The French nuclear capability fundamentally rests upon its small nuclear submarine fleet, just barely large enough to sustain a continually patrolling presence of one boat. Successive French administrations have long chosen to maintain legacy nuclear arsenals, despite the substantial cost.

Navy

The French Navy is considered a blue water navy i.e. capable of operating across the deep waters of opens oceans and possessing maritime expeditionary capabilities. It has the ability to deploy an aircraft-carrier-based task group and the amphibious assault capability through its Mistral-class amphibious assault ships.

The French navy consists of 1 aircraft carrier - Charles de Gaulle (R91) The French Navy is theoretically a two-carrier navy, to ensure that at least one ship is operational at all times even if the other is under repair. As of the 2013 French Defence White Paper, the plan for a second carrier has been cancelled and collaboration with Britain for future aircraft carrier is in negotiation. The Charles-de-Gaulle carrier will remain the flagship of the fleet after 13 long years of construction,

with its limited power due to its size it was riddled with problems. The French fundamentally cannot afford two aircraft carriers.

Alongside this the French navy consists of 10 submarines. The 4 Triomphant class of ballistic missile submarines provide the ocean-based component of France's nuclear deterrent. Whilst the 6 Rubis class submarines are the first-generation nuclear attack submarines of the French Navy. They are the most compact nuclear attack submarines to date.

Conclusions

The biggest problem the French forces face is whilst their soldiers may be numerous, they are struggling with 45-year-old refuelling aircraft, 28-year-old armoured vehicles, 30-year-old helicopters and a fleet of tanks of which as few as 50% are actually in working order. Whilst the French defence industry provides a wide range of weaponry and capabilities, these are often limited in number and increasing in age.

The biggest problem the French forces face is whilst their soldiers may be numerous, they are struggling with 45-year-old refuelling aircraft, 28-year-old armoured vehicles, 30-year-old helicopters and a fleet of tanks of which as few as 50% are actually in working order. Whilst the French defence industry provides a wide range of weaponry and capabilities, these are often limited in number and increasing in age.

This is why the French have struggled with global operations as they have a force disproportionate to its political ambitions. In the Libya intervention in 2011, the US provided the lion's share of military capability. In Mali, French troops quickly needed more support. France simply did not have enough military transport aircraft to ferry in promised reinforcements, including those from African nations Chad and Togo. Nor did it have the aerial refuelling capacity to allow its Mirage F-1 jets to make planned bombing runs against insurgent convoys and cells. When it came to the weapon of choice for today's proliferating asymmetrical wars, the drone, it had none. The US provided aerial refuelling capability, US Air Force KC-135 Stratotankers began refuelling French fighter-bombers. They flew more than 200 missions, providing over 8 million pounds of fuel. It was also the US and not French Air Force C-17 cargo planes that moved tons of equipment and supplies, along with thousands of African soldiers, into Mali. The French defence minister, Le Drian, said after meeting US secretary of defence Chuck Hagel at the Pentagon in May 2013: *"It's incredible that a country like France, with its technological, aeronautical, and electronic knowhow and companies able to produce its own drones, hasn't done so. But it hasn't, and we've got to have surveillance of our theatre of operations. What else could I do? Wait another ten years for somebody to make French drones?"*[28]

Despite the countries industrial base it lacks the economy to sustain this and this is having a knock on effect on French global ambitions.

5. Britain

The British Empire dominated the global balance of power after defeating Napoleon at the battle of waterloo in 1805 until WW2. During this period its dominance of the world's oceans ensured the sun never set on the British Empire. The development of the British navy ensured the British Isles would not be threatened and allowed Britain to maintain colonies across the world.

Britain saw of threats from Germany and France to conquer the European continent by constructing a balance of power strategy to maintain its position. When this failed it built coalitions to go to war in order to maintain its dominance. Dominating the European continent allowed Britain to interfere far afield from the British Isles.

Whilst WW2 brought British power to an abrupt end, Britain has continued to partake in global issues around the world, with an ever dwindling power base and this represents Britain's basic challenge. Maintaining influence in the world, with a shrinking power base at home is the basic challenge Britain has faced since the end of WW2. Competing with France, the US, Germany and Russia, with this shrinking economic base has become even more arduous as Britain's manufacturing base has disappeared.

Doctrine

Britain's economic and political decline after WW2 was reflected by the military's declining global role. Its protracted decline was dramatically epitomised by its political defeat during the Suez Canal crisis in 1956. Unable to fund the empire and politically no longer able to influence the global situation conscription was abolished and the size of the Armed Forces was reduced from 690,000 to 375,000 by 1962. Britain looked for a military posture that would be an inexpensive alternative to maintaining a large conventional military. This doctrine gave rise to nuclear deterrence, which initially consisted of bombs operated by the RAF, but these were eventually superseded by the submarine-launched Polaris ballistic missile.

During the Cold war Britain's doctrine consisted of balancing the Soviet Union's influence in Europe. Whilst substantial forces were committed to NATO in Europe and elsewhere, Britain came to rely on the Royal Navy's fleet of anti-submarine warfare, with a particular focus on countering Soviet submarines.

The disintegration of the Soviet Union and the outbreak of war in the Balkans in the 1990's led Britain to pursue a posture to enhance joint operational cohesion and efficiency. This entailed the Armed Forces often constituting a major component in peacekeeping missions under the UN or NATO, and other multinational operations. The Strategic Defence and Security Review (SDSR) in 1998, made expeditionary warfare and tri-service integration central to improve efficiency and reduce expenditure by consolidating resources. Most of the Armed Forces helicopters were collected under a single command and a Joint Force Harrier was established in 2000, containing the Navy and RAF's fleet of Harrier Jump Jets.

Since the end of the Cold war, the British armed forces have moved from a doctrine of administrative and operational structure dominated by the single services to the present doctrine of single services focused on delivering operational capability through highly joint structures. This change has included the adoption of significant joint administrative functions to replace those that previously resided in the individual services. The forces are highly deployable and flexible and are able to participate across the full range of combat and non-combat missions demanded of modern military forces. The UK has struggled over the past 25 years to balance its political ambitions and the demands this places on its armed forces with the resources it has made available for readiness and operations. The UK has chosen to participate with other countries and organizations in its attempts to influence events around the world. During this time, the way in which the British armed forces prepare for and execute operations has evolved where almost all operations are wholly focused on supporting deployed and joint operations.

Industrial Base

Britain's defence industrial base has undergone considerable change over the past 25 years, the underlying trend since WW2 has been a shrinking industrial base. The Conservative administrations of Margaret Thatcher and John Major completed the privatisation of the government arsenals (Royal Ordnance, British Aerospace, Rolls Royce and British Shipbuilders).

Under Labour the privatisation of defence, along with other parts of the public sector, was much more aggressive. The Royal Dockyards and then a large chunk of the Defence Evaluation and Research Agency were placed in the private sector. The number of defence Private Finance Initiatives was much increased, under which the private sector made considerable investments, often but not only in infrastructure, in order to sell services to the ministry based on the capital items involved. The private sector has also been used to provide more services, including the design of military training as well as the management of military facilities. With regard to many equipment items, industry was made responsible, not just for the timely supply of spare parts, but also for the overall availability of the equipment. This brought industry more and more into support roles including maintenance and repair. By contracting with industry on a long-term basis, the government hoped to incentivise business to develop and modify equipment to render it reliable and easy to maintain.

Britain is in the midst of the most aggressive fiscal tightening since World War II. Following the October 2012, strategic review, Prime Minister David Cameron announced plans to cut the military budget by 7.5% and the head count by 10% over five years, and to retire lots of equipment, leaving the armed forces with 40% fewer tanks and 35% less heavy artillery. The planned cuts will come on top of an 8% reduction in personnel during the 13-year tenure of the former Labour Party government

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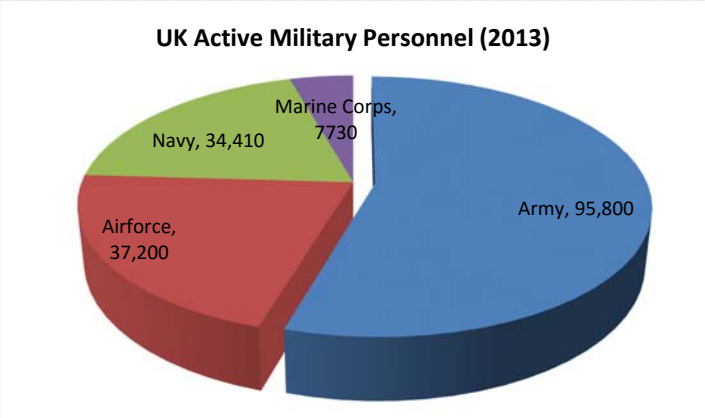
Party government.

The UK Defence industry is made up of a few very large companies which include, amongst others BAE Systems, Thales, Goodrich, EADS Astrium, Airbus and GE Aerospace. But Britain's military industry is dominated by BAE Systems, who manufactures civil and defence aerospace, land and marine equipment, which include the Type 45 destroyer, aircraft carriers, the Eurofighter Typhoon and maintains Tornado and Harrier jets. Only the Type 45 destroyer is built entirely by British engineers, all other heavy military equipment is either imported from overseas or developed with partners. Very few military systems are indigenously constructed by Britain. Britain's industrial base is geared towards a few advanced platforms.

Ground Forces

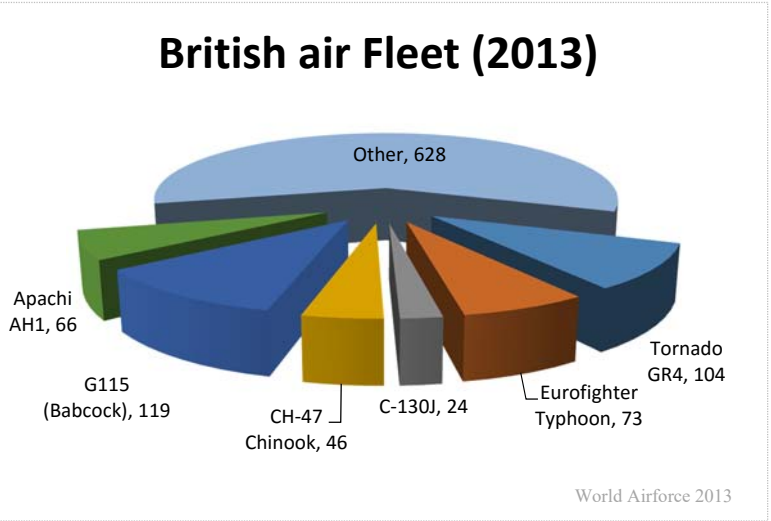


Britain's combined armed forces consist of 205,000 personnel, with a further 181,000 in reserve. The ground forces dominate the forces with force strength of 104,000. The Strategic Defence and Security Review (SDSR) 2010 ordered the reduction of the ground forces by 2018 to 82,000 regulars. This would mean there will remain only two fighting (i.e., deployable) divisions that will command the bulk of the forces in the regular army. The UK will soon have one of the most land-centric force structures. By 2015, land forces will account for around 65% of total service personnel, compared with current levels of around 55%.

The basic infantry weapon of the British forces is the indigenously developed SA80 rifle, produced in 1985.Its Main Battle Tank (MBT) is the challenger 2, the armed forces have no other tanks. Produced indigenously from 1998-2002, this third generation tank its Britain's equivalent of the US M1 Abrams.

The British ground forces real estate is dominated by logistical vehicles rather than tanks and armoured personnel carriers due to its small size and the armies overall posture of being flexible and deployable. Large forces would take much longer to deploy. Britain's ground forces lack offensive capability and that's why Britain's 9,000 troops in Afghanistan and at its peak in Iraq were in defensive postures rather than expansionary. Any foreign adventure will overstretch Britain's ground forces and that is why all overseas operations are conducted through NATO or in coalitions.

Air Force



The mainstay of Britain's air force is its fleet of 104 Tornado GR4s and 73 Eurofighter Typhoons. These supersonic aircraft can carry a wide range of weaponry, including Storm Shadow cruise missiles, laser-guided bombs and the ALARM anti-radar missile.

The British armed forces are now so intimately linked that, except for the most simple of deployments, all operations are approached from a joint perspective. As a result the British air force is based on smaller fleets of more sophisticated, capable and expensive platforms. This has led to a decrease in the range of design and development products for military fixed wing aircraft and extended the gaps between new products.

New platforms such as the Typhoon and the F-35 are expected to have lengthy service for 30 years or more. No plan is currently in place for the UK to design and build future fast jet aircraft beyond these types. In the short to medium term, the air force expects the defence industry to be primarily supporting and upgrading these platforms, rather than moving to design the next generation of aircraft. There are no plans for a fifth generation fighter jet.

CASE STUDY: The Eurofighter Typhoon

The Eurofighter Typhoon is a 4th generation twin-engine, canard-delta wing, multirole fighter. Initially conceived in 1983 it was designed and manufactured by a consortium of three companies and remains Europe's largest military collaborative program. EADS, Alenia Aeronautica and BAE Systems manufactured the aircraft and it was inducted into full operational service in 2003 – 20 years after being conceived. Around 470 have been built with a future 500 on order.

The Eurofighter Typhoon is a highly agile aircraft, designed to be an effective dogfighter when in combat with other aircraft. The Typhoon boasts sensor fusion technologies and has a higher performance engine with comparable platforms. Along with its aerodynamically unstable design and delta-canards this makes the aircraft much more manoeuvrable than comparable aircrafts. Whilst the aircraft has a largely conventional configuration, it exhibits a substantially lower radar cross-section than its predecessors.

Within a decade the typhoon will be 40 years old and significantly outdated and inferior to stealth jets such as the F-22, F-35 and Russia's T-50. Conceived in the 1980's and built in the 1990's this platform was designed for within-visual-range air combat and with the Soviet Union as an enemy in mind. The Typhoon is only capable of supersonic cruise speed of Mach 1.1, but lacks beyond visual range capabilities which will be the mainstay of air warfare in the decades to come.

WMD's

The UK, in the past fielded a wide variety of nuclear-capable weapon systems, these included longer-range bombers, fighter aircraft and maritime helicopters capable of delivering British-produced nuclear weapons, as well as short-range land-based missiles and artillery able to fire US nuclear weapons under a dual-key arrangement. But by the late 1990s, Britain had phased out all of its air-delivered and land-based nuclear-weapon systems as it could not afford them. This led to a substantial reduction in the total number of deployed nuclear weapons.

Today, four Vanguard class ballistic missile submarines (SLBM) armed with Trident II missiles, all products of the cold war era provide the sole platforms for the nuclear weapons of the UK. Constructed from 1986-1999, each are armed with up to sixteen Trident D-5 ballistic missiles. Whilst the UK built the submarines and nuclear warheads, the missiles were purchased from the US under the terms of a sales agreement that dates back a half-century. With four submarines in service, at least one can always be under way and on patrol. British government officials have long regarded "continuous at-sea deterrence" as essential to maintaining a credible deterrent, because it ensures that at least a portion of the nuclear force is likely to survive any attack and still be capable of mounting a retaliatory strike.

Britain has never had an independent nuclear deterrent. In 1958, the US-UK Mutual Defence Agreement (MDA) allowed the US to provide the UK with nuclear weapons designs, nuclear weapons, manufacturing and nuclear reactor technology, designs and materials. It was the US that supplied the missiles and associated strategic weapon systems equipment, a number of warhead-related components and services and missile preparation and refurbishment services. A secret British government assessment of 'The Dangers of Becoming an American Satellite' released after 1988 stated *"The UK, in its relatively weak position, is already greatly dependent upon United States support. It would be surprising if the United States did not exact a price for the support, and to some extent it does so…the more we rely upon them, the more we shall be hurt if they withhold it."*[29]

Britain completely relies on a small Submarine fleet, just barely large enough to sustain a continually patrolling presence of one boat. Britain has long chosen to maintain a legacy nuclear arsenal, despite the substantial cost.

Navy

At the beginning of the 1990s the British Navy was a force designed for the Cold War, with its three small aircraft carriers and a force of anti-submarine frigates and destroyers, its main purpose was to search for – and in the event of war, to destroy – Soviet submarines in the North Atlantic. However, since the end of the Cold war, the British Navy has been shrinking. Over the course of the 1990s and the 2000s, the navy began a series of projects to improve its fleet, with a view to providing enhanced capabilities, although many of these were cut or cancelled. This has led to the replacement of smaller and more numerous units with fewer, but larger, units. The Type 42 destroyer was replaced with half as many Type 45s and three 20,000 tonne Invincible-class aircraft carriers are to be replaced with two 65,000 tonne Queen Elizabeth-class aircraft carriers.

At the start of 2013 the British Navy operated 78 commissioned ships, major surface combatants included:

- 5 guided missile destroyers
- 13 frigates
- 11 nuclear-powered submarines - 4 ballistic missile submarines and 7 fleet submarines
- 1 aircraft carrier (without any fixed-wing aircraft),
- 1 amphibious assault ship,
- 2 amphibious transport docks,
- 15 mine countermeasures vessels
- 24 patrol vessels

The Navy's carrier strike capability is based around a single operational carrier, with a second planned to be kept at extended readiness. This will leave open options to rotate them, to ensure a continuous UK carrier strike capability. This however remains in questions as the UK plans alternatively to rely on cooperation with a close ally to provide continuous carrier strike capability.
The Navy's Submarine fleet consists of 5 Trafalgar class submarines and 2 larger Astute class submarines. It also consists of four ballistic missile submarines (SSBN), of the Vanguard class,

which do not leave the British shores and only has one submarine on patrol at any given time. The Trafalgar class submarines are the backbone of the navy's capability, but are now three decades old and at the end of their operational life. Whilst the navy is moving over to the larger and more modern Astute class submarines, it remains to be seen if the government will acquire them as a replacement for the aging Trafalgar class submarines.

The cuts over the last 20 years have severely undermined the fleet's ability to deploy its forces, even to the levels that the government commits it to. The 19 destroyers and frigates currently in service are not enough to deploy warships to the Falklands and Persian Gulf and maintain escort duties for the reaction Group. The reality is the British marines and the navy are unable to operate independent of the army if need be and considering Britain wants to maintain a global presence it lacks huge capability gaps, like no hovercraft and no mobile shore support from heavy guns.

Conclusions

A comparison of British political ambitions and its military capability clearly show that Britain punches well above its weight. The Libya campaign highlighted this. Britain's largest contribution in Libya came two months into the conflict with the deployment of Apache attack helicopters to HMS Ocean. The claims they were a 'game changer' were simply bravado. Their physical impact was limited by their small number, low sortie rate, vulnerability to unguided weapons and limited utility beyond the coastal region. Similarly, despite the fanfare accompanying their first mission, their weapons provided no greater accuracy than the precision munitions dropped by fast jets.

The cuts to the military will also leave its effects, Former Welsh Guardsman Simon Weston, who fought in the 1982 Falklands war said: *"The biggest problem is that the cuts and redundancies are being made, but you need to have well-trained regular soldiers to send to any conflict straightaway. If you bring regular numbers down to 80,000, then that really means a fighting force of 20,000 with 60,000 soldiers to support them and carry out logistics,"*[30]

Whilst British forces do possess capable platforms most of these are from foreign sources, but these are used by a force which is only getting smaller, which negates their effect. Unable to fund a large military industry and large armed forces, Britain's capabilities are extremely limited, despite the rhetoric. Although its overall forces are small currently, they are set to get even smaller. The aircraft carrier Ark Royal, along with its Harrier aircraft, is being decommissioned, leaving Britain with one carrier for the next ten years that will only carry helicopters.

The British forces have attempted to deal with its shrinking size by focusing on joint operations and training on integrated scenarios between the different services. This it hopes will give it the force multiplier effect. Whilst this has given some success to the forces, the sheer size of the forces means it could become an irregular force in the years to come. Britain would struggle in a war with a country such as North Korea which is less capable, filled with Soviet era platforms, but has more of everything the UK could deploy. As a comparison Iran's Revolutionary forces, which is the unconventional element of Iran's capability consist of more personnel then Britain's conventional ground forces.

6. India

The last two decades has seen India make rapid developments on the international scene. Its trillion dollar economy, which has made it the world's fastest growing economy, also means India has significant real estate to protect and this is leading it to make rapid advances in its military. Modern India is the seventh largest country in the world, with the world's largest population after China. Until India's recent rise its military was focussed on the threat posed by Pakistan, especially in Kashmir, it has similarly been to war with China over border disputes.

The share overwhelming size of India has also created many internal challenges. India has over 2,000 ethnic groups and there are 1,652 languages and dialects spoken in the country.[31] Maintaining internal cohesion in the face of multiple separatist struggles is something India's military has had to contend with since independence. India has had to contend with both conventional warfare and asymmetrical warfare, from both militant and separatist groups, sponsored by both internal and foreign actors.

India's recent rapid economic development is leading it to partake in regional issues and move away from its focus towards Pakistan. However, today, India has no global ambitions. India has strategic interests, but its fundamental interest come from within - from its endless, shifting array of domestic interests, ethnic groups and powers.

Doctrine

As India's security challenges lie either on or within its borders it has not really dabbled in power projection. When it did in Sri Lanka, matters went horribly wrong. Immediately after independence securing the countries territorial integrity dominated its military posture. India's doctrine for long was framed in the context of war with Pakistan. Post-independence India's geopolitical position evolved within the context of a much larger struggle for influence between the Eurasia-based Soviet Union and a maritime United States. A distinct fear of invasion by a foreign power marked Indian foreign policy in the early years of independence. This led to a military alliance with the Soviet Union and the creation of a large land based force. This posture was to coerce smaller states, including Pakistan, through its military superiority

India's military formations were deployed alongside its western border. This military posture – referred to as the "Sundarji Doctrine" – was defensive, and relied on utilizing deterrence through the presence of large military formations to ward off incursion from Pakistan. During the 1980s and 1990s, these formations were in large part located deeper inside India.

The collapse of the Soviet Union led to a change in India's security environment, which led to a drive for the development of nuclear weapons and missiles. With Pakistan's asymmetric capabilities increasing, especially during the Kargil conflict, India enacted the Cold Start doctrine. The foremost objective of this was to act offensively against Pakistan in case of a perceived threat. In doing so, India could launch pre-emptive strikes without giving Pakistan time to react militarily. The Indian leadership eventually revised this doctrine due to the possibility of a 'two-front' war with China and

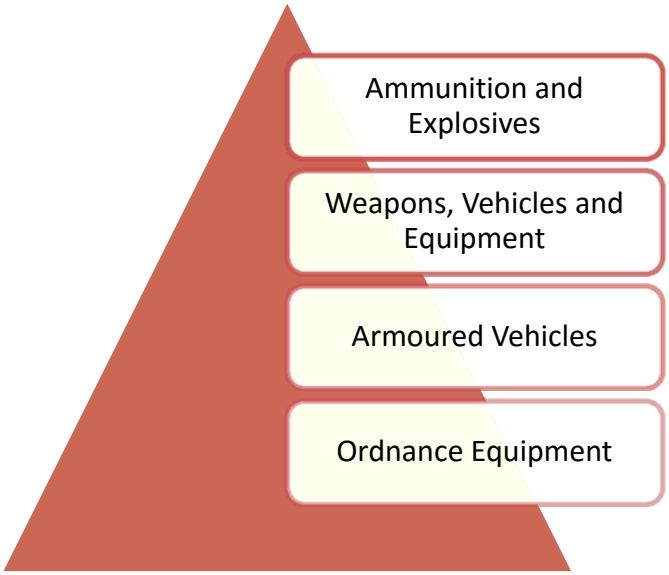
Pakistan, This doctrine included tanks backed by air cover and artillery fire assaults into enemy territory within 96 hours.

The current combat doctrine of the Indian Army is based on effectively utilising holding formations and strike formations. In the case of an attack, the holding formations would contain the enemy and strike formations would counter-attack to neutralise enemy forces. In the case of an Indian attack, the holding formations would pin enemy forces down whilst the strike formations attack at a point of Indian choosing. The Indian Army is large enough to devote several corps to this strike role. Currently, the army is also looking at enhancing its Special Forces capabilities. With the role of India increasing and the requirement for protection of India's interest in far off shores become important, the Indian Army and Navy are jointly planning to set up a marine brigade.

Industrial Base

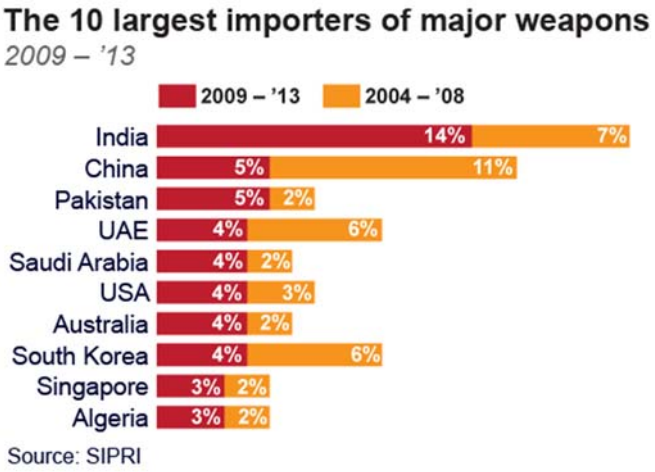
India maintains a defence industrial base principally owned by the government, its defence industrial base consists of eight government-owned Defence Public Sector Undertakings (DPSUs), 39 Ordnance Factories (OFs), and, at the top, the all-powerful Defence Research and Development Organization (DRDO), that employs more than 1.4 million workers, including some 30,000 scientists.

The Department of Defence Production of the Ministry of Defence is responsible for the indigenous production of equipment used by the Indian Armed Forces. India's defence industry today mirrors China's defence base from the 1990's. The Research and Development (R&D) element of the DRDO functions separately from the manufacturing element (the defence PSUs). India's military has little say, and no oversight, in what is researched and manufactured. In 2001, New Delhi began encouraging the private sector to play a role on a basis similar to that of a subcontractor (although notably without the opportunity to compete with the state-owned champions on an equal footing).
India's defence industrial capacity is in its 39 ordinance factories and is organised around 4 platforms:



The eight publicly-owned Private Sector Undertakings (PSUs) are:

1. Hindustan Aeronautics Limited
2. Bharat Electronics
3. Bharat Earth Movers
4. Mazagon Dock Ltd
5. Garden Reach Shipbuilders and Engineers Ltd
6. Boa Shipyard Ltd
7. Bharat Dynamics Ltd and
8. Mishra Dhatu Nigam Ltd



Despite substantial investment in capacity building, partnering and license production agreements with foreign companies and governments, defence procurements continue to hover around the 70% imported and 30% indigenous threshold. The Indian Armed Forces are currently the world's largest arms importer.

Manoj Joshi, a fellow at the Observer Research Foundation, a policy group based in New Delhi highlighted: *"India's main problem as an arms manufacturer is a corrupt and inefficient government sector that has neither the expertise to develop top-notch weapons nor the wherewithal to make them in abundance."*[32] He also highlighted, India could buy fully assembled Russian Sukhoi fighters for about $55 million each, but instead mostly relies on kits that are sent to the government-owned Hindustan Aeronautics Limited, which assembles them at a cost of about $68 million each — nearly a quarter more. In another example, government labs spent billions trying to develop an aircraft engine, only to abandon the effort and buy engines from General Electric for the recently introduced fighter, the Tejas.

India is still one of the world's largest importers of military equipment and despite two decades of efforts to develop its internal military capability it has failed to develop quality platforms. Pieter D. Wezeman, a senior researcher at the Stockholm International Peace Research Institute said: *"I don't think there's another country in the world that has tried as hard as India to make weapons and failed as thoroughly."* Mr. Wezeman said he was sceptical that India's new products would change that history, saying that its fighters, tanks and guns were *"of questionable quality."*[33]A 2006 government audit of the Ordnance Factories revealed that about 40% of products had *"not achieved the desired level of quality despite the fact that most items were in production for decades."*[34]

CAST STUDY: India's Struggle for Self-Sufficiency

Since its founding India has had to import most of its weapons. Efforts to change this have failed so far. Efforts to create domestic defence industries have been crippled by corruption and bureaucracy. Although India clung to democracy on independence, the educated classes were infatuated with the promise of socialism. For several decades Indians abhorred the Russian form of government (a dictatorship) but admired their socialist approach to running their economy. It wasn't until the 1980s that most Indian politicians admitted that the Russian economic model was not working and set in motion the free market policies that China employed. By then it was too late. Decades of attempts to impose government regulation and guidance of the economy had created a huge bureaucracy that could not be easily dismantled. That's because many of these jobs were used by politicians to reward supporters.

When Russia was supplying over 80% of weapons imports it was comfortable with bribes and payoffs from Indian officials. Then there was the price of Russian weapons. They were cheaper than Western equipment. This meant more could be spent on bribes and payoffs. Russia was also a practical supplier as India's main foes were Pakistan and China. Pakistan had a much smaller population, economy and defence budget than India. Russian weapons were adequate for Pakistan. China was also poorly equipped (until quite recently) and separated from India by the Himalaya Mountains. So Russian weapons met Indian needs.

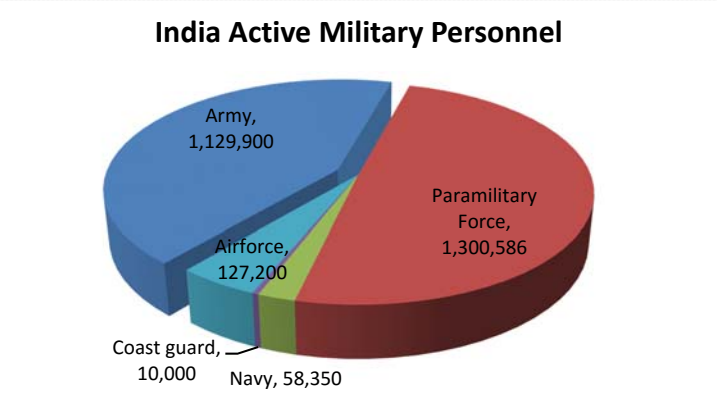
Indian efforts to deal with this reality resulted in yet another bureaucracy; DRDO (Defence Research and Development Organization). DRDO became a monumental example of bureaucratic inefficiency, wasting billions of dollars and decades of effort on weapons systems that never really became operational or failed. DRDO was created in 1958 to provide government support and guidance for defence related research. But the network of research and manufacturing facilities DRDO established since then were more about patronage and plundering the tax payers than in actually creating competitive defence industries. Even DRDO efforts to create low-tech weapons, such as assault rifles and other infantry equipment were failures, with the lack of quality and inefficiency resulting in very poor weapon systems.

Many major DRDO weapons development projects have failed because bad politics ensured that bad ideas kept getting funded, and those efforts rarely produced anything the military found acceptable. For example, the 5.5 ton Dhruv helicopter was in development for two decades before the first one was delivered in 2002. Since then domestic and foreign users have expressed dissatisfaction. A series of crashes indicated some basic design flaws, which the manufacturer insists do not exist.

Then there is the effort to develop and build a tank. Many of the problems with the Arjun tank project had to do with nothing more than government ineptitude. The Ministry of Defence was more interested in putting out press releases about how India was becoming self-sufficient in tanks than in attending to the technical details needed to make this happen.

Efforts to develop missile systems have also been a long running failure. Work on indigenous missile designs, under the Integrated Guided Missile Development Program (IGMDP), managed by DRDO has gone on for decades, with no useful weapons to show for it. The most common problems were caused by inept software development. While India has a lot of local talent in this area, creating this type of specialized military software is very difficult and the best programmers tend to join the growing number of new companies that sell their services to foreigners. The one exception has been ballistic missiles. Curiously this was seen as so important that politicians backed off and let the engineers get on with it.

Ground forces



The ground based branch of India's armed forces, is the country's largest component, numbering in excess of 1 million personnel. With its 36 divisions India's ground forces receive the lion's share – 48% of the defence budget. Currently, much of the army is either deployed for internal security or postured towards Pakistan. Much of India's ground force is configured for a surprise attack against Pakistan, which politically is very unlikely to ever happen.

India's ground forces are equipped mainly with ageing Soviet technology or indigenous made platforms that have failed to operate effectively in diverse terrains such as the harsh mountainous conditions, the dry dessert plains of Rajistan or the sub-freezing temperatures in the disputed territories of Kashmir.

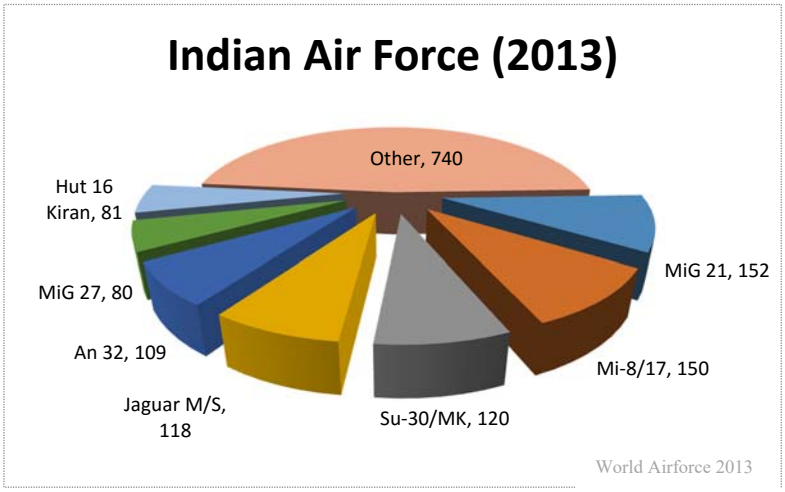
India's Main Battle Tank (MBT) is the T-72, a Soviet development from 1971. These are being replaced with the modern T-90's and India's indigenously developed Arjun Tank. Arjun is India only indigenously developed tank, but it has been in development for over a decade, due to finance related issues as well as problems with operating in hot environments. Moving India's large ground force around the nation's large territory has always been an expensive exercise, but India's industry has failed to develop or acquire modern Armoured Personnel Carriers (APC). India APC's consist overwhelmingly of Czechoslovakia-Poland's, OT-62 TOPAS, developed in the 1950's. India's current modernisation attempts are to replace its ageing Soviet equipment with more modern equipment. Replacing equipment for over a million soldiers is a big task, especially for a large bureaucracy, which drags its feet on large capital intensive projects. Despite these efforts India's ground forces remain equipped mostly with Soviet platforms.

Air force

The Indian Air Force has approximately 170,000 airmen and is one of the world's largest air forces with both fixed and rotary wing aircraft inventory of 1,370, operating from more than 60 air bases. India's Air Force has nearly 600 combat aircraft, supported by 231 transport aircraft and 7 tankers, as well as 231 helicopters.

Since Indian independence in 1947, the Indian Air Force (IAF) has participated in four wars against Pakistan and one against China. These conflicts and continued tensions with Pakistan and China have led the IAF to emphasize maintaining a large force structure capable of engaging in large-scale conventional wars against enemy air forces and ground formations. The IAF has five operational and two functional commands. Two of the operational commands are oriented toward Pakistan, two are primarily oriented toward China, and the fifth and most recent, Southern Command, was established in 1984 and focuses on conducting operations over the Indian Ocean, though such

operations remain the principle domain of the Indian Navy Air Arm. The Indian Air Force (IAF), since the country's independence has favoured fighter capabilities and air dominance over ground support. However, the bulk of IAF aircraft today are outmoded, and overall the force structure is deteriorating.



The Soviet-era MiG-21 has been the combat backbone of India's air force for 50 years with nearly 1,000 planes in its fleet. Aside from the purchase of Russian Su-30MKIs in 2002, the IAF has not made any additions to its fighter fleet since the 1980s. Many of the aircraft acquired during the 1978-1988 modernisation programs have either been retired or are falling into disrepair. Thus, the IAF is currently developing significant plans to modernise some aircraft types and replace others with newer and far more advanced warplanes. Historically, the IAF has generally relied on Soviet, British, Israeli and French military aircraft and technology to support its growth. However, in recent times India has manufactured its own aircraft such as the HAL Tejas, a 4th generation fighter, and the HAL Dhruv, a multi-role helicopter, which has been exported to several countries. The IAF's primary air superiority fighter is Russia's Sukhoi Su-30MKI. The MiG-29 is a dedicated air superiority fighter and constitutes a second line of defence after the Sukhoi Su-30MKI.

The major problem the IAF faces is the very high crash and accident rate within its fleet due to the age of many of the aircraft types flown. In May 2012, India's defence minister A. K. Antony said that 171 Indian pilots, 39 civilians, eight service personnel and one member of an aircrew had lost their lives in accidents with the MiG series of aircraft, between 1971 and April 2012.[35] The MiG-21, which constitutes 25% of the IAF stock first entered service in 1964, and is not only one of the most numerous jets operated in the IAF, but it is also expected to be in service for a few more years. Poor industrial maintenance is one of the major problems. In November 2011, India's first astronaut, Rakesh Sharma, who is also an experienced test pilot with Hindustan Aeronautics, blamed faulty planning in public defence companies (known in India as public sector undertakings, or PSUs) for the high rate of crashes, indicating that *"the PSUs have the infrastructure but they do not have the expertise."*[36]

The other cause of the high crash rate is the state of the IAF trainer fleet. The Comptroller and Auditor General (CAG) of India said in 2008 that the IAF was facing an acute shortage of effective pilots after failing to impart quality training. The CAG blamed a lack of adequate state-of-the-art training aircraft in the IAF for the shortage. The bulk of the IAF trainer fleet is composed of indigenously made platforms by HAL. These aircraft have largely proved inadequate and have not met expectations. For instance, the HPT-32 Deepak fleet was grounded in 2009 due to recurrent engine failure that led to numerous crashes. The lack of a capable training fleet has forced new IAF pilots to undergo their basic training on the HAL Kiran of which India reportedly has less than 100.

WMD's

India is believed to have something in the range of 60-80 assembled nuclear weapons, of which around 50 are fully operational. At the moment, fighter bombers (Mirage, Jaguar and possibly MiG-27s) and short range ballistic missiles (the Prithvi I with a range of only 150km) are the only fully operational elements of India's nuclear force.

India began a missile development programme in 1983 – the Integrated Guided Missile Development Program (IGMDP). This Ministry of Defence program was for research and development into a comprehensive range of missiles with the aim of achieving self-sufficiency in all aspects of missile development and production.

With significant technical support from countries such as the UK, France, the US, and the Soviet Union, India has built a relatively robust indigenous ballistic missile program. India engaged in the development of short-range conventional tactical missiles prior to achieving nuclear status, and several of its initial nuclear delivery vehicles were predominantly short-range systems. The development of Pakistan's programme in parallel lead to the desire for greater ranges and this led to the focus on intermediate-range systems.

By 2010 India developed a range of missiles around a number of core platforms:

1. **Agni –** A land-launched strategic ballistic missile series, whose versions range between 700 and 5000 km though to the Agni V
2. **Prithvi –** A tactical ballistic missile series, versions of which range between 150 and 750 km
3. **Akash –** A medium range surface-to-air missile system
4. **Trishul -** A short range surface-to-air missile system
5. **Nag -** A third generation attack anti-tank missile
6. **Nirbhay -** A sub-sonic cruise missile, it can strike targets more than 700 km away carrying nuclear warheads.

Navy

India's navy consists of:

- 1 aircraft carrier
- 1 amphibious transport dock
- 9 Landing ship tanks
- 8 destroyers
- 15 frigates
- 1 nuclear-powered attack submarine
- 14 conventionally-powered attack submarines
- 24 corvettes
- 7 mine countermeasure vessels
- 30 patrol vessels and various auxiliary vessels

India's navy is currently only capable of projecting power within the Indian Ocean basin and only occasionally operates beyond this. For the moment India's navy is limited by its aging inventory, in order to overcome this the Indian Navy has overseen a series of projects, building new vessels that will increase its operational capability as a blue-water navy. These projects, although mostly undertaken by local shipyards, all of them include integration of weapon systems from foreign sources.

India launched the Indian Navy Ship Vikrant with much fanfare on August 12 2013, the INS Vikrant is the first vessel of the Indigenous Aircraft Carrier program - India's effort to design and build its own aircraft carriers. This ambitious plan with inexperienced domestic shipyards, problems and delays were to be expected. However, the Indigenous Aircraft Carrier program has faced significant cost growth in addition to consistent delays. The launch of the INS Vikrant came almost four years behind schedule, and the vessel was only approximately 30% complete; it will miss its current 2018 commissioning date by at least another two years. The carrier is also not completely indigenous, with a significant portion of components imported from abroad.

The Indigenous Aircraft Carrier effort is not the only carrier program facing significant delays and costs. As part of India's plans to field a force of three carriers by 2020, Indian military leaders purchased the INS Vikramaditya, a modified Kiev-class aircraft carrier, from Russia. Originally set to be delivered in August 2008, the INS Vikramaditya has faced consistent delays, faulty machinery and cost growth, although eventually delivered by 2014 at more than double its original price.

The INS Viraat, for long the sole aircraft carrier in India's naval service, was to be retired with the commissioning of the INS Vikramaditya. But with the delays in the launch of the INS Vikramaditya, the INS Viraat underwent an extensive and costly refit to allow it to serve until the end of this decade. In fact, the INS Viraat (already having served twice its life expectancy) is old enough to consistently need maintenance work.

India first operated an aircraft carrier in 1961 and has developed decades of institutional knowledge in the operation of carrier task forces. Despite this the problems India has encountered in developing its carrier force will weigh heavily on plans for the design and construction of current and future aircraft carriers.

The Indian navy has been directing a number of projects for the construction of new destroyers and frigates:

Project 15A – Constructed three Kolkata class destroyers, of 7,000 tons each. These destroyers are equipped with BrahMos cruise missiles and Israeli-made Barak surface to air (SAM) missiles. The first ship of this type entered service in 2011; the remaining ships are in advanced stages of construction.

Project 17 – Constructed three Shivalik class frigates, with 5,300 tons each. These frigates are equipped with Russian SS-N-27 Club-N cruise missiles. The project was completed with the entry of the last frigate into service in 2010.

Project 28 – Constructed 12 missile-carrying corvettes. These ships will be equipped with Club-N missiles and Israeli Barak-8 SAM missiles.

Most of these projects involve Israel Aerospace Industries (IAI), which supplies the Indian shipyards with radar systems and the Barak-8 missile for anti-aircraft and anti-missile defence. At an operational level, the Indian navy's strongly carrier-centric focus has led it to systematically neglect anti-submarine warfare and sea denial in favour of sea control and soft power projection. The Indian Navy operates a sizeable fleet of Sindhughosh and Shishumar class submarines from the 1980's. India is looking to replace this aging fleet with the Arihant class submarine, which is India's first designed and built nuclear-powered ballistic missile submarine. This will allow the Indians to familiarize themselves with nuclear propulsion as they move to deploy domestically built nuclear attack and ballistic missile submarines.

Conclusions

India has for long had a huge army which it has struggled to arm with modern weapons. Whist a Pakistani invasion has influenced the armies' posture for long its real challenge is internal from the array of separatist groups, which the army has struggled to contend with.

Since India's rapid economic development took-off it only now has the capability to fund a military modernisation program, which continues to suffer from numerous problems. In March 2012 a letter from Army Chief Gen. V.K. Singh to Prime Minister Manmohan Singh was leaked which highlighted the internal problems.The army general highlighted: *"India's million man-plus armed forces are unfit to fight a war, the army's tanks have run out of ammunition, the air defense is as good as obsolete and the infantry is short of critical weapons. The state of India's military is alarming, the country's air defense is 97% obsolete, while the elite Special Forces are woefully short of essential weapons. The Army's entire fleet of tanks is devoid of critical ammunition to defeat enemy tanks."*[37] Gurmeet Kanwal, former director of the Army's think tank, the Centre for Land Warfare Studies, highlighted:

"India's million man-plus armed forces are unfit to fight a war, the army's tanks have run out of ammunition, the air defense is as good as obsolete and the infantry is short of critical weapons. The state of India's military is alarming, the country's air defense is 97% obsolete, while the elite Special Forces are woefully short of essential weapons. The Army's entire fleet of tanks is devoid of critical ammunition to defeat enemy tanks." Letter from Army Chief Gen. V.K. Singh to Prime Minister Manmohan Singh, March 2012

"Sadly, the Indian Army has almost completely missed the ongoing Revolution in Military Affairs…The Corps of Army Air Defense is also faced with serious problems of obsolescence. The vintage L-70 40 mm AD gun system, the four-barreled ZSU-23-4 Schilka AD gun system, the SAM-6 (Kvadrat) and the SAM-8 OSA-AK have all seen better days and need to be urgently replaced by more responsive modern AD systems that are capable of defeating current and future threats."[38]

India defence acquisition process is a mess, being one of the world's largest importers of defence equipment, India's bureaucracy is famous for its corruption and convoluted system which delays all acquisitions. This problem has had profound effects on the army's capabilities. In early 2010, the Army reported it was short of 390,000 ballistic helmets, 30,000 third-generation night vision devices, 180,000 lightweight bullet-proof jackets, 15,000 general purpose machine guns and 1,100 anti-materiel rifles. By the end of 2012, the Army was expecting to begin the process of testing the 66,000 5.56mm assault rifle it needed to replace substandard Indian-made weapons it was arm-twisted into accepting in the late-1990s.[39]

Due to poor infrastructure, stultifying labour rules and difficulties acquiring real estate, making anything in India is hard. The country's manufacturing sector is declining and now represents 13% of the total economy. As an example in 2010, Sikorsky Aircraft, part of the American conglomerate United Technologies, opened a plant in Hyderabad that it operates jointly with Tata Advanced Systems. The facility assembles the cabin for its midsize helicopter, the S-92. The helicopter's cabin was previously made at a Mitsubishi facility in Japan. Production was transferred to India not because costs were lower (in the end they were not), but because having a local facility might encourage sales in India, said Ashish Saraf, program manager for the Tata-Sikorsky joint venture, of which Sikorsky owns 26%. But the challenges were immense. New roads had to be built to the venture's 11-acre site, and they came slowly. The company had to build its own facilities to treat water, handle sewage and harvest rainwater. It eventually got power from the state but operated initially from six backup generators, which must be kept operational for occasional power cuts.[40]

Even if India overcame such challenges it would face a daunting task of arming over 1 million men. All of them would need to be trained and retrained relatively quickly as new developments emerged. They would all need to be armed and then trained to use such arms and then retrained as such arms where upgraded or changed. Having over 1 million personnel organized, mobile and deployed at a moment's notice requires considerable training and experience and the most organized armies in the world already struggle with this.

Despite these shortcomings India has a large army which could withstand an invasion of the nation, this army in its current form lacks the capability to conduct power projection or posture towards offensive operations. All of this could be dealt with by moving up the technology ladder and replacing the large force with military platforms – here India has shown throughout its history that cronyism and red tape gets in the way.

7. Israel

The state of Israel for all intents and purposes is an artificial state that was created by the colonial powers. From 1900 until its creation in 1947, Jews mainly from Europe migrated in large numbers to Palestine and after confiscating land from the inhabitants and expelling them the state of Israel was created. This history remains central to Israeli security today.

Israel lacks strategic depth. The country has less than 21,000 km^2 of land, which makes it smaller than Wales in the United Kingdom. At its narrowest, Israel is a mere 10 km wide. A hostile fighter could fly across all of Israel (40 nautical miles wide from the Jordan River to the Mediterranean Sea) within four minutes. For these reasons Israel is considered one the most densely populated countries in the world.

Israel is surrounded by Muslim nations. Egypt the largest country in the region and with a population 11 times the size of Israel can field a military that will outnumber Israel. This means Egypt can absorb casualties at a far higher rate than Israel. This would mean the Egyptian military can engage in an extended, high-intensity battle that would break the back of the Israeli military with a rate of attrition that Israel cannot sustain. If Israel was forced to simultaneously engage with the other countries it shares borders with, dividing its forces and supply lines it will run out of troops long before Egypt, even if Egypt were absorbing far more casualties.

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Israel is also small in terms of its demography, Its population is just over 8 million people. In comparison, there are 22 million people in Syria and 80 million in Egypt. Unable to field a large army compared to others in the region, due to its small population, Israel must rely on its reserves. Israel's small population also increases its sensitivity to civilian and military losses. Losing just one war can mean the end of the country and thus ever since 1947 Israel faces an existential survival from the surrounding states as well as non-state actors. The basic challenge of Israel is its national security requirements outstrip its military capabilities, making it dependent on an outside power.

Doctrine

Being a small country with little flexibility in the use of land as a buffer zone, a limited capacity to take large numbers of military or civilian casualties, and economic and social constraints, a quick end to any major war is essential for Israel and this has dominated its military doctrine. On its inception Israel faced the threat of extinction at the hands of massed Arab armies, that if working in concert, would overwhelm Israel in an invasion. Israel's doctrine was to maintain what they had and

expand to gain as much of the surrounding land. The threat posed by Egypt and Syria shaped Israeli posture, having a mobile force in conjunction with the air force in a unilateral attack is how the army was shaped.

This led to the birth of Israel's offensive approach, with a posture that called for transferring the fight to enemy territory, delivering pre-emptive strikes, attaining a quick victory by concentrating the offensive on a single front while defending other fronts, and enhancing the ability to rapidly shift the main effort from one front to another. This led to large investment in the Israeli Air Force (IAF) as the main firepower. In 1953, Prime Minister David Ben-Gurion laid this out: *"Dominance in the air, more than any other factor, will ensure us victory, and vice versa."*[41] The emphasis was on quality for survivability in the Middle East and that dictated an advanced strike force.

With a possible war with multiple Arab armies Israel's doctrine sought to balance its quantitative weakness with technologically superior arms to its Arab neighbours. Through help from the West Israel was able to very quickly develop a combat aircraft, navy vessels, ammunition, small arms, missiles, electronics and a nuclear bomb. Israel was convinced it must maintain a Qualitative Military Edge (QME) over its Arab neighbours — the concept that Israel must rely on superior equipment and training to compensate for the its smaller population and recruitment base relative to the Arab states

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Despite victory in the 1967 six day war, Israel was caught out by a surprise attack in the 1973 Yom Kippur war. When Iraq joined the war with an expeditionary force it posed a conventional threat with its armoured formations. Until 1973, the IDF was countering Syrian and Egyptian attacks meant to weaken IDF posts on the border and force the Israeli government to withdraw. However, the IDF managed to sustain low casualties. The IDF reprisal strikes on the Egyptians and Syrians inflicted heavy losses in 1967. The Yom Kippur war led Israel to develop space bourn systems, ballistic missiles, anti-ballistic missile systems, precision guides munitions (PGM) to counter any future missile attack.

The threat from Israel's neighbours was considerably reduced by the 1979 peace treaty with Egypt, which essentially took the large Egyptian force out of the security equation. Israel then postured to dealing with asymmetric threats and non-state actors as most of the rulers in the region had signed peace treaties with them. The survival of Israel was no longer at stake after 1979. In the 1982 invasion of Lebanon, the various Palestinian intifadas and the wars with Hezbollah in 2006 and Hamas in Gaza in 2008, Israeli interests were involved, but not survival. Israel had achieved a geopolitical ideal after 1979 in which it had divided and effectively made peace with two of the four Arab states that bordered it, and neutralized one of those states. The treaty with Egypt removed the threat to the Negev and the southern coastal approaches to Tel Aviv. The Israeli military was

therefore postured to initiate combat at a time and place of their own choosing, preferably with surprise, as they did in 1956 and 1967. Failing that, as they did in 1973, the Israelis would be forced into a holding action they could not sustain and forced onto an offensive in which the risks of failure would be substantial. From 1982 Israel primarily faced asymmetrical threats.

Neither Hizbullah nor Hamas possess large armoured formations, nor do they have the potential to invade Israel proper or overrun well-defended Israeli positions. Nonetheless, both have the capability — together or separately — to severely disrupt the Israeli economy and its daily life. Israeli planners adapted to the changing threat environment through a virtual crash program to expand its missile defence capabilities. And it is in this sphere that American-Israeli cooperation has been the most extensive. Israel, assisted by the US developed missile defence systems in the mid-1980s. In 1988, the US and Israel began jointly developing the Arrow Anti-Missile System that ultimately become operational in 2000.

As the threat of nation-to-nation war has subsided Israel's doctrine became completely geared towards asymmetric warfare. This consisted of asymmetric warfare in an urban setting, in which the army deliberately targets civilian infrastructure, as a means of inducing suffering for the civilian population, thereby establishing deterrence.

The IDF underwent a period of intense self-scrutiny after its performance in Lebanon in 2006. It conducted some 50 internal reviews and underwent a high-profile examination by a commission headed by former acting Israeli Supreme Court Judge Eliyahu Winograd. The Winograd Commission's final report found the ground forces to be insufficiently prepared and charged IDF leaders with holding a baseless hope that the capabilities of the air force could prove decisive in the war.

In September 2007, the Israeli government announced a new defence plan, Teffen 2012. This plan called for a new emphasis on building up IDF ground forces, including the creation of new infantry brigades. It also called for the adding of "hundreds" of Namer heavy infantry fighting vehicles, several dozen Merkava IV main battle tanks, and a number of tactical UAVs for use at the battalion level. Israel also put new emphasis on training with its decision to make the training budget for 2007 double that of 2006. There were also doctrinal reforms. IDF training, particularly in the Israeli Army, went back to basics and focused on bedrock combined-arms fire-and- manoeuvre tactics and skills.

Israeli President Shimon Peres once described the range of threats confronting Israel by saying that the country needed to prepare itself for attacks from *"knives, tanks, and missiles."* By knives, he meant the threat of non-state adversaries - today Israel faces such threats from Hizbullah and Hamas. Tanks refer to conventional military threats, such as Syria. By missiles, President Peres meant the threats associated with Iran and other groups that might turn to weapons of mass destruction. Israel's fundamental challenge is it must prepare its military for a variety of threats - threats the Israelis call the rainbow of operations.

Industrial Base

Israel's industrial base has evolved from a small defence industry providing light arms upon the inception of the nation to today's industrial base comprising 150 firms, with the ten largest firms accounting for 87% of the industry. Prior to the establishment of Israel and until the mid-1950s, the young defence industry concentrated on the production of light arms and ammunition and the reconstruction of surplus equipment. The second period, after the 1956 Suez war, was characterized by production under license, mainly from French firms. In the third phase, the industry started to modify and improve weapon systems produced under license or purchased from other countries. During this phase, for example, the Fuga Magister aircraft was converted into a fighter plane by adding guns and rocket launchers. The expertise gained during these improvement programs was used later on to produce new platforms such as the 'Eagle,' an Israeli version of the Mirage 5. A new era opened in the late 1960s and early 1970s when the local industry was called on to develop entirely new weapon systems. Since then, the Israeli defence industry has developed unmanned airborne vehicles (UAVs), main battle tanks such as the Merkava, missile boats, various types of missiles and communication and intelligence spacecraft.

Israel's defence industry has been constructed to deal with its precarious situation. Israel has an extremely small population, too small for government to collect sufficient taxes to fund a large industrial base. This means investment in platforms is prohibitively expensive because of the huge investment required to keep a leading position in those areas. Israel is also limited in purchasing platforms from abroad, due to costs, even though it has consistently found foreign patrons to its cause, politicians from its inception have found that defence sales have come with strings attached. At the same time Israel faces a formidable threat from its neighbours, this quantitative imbalance has been dealt with through the development of an industrial base that maintains an asymmetrical Qualitative Military Edge (QME).

This qualitative edge has been developed through an the evolutionary process of trial and error and through Israel's defence industry focusing on innovative system applications using proven technologies and avoiding investments in major platforms - the Merkava tank being an exception. This was achieved through the very close teamwork between the defence industry and the end user in the Israel Defence Forces (IDF).

The relations between the military and the defence firms are very close. The small size of Israel and its economy, the common background of military service of almost all citizens, and the small number of engineering schools has created the basis for open communication between military professional staff and industry. Over the years, these close relations have enabled the shortening of development time, the cutting of development costs, and the development of some unique weapon systems suitable to the conditions in the Middle East and to the special needs of the IDF. This has allowed Israel to continuously develop and maintain weapons and systems that are not anticipated by its enemies. This approach is what Israel believes ensures a sufficiently high probability of a swift and crushing defeat of its enemies in a full-scale war.

Exports are essential for Israel's industry to keep its critical mass because the internal market is too small to support it. 70% of Israel's defence production are exported abroad (defence exports are $7 billion annually). Israel's defence industry can be split into three groups:

- The three large government defence organisations, IAI, TAAS and Rafael. They mainly develop and produce defence systems.

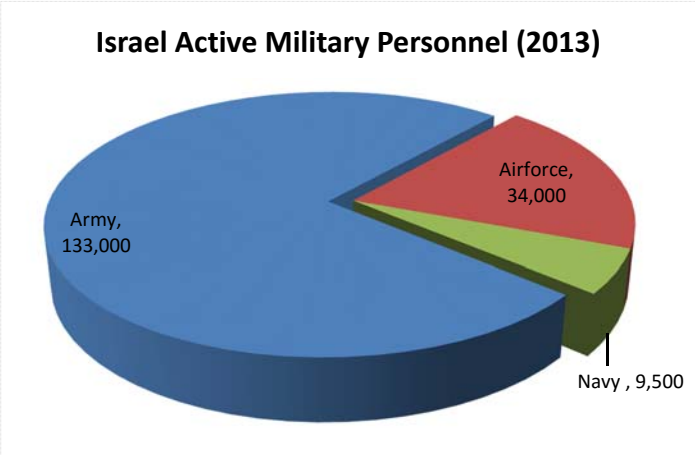
- The second group consists of privately-owned large and medium size firms. Three of the main firms in this group are ELOP, Elbit Systems and Elisra. They concentrate almost entirely on defence products. The other firms in this group, ECI and Tadiran, produce mainly civilian products (communication equipment), but have defence systems divisions.

- The third group consists of relatively small privately-owned firms, each producing a narrow line of defence products. BVR develops computerized aircraft simulators, Astronautics manufactures command and control systems, International Technologies produces laser designators, and Rokar develops navigation equipment

Beside these three groups there are several large refurbishment and maintenance centres that are part of the army's Division of Technology and Logistics. These centres maintain armoured vehicles, aircraft, communication equipment and other support devices used by the military forces. One large refurbishment centre is devoted to the Merkava battle tank.

Ground Forces

Due to Israel small's population the Israeli military only has an active standing force of 176,000. It is extremely reliant upon its reserves of 565,000 personnel. The bulk of these service personnel make up Israel's ground force of 133,000 active soldiers and 380,000 soldiers in reserve



Israel's ground forces are equipped with modern weaponry, with some indigenously developed platforms. The Magach tank platform sold to the Israel by West Germany and the US during the 1960s and 1970s, which dominated Israel's tank inventory for long have been replaced by 1,680 more capable and indigenously developed Merkava battle tanks.

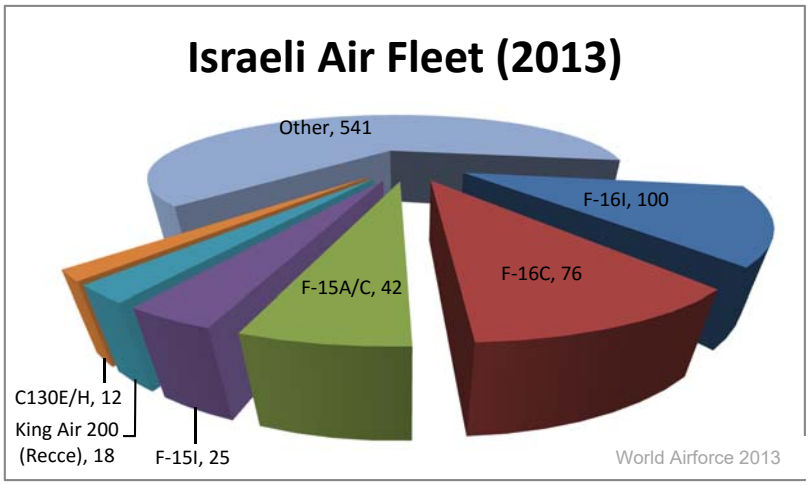
The ability to deploy troops across its territory rapidly is essential for the threats a country like Israel faces. Israel's 7823 armoured carriers consist of 5500 M113 APCs, which are a Vietnam war development. The M113 and its variants are the most widely used armoured fighting vehicles of all time.

The IDF ground forces are being equipped with the 'Skylark' short range UAVs. Skylark is a miniature unmanned aerial vehicle, designed as a man-packed system for tactical surveillance and reconnaissance.

Where Israel's ground forces have excelled is in training its troops for the wide spectrum of threats the country faces. Training is geared to the practical needs of the military while emphasizing cooperation and communication between the services to enhance their effectiveness. Training is also focused at the tactical level rather than at the operational and strategic levels. Israel's ground forces focus on tactics is due to the immediate nature of the threat that Israel faces. This training focuses on performance orientation rather than strategy. Practically ground forces use lists of tasks to focus preparation for combat. Battalion commanders choose from a universal list of tasks and train their units to achieve capability in those tasks. Training is geared toward the requirements set in existing operational plans, and commanders report readiness data back to their respective branches. Whilst this helps in dealing with diverse threats it also makes an institution difficult to change.

Air Force

The Israeli air force has always been the mainstay of the IDF. Israel has focussed on possessing quality jets and has the most advanced air force in the region. This has allowed Israel to conduct short campaigns which has limited damage to Israel's relatively small force and to its populace. Israel has failed to build its own platforms for both rotary and fixed wing aircraft. The Levi programme to develop an indigenous fighter jet was brought to an end in 2006 which produced three prototypes.



Israel's combat stock consists of variants of F15's and F16's. This has allowed the Israeli Air Force (IAF) to conduct High Intensity Combat (HIC). This has allowed it to gain air superiority and conduct operations far beyond Israeli borders. Since 2003, the IAF shifted its focus more toward Low Intensity Combat (LIC) to reduce collateral damage and increase its effectiveness at striking individual combatants and small groups. Israel has negotiated the purchase of the fifth generation F-35, which will give it significantly more capability.

Israel has 183 rotary wing aircraft, consisting mainly of US built platforms. Bell AH-1 Cobra and Boeing AH-64 Apaches is the mainstay of Israel's combat aircraft, whilst the US UH-60 Black Hawk provides tactical support.

Israel has made big strides in unmanned aerial vehicles (UAV's). Israel is now the world's largest exporter of unmanned aircraft, in terms of the number of systems sold. Over the last eight years Israel has exported $4.6 billion worth of unmanned aerial vehicles. The Air Forces' squadrons of UAVs include the Eitan, which boasts a wingspan of up to 26 meters; and the Hermes 450, which can be armed to carry out targeted killings from the air. For a nation very sensitive to casualties, this is a very significant development, Israel fundamentally maintains is qualitative military edge in the region due to its air force, although Egypt and Syria possess more platforms, these are aging soviet technologies.

CASE STUDY: Can Israel Strike Iran?

Israel has spent many years building the case for military strikes against Iran. Despite much sabre rattling Israel has not carried out such an air strike and if it decides to do so there are a number of obstacles Israel's air force will have to overcome.

Any attack on Iran would require a surprise attack (not the very public statements constantly coming from Tel Aviv), cover a large area and circumvent Iranian reprisals. An Israeli airstrike on the Iranian nuclear program would be a complicated and an operationally demanding task, a strike package of fighter-bombers and associated support aircraft would be needed to carry out most of the attack. The first challenge Israel has is actually getting to Iranian territory with enough fire power. A successful Israeli attack would require up to 1000 sorties, which would need over 100 military aircraft, according to retired US Air Force General Charles Wald, in an interview with the NYT.[42] That high number alone would stress the capabilities of Israel's air force. Alongside this Israel's military would face several logistical problems, the Israeli military would need to locate Iran's nuclear facilities, which have been spread out all over the country.

Iran is around 1000 miles from Israel, each jet would have a 2000 mile round trip. This distance means only a certain number and type of aircraft can be used. Whichever way, aerial refuelling will be needed for Israeli jets to make it home. Fuel use will also be affected by altitude, speed and payload, to effectively strike Iran's nuclear facilities each jet would need large payloads to make a difference, which means more fuel use, more demand on aerial refuelling assets. According to Scott Johnson, an analyst at the defence consulting firm IHS Jane's *"Israel had eight KC-707 American-made tankers, although it is not clear they are all in operation."*[43] These would not be enough for the 100 plus fighter jets making trips of 2000 miles. Any number of tankers would need to be protected by ever more fighter planes, this would stretch Israel beyond its capabilities unless it could have another airforce participate – such as the US. This is even without taking into account Iran's response.

Israel will also need the participation of numerous Muslim rulers as it does not share a border with Iran. It could go north from Israel, along the Syria-Turkey border. It could fly over Jordan and Iraq - the more direct route, or it can go south and fly over Northern Saudi Arabia. Without the active participation of the rulers in these countries, Israel will not be able to traverse the airspace of these countries and with the situation the Muslim world is in the Muslim rulers will not be able to comply like they always have.

In conclusion any military strike on Iran is pushing Israel's military capability to its limits. Israel's military capability is not strong enough to completely end Iran's nuclear programme, this is why it will need US participation in any strikes.

WMD's

The Israeli government maintains a policy of deliberate ambiguity on whether it has nuclear weapons. It is believed that Israel has possessed an operational nuclear weapons capability since 1967, with the mass production of nuclear warheads occurring immediately after the Six-Day War. This programme was created largely with French help and technology transfer. Various studies have estimated that Israel possesses from 75 to as many as 400 nuclear weapons. The delivery systems for these warheads are cruise missiles aboard its three Dolphin-class submarines.

In order to maintain a qualitative edge over its neighbours Israel indulged in missile development from its inception. Since the missile threat to Israel is not confined to one geographical region or to any one type of rocket, Israel, in collaboration with the US, created a multi-layered missile defence apparatus – comprising four key anti-missile systems.

Israel's missile capabilities include nuclear-capable medium-range ballistic missiles (MRBM); short-range sub-sonic cruise missiles with advanced capabilities such as non-line of sight targeting (NLOS) and mid-flight manoeuvrability. The US substantial technology sharing has allowed Israel to maintain its 'qualitative military edge,' in this area.

Israel's first line of defence is the short-range anti-rocket system, **'Iron Dome.'** The missile defence system was designed to intercept very short-range rocket threats between two and forty-five miles in all weather. Iron Dome's selective targeting system and radar are designed to fire interceptors only at incoming projectiles that pose threats to population centres – it is not configured to fire on rockets headed toward uninhabited areas.

David's Sling, still in development will eventually be a flexible, multipurpose weapon system capable of engaging aircraft, cruise missiles, ballistic and guided missiles. David's Sling was designed to target incoming missiles during their terminal phase, unlike the Iron Dome which intercepts missiles at their highest trajectory. Its primary role is to intercept medium - and long-range ballistic and guided rockets.

The Arrow system is designed to give Israel a full theatre ballistic missile defence capability. The original versions - Arrow-1 and 2, were initially conceived in 1988 and became operational in 2000 to protect against long-range conventional missiles. In 2008, the US and Israel began production of the Arrow-3 which is comprised of an exoatmospheric interceptor and proportional navigation to directly target an incoming missile outside of the earth's atmosphere, thereby preventing collateral damage from impact with a nuclear warhead. The Arrow has a greater accuracy (99% kill rate) and a longer targeting range (missiles of over 600 miles). Currently, Israel has two Arrow-2 batteries deployed in the centre of the country.

Israel's recent developments in both offensive and defensive missile technology reflect concern over both intermediate-range threats such as Iran and short-range threats such as Hizbullah rocket artillery. On the offensive side, Israel's development of the Jericho-3 missile, with an estimated maximum range between 4,800km and 6,500km and a 1,000kg to 1,300kg payload, would provide Israel with an intermediate-range nuclear strike capability.

This layered defence system however failed to intercept many Hizbullah rockets which were deployed in an area of 4 square miles by mobile facilities. Hizbullah also showed that missile systems can be overwhelmed with multiple missile launches.

Navy

The Israeli Navy is relatively small and does not play as prominent a role in its country's defence. The size of the navy in reality makes the navy a mere coast guard. Its small force focuses mostly on patrolling Israeli territorial waters and interdicting weapons being smuggled into Gaza. The Hanit, Israel's premier missile ship, was struck in the 2006 invasion of Lebanon by a C-802 radar-guided missile that was manufactured in China and upgraded in Iran. The Hanit's Barak anti-missile system should have been able to counter the missile strike, but the system was not turned on because Israel mistakenly believed that Hezbollah could not fire sophisticated missiles at naval targets. This shows that the Israeli Navy is largely focused on interdicting weapon shipments into Gaza, which falls within the scope of coast guards.

The Israeli fleet consists of 3 Sa'ar 5-class corvettes, 10 missile boats, 4 Dolphin-class submarines, 42 patrol boats and 6 support ships. Most of the Israeli navy is based on the Mediterranean coast at Haifa and Ashdod. There is also a small and vulnerable naval installation at Eilat that hosts patrol boats used to combat local smuggling. Israel is working to incorporate UAVs into its operations and is seeking to develop an amphibious capability.

Conclusions

Israel faces a precarious military reality, which no amount of military development can change. Despite receiving significant US funds and military equipment it has failed to change the fact that it is outnumbered and surrounded. Hamas and Hizbullah have exposed Israel's Achilles heel on numerous occasions despite the fact that surrounding nations have large conventional armies. Israel's attempts at developing indigenous platforms have failed on most occasions as it lacks the economy to fund such large projects. This is why it has come to rely on US hand outs and partnerships in developing state of the art platforms.

Israel's aggressive posture is really a deterrent to halt the surrounding nations from ever contemplating an invasion – something the rulers continue to abide by. Israel lacks the strategic depth for a long intensity battle and aside from its air force has no power projection capabilities. Israel's endless struggle will remain in having a qualitative advantage over its neighbours, something its economy has no capability to fund. If Egypt or Syria's were to go through rearmament they would bankrupt Israel.

Despite possessing some capability, in a region where Israel is alone, without external help Israel would not have survived.

CASE STUDY: Israeli Invincibility?

Strategic depth – Israel is an artificial nation created by the colonial powers. The nation is so small that in any war scenario Israeli territory would suffer from significant loss and damage as it will have to fight from within its own territory. A hostile fighter could fly across all of Israel (40 nautical miles wide from the Jordan River to the Mediterranean Sea) within four minutes.

Small population – Israel's biggest problem is its small population relative to the region. Israel has a population of around 8.1 million and must have an increasing demography if it is to survive in the region. As Israel is vastly outnumbered by the nations surrounding it, it has a big reliance on migration. In the last decade no other country in the world has such a large percentage of new immigrants preparing to leave. Due to security fears, growing numbers of Israelis want to leave and Israel is now in a situation where every year more Jews leave Israel for Europe and the US than the other way around.

Labour problem – The knock on effect of such a small population is a labour shortage. Israel only has a labour force of 3.3 million. Economic development and industrial development are labour intensive and dependent on knowledge and skills retention. With such a small labour force Israel is reliant upon foreign knowledge and expertise.

Economy – Israel's economy is worth $300 billion, this is just too small to cater for Israel's population. This has a knock on effect on how much taxes the government collects as it subsidises the worlds Jews to migrate to Israel to normalise its occupation. As a result Israel has focused on key industries for its survival. This means many industries such as mining and manufacturing have been neglected. To compensate for this Israel relies on technology, military and foreign aid transfers. It also relies on influential Jews across the world, especially in the US to influence foreign policies of these states in favour of Israel. Israel has a heavy dependency on the goodwill of other states. If it was to lose favour it is too small for country to be self-sufficient

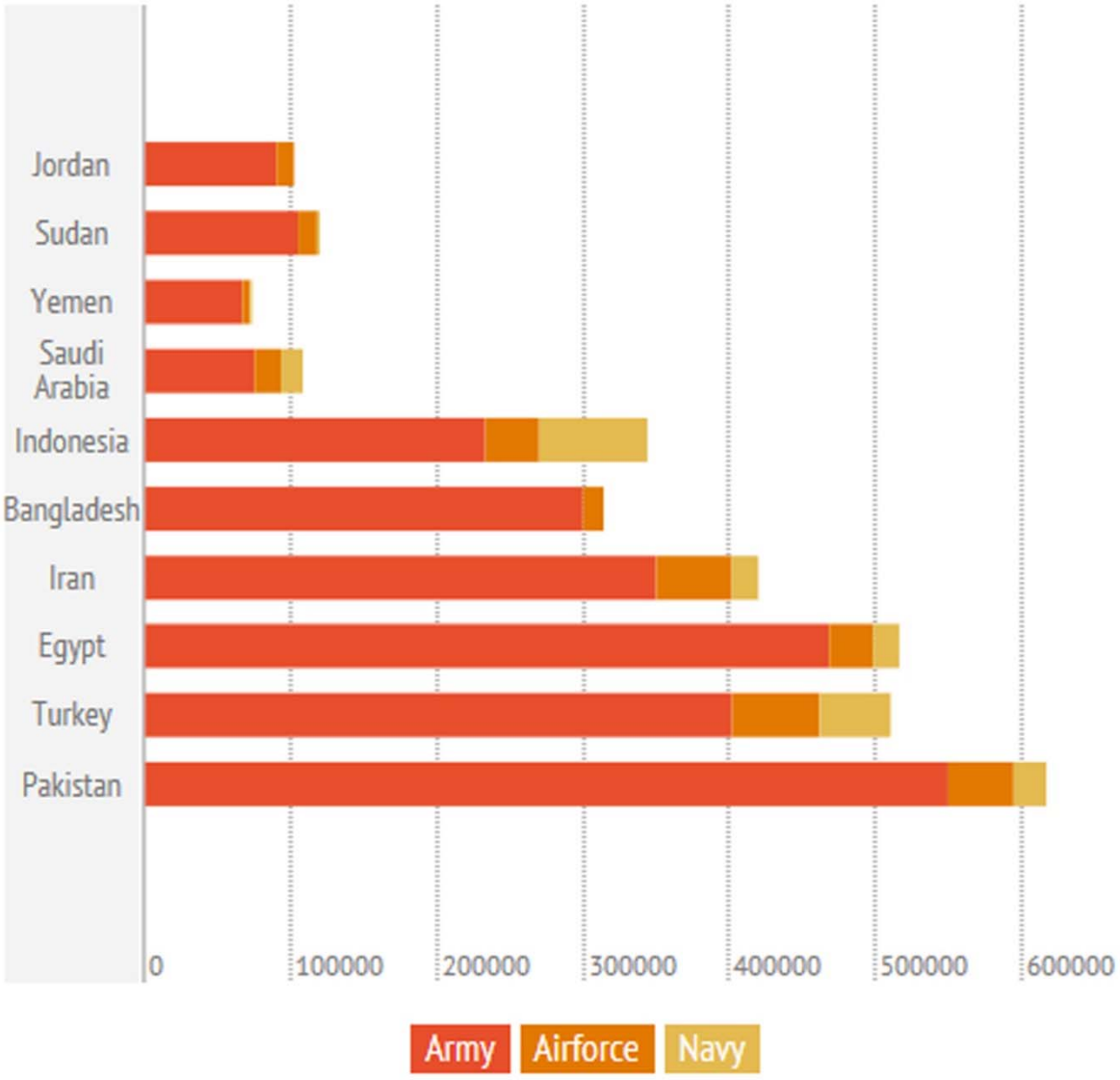
Poverty – One effect of such an economy is poverty in Israel. 24% - over 2 million Israeli citizens live below the poverty line. The small budget of the Israeli government has led to many to resort to utilizing family links to gain wealth. One report in 2010 highlighted 18 Israeli families controlled 60% of all Israeli companies.[44] Their wealth is concentrated in the four of Israel's largest industries: banking and insurance, chemicals, high tech, and military/homeland security.

Lack of resources – Israel will never become self-sufficient as it will always have to import energy. Israel relies heavily on external imports for meeting most of its energy needs, spending significant amounts from its domestic budget for its transportation sector which relies on gasoline and diesel fuel, while the majority of electricity production is generated using imported coal. Whilst the region has an abundance of oil and gas, none of this is in Israel.

Reliance on exports – Foreign markets are critical for Israel. Due to having a very small domestic market (due to its small population) it is forced to search for foreign markets to generate wealth. Industrialised nations generally focus 10% of their economy towards foreign trade (imports and exports). However 30% of the Israeli economy relies on exports, which is very high. Israel's main exports 10 years ago were Jaffa oranges and other agricultural products. Today's exports are increasingly high-tech, an estimated 80% of the products Israel exports are high-tech and electronic components. However Israel is finding it is light years behind Japan, China and Germany in this very competitive sector. 40% of Israeli exports end up on US shores even though the US can make the same agricultural goods and computer hardware cheaper and of better quality. A reliance on foreign markets makes an economy reliant on foreigners constantly consuming and links the fortunes of ones economy with others.

Agriculture - The geography of Israel is not naturally conducive to agriculture. More than half of the land area is desert, and the climate and lack of water resources do not favor farming. Only 20% of Israel's land area is naturally arable. Whilst Israel is now able to produce most of what it needs it has to also export this as it needs to earn foreign income. Israel's Achilles heel however it's the need to import grain. 80% of its grain is imported, which is another strain on government revenues.

MUSLIM MILITARY IN NUMBERS (2013)



Muslim Military Balance

1. Pakistan

Pakistan gained independence from the British Empire in 1947 and ever since, strategically, defending the border with India has been the military's paramount objective because it represents the most direct existential threat. The seeds of animosity were sown during the bloody partition, in which Pakistan and India split from each other along a Hindu-Muslim divide. The sorest point of contention in this divorce centred around the Muslim-majority region of Kashmir, whose princely Hindu ruler at the time of the partition joined India, leading the countries to war a little more than two months after their independence. That war ended with India retaining two-thirds of Kashmir and Pakistan gaining one-third of the Himalayan territory, with the two sides separated by a Line of Control (LoC). The two rivals fought two more full-scale wars, one in 1965 in Kashmir, and another in 1971 that culminated in the secession of East Pakistan - Bangladesh.

Pakistan's basic challenge is survival, and there are various aspects to this, the first is securing the Indus river and the country's fertile heartland, this gives Pakistan a degree of self-sufficiency economically. Secondly, creating internal cohesion between the different regions with various ethnic groups is essential as Pakistan as an entity will be threatened.

Military Doctrine

Pakistan's doctrine since its inception has been postured towards India. This has included significant periods of army rule that removed various civilian leaders from power and ruled the country under martial law. As soon as both India and Pakistan gained independence from the British Empire both countries fought over Kashmir, which has remained a constant feature between both neighbours. The loss of Kashmir led to the evolution of Pakistan's military doctrine, which has always recognized India was more powerful by almost every metric of military, economic, and political power and that in any situation of war India would quickly out-number and outgun Pakistan.

Throughout the 1965 wars and 1971 Pakistan's doctrine emphasized static defence of the Line of Control (LOC) and the border. Penetration of Indian territory would be undertaken only on an opportunity basis. However the wars with India showed that because of lack of strategic depth in Pakistan a 'stand and fight' doctrine would probably result in deep penetration by Indian forces without Pakistani forces being able to manoeuver effectively.

In this context Pakistan developed the 'Riposte doctrine' which was a limited offensive-defensive posture. The doctrine called for strike corps to take the initiative in a war with India, pushing deep into Indian territory, while other corps hold back the initial Indian advance. This action against a

numerically superior enemy relied upon initial momentum and the assumption that the international community would buttress their efforts by stepping in within a few weeks to urge a ceasefire, effectively halting both armies from advancing farther into each other's territory. Under such a scenario, Pakistan could then trade territory gained for concessions from India. This doctrine since its inception underwent significant changes as wars with India took place and developments in India's military occurred.

Another aspect of Pakistan's military doctrine has been the 'strategic depth' doctrine with regards to Afghanistan. Ensuring a peaceful and secure Afghanistan on its Western border, meant the Pakistani military could fully concentrate on the Eastern borders

Over the last decade Pakistan's army has been engaged in America's war in the Northern tribal areas of the country. Under General Ashfaq Kayani's leadership the countries strategic doctrine and posture was altered in January 2013, the India centric doctrine was revised and defined internal threats as the greatest risk to the countries security. America's war on terror has become the primary focus for the military. 70% of Pakistan's ground forces however remain on Pakistan's Eastern border with India, despite this.

Industrial Base

Pakistan's defence industry consists mainly of state owned enterprises and a small number of private companies. The defence industry also includes seven specialized organizations devoted to research and development, production, and administration. State owned enterprises include:

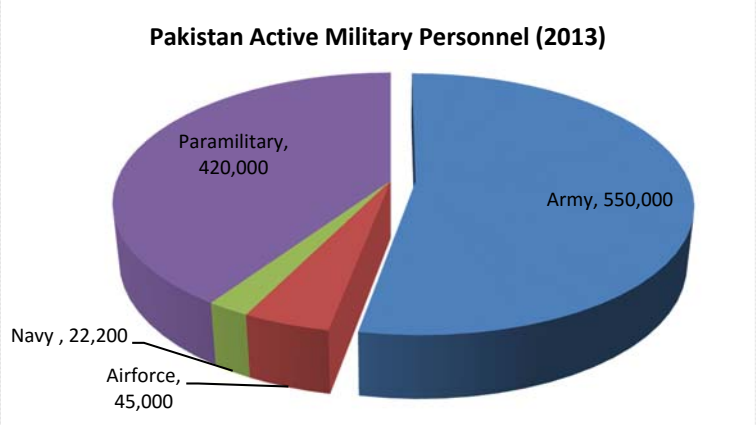
- **Air Weapons Complex (AWC)** — development and production of various airborne weapon systems and avionics.
- **Heavy Industries Taxila (HIT)** — maintenance, overhaul, modernisation, development and production of armored vehicles including main battle tanks, self-propelled artillery, armored personnel carriers (APC) and armored cars.
- **Kahuta Research Laboratories** – Development and modernization of Pakistan's nuclear arsenal
- **Karachi Shipyard and Engineering Works (KSEW)** — production of civilian and naval vessels, including surface warships and submarines.
- **National Defence Complex (NDC)** — development and production of tactical and strategic ballistic missiles for the countries military.
- **National Engineering and Scientific Commission (NESCOM**) - scientific and research organisation carrying out research in engineering and scientific areas such as IT, fluid dynamics, aerodynamics, aerospace, electrical, engineering and chemical engineering
- **Pakistan Aeronautical Complex (PAC)** — maintenance and overhaul of various aircraft, production of aircraft and components.

- **Pakistan Ordnance Factories (POF)** — production of various ammunition types, small arms and explosives.

Private companies include:

- **SATUMA** — design and production of multiple unmanned aerial vehicles (UAV's) for sale to domestic and foreign customers.
- **Global industrial defence solutions (GIDS)** - designs and produces UAV platforms, flight control systems, C^4I systems and data-links.
- **Integrated Dynamics** - design and production of multiple unmanned aerial vehicles for sale to domestic and foreign customers.

Ground Forces



Pakistan has a standing force of 617,000 troops with reserves of 513,000. The Pakistani ground forces form the bulk of the armed forces and are the key player in its offensive and defensive capabilities. Pakistan's ground forces are primarily arranged into has 13 army corps, with nine of these deployed close to the Indian border in anticipation of conventional conflict with India. Some were dispatched to support operations in the tribal areas. Each corps comprises Infantry - mechanised, armoured, artillery and anti-Tank divisions and brigades in the region of 60,000 personnel.

The I and II Corps are armoured strike corps and designed to penetrate Indian territory in a conflict. The XI and XII Corps have had principal responsibility for counter insurgency in Khyber Pakhtunkhwa and Baluchistan. The remaining corps continue to be positioned to counter potential Indian offensives.

The basic infantry weapon is the Heckler & Koch G3 rifle developed in the 1950s by the German armament manufacturer Heckler & Koch. Variants of this are locally produced by Pakistan Ordnance Factories in Wah Cantt.

Pakistan's tank inventory is dominated by the 1,100 aging type-59 tanks. Produced by China in 1958, production came to an end in 1980 by China. Pakistan has been able to modernise this tank at Heavy Industries Taxila. Calling it al-Zarrar, the design was an improved rebuild by way of more modern armament, fire control and defensive equipment such as explosive reactive armour and anti-mine cover.

Pakistan fields a significant number of older tanks but still reasonably modern and capable such as the Russian T-80s. Pakistan is replacing its aging tank fleet with a new Main Battle Tank (MBT)

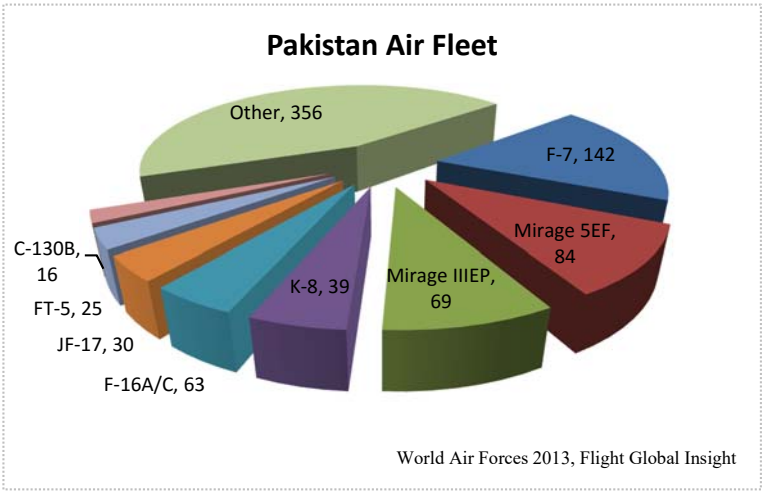
named after the Sahabah – Khalid bin Waleed, the al-Khalid tank, was developed with Chinese cooperation for domestic production. An evolution of Chinese and Soviet tanks, the design is considerably smaller and lighter than the most Western main battle tanks. It is based on the Chinese Type 90-II, which combined technologies from several Soviet and Western tanks. The Al-Khalid is unique in that it was designed to be adaptable for manufacture, so that it can be easily integrated with a variety of foreign engines and transmissions. The current production variant of the Al-Khalid use a diesel engine and transmission supplied by the KMDB design bureau of Ukraine. The first production models entered service with the Pakistan Army in 2001.

In addition to its MBTs, the Pakistani army has armoured personnel carriers (APC) for troop movements. Pakistan's APC's consist mainly of America's M113 APC's, developed during the Vietnam war, production has long ended for these, but they remains the most widely used armoured fighting vehicle of all time. In order to replace this aging APC, Pakistan developed the Talha, its first indigenously developed APC. The Talha uses chassis of the US M113 APC, but is better protected. The APC is fully amphibious and can cross water obstacles without any preparation.

Air force

Pakistan's air force similarly consists of an ageing fleet, with only a relatively small fleet of modern fighters, these are a mix of US and Chinese jets. Currently Pakistan's aircraft inventory consist of 400 aircraft and over 200 trainer, transport, communication, helicopter and force multiplier aircraft. Pakistan's air force is dominated by China's Chengdu F-7 and French mirages. The F-7 is Pakistan's primary combat fighter. This ageing jet was based on the Soviet MiG-21. The MiG-21 entered service with the Soviet air forces in 1958 and was copy-produced in China beginning in the 1960s.

The French-designed Dassault Mirage III and Dassault Mirage 5, are geared towards performing multiple mission types, including interception and strike, whereas Mirage 5 fighters are more focused towards strike missions. Around 150 Mirage fighters are in service, many of which are second-hand procured from other countries, making the Pakistan Air Force the largest operator of the type in the world.



These ageing fleets are supplemented by 63 F-16's and the indigenously produced JF-17, with China. Joint production and further development of the JF-17 Thunder light-weight multi-role fighter is ongoing and around 150 JF-17 are expected to be inducted by 2015, replacing all F-7's and Mirages.

The Pakistan Air Force (PAF) has made several strategic acquisitions that are characteristic of projecting power. These procurements include a fleet of aerial refuelling aircraft, airborne early-warning and control (AEW&C) systems, long-range air-to-surface weapon-systems and as of late, a renewed effort to develop armed-UAVs similar to the US Predator.[45] The PAF's Achilles heel however is the fact that it operates separately to Pakistan's ground forces. Air Marshall (retired) Masood Akhtar in an interview with the Harvard Kennedy school confirmed with the exception of recent internal security operations, the air force has generally been poorly integrated into overall military planning.[46]

Pakistan has no indigenous helicopter capability and has relied on foreign purchases. Currently its most advanced platform is the US Bell Cobra, from the Vietnam era. Pakistan has however developed an indigenous unmanned aerial vehicle (UAV) capability. Pakistan's Global industrial defence solutions developed the Uqab in 2008, which was primarily a reconnaissance platform lacking any offensive capability. Its 50hp engine gives it a ceiling of 3,000m and an endurance of six hours. Uqab takes off on a wheeled undercarriage from conventional runways, but the Pakistan Navy had a requirement for a zero-length launch version, primarily for shipboard use. A modified Uqab to cater for a rocket-boosted launch and parachute recovery, is undergoing trials now. This also led to the development of the Shahpar, a medium range tactical UAV System with autonomous take-off and landing. It can carry various types of payloads integrated for reconnaissance and day and night surveillance. Other features include accurate lateral, longitudinal trajectory control, mission planning, management & control, geo referencing & geo pointing for terrestrial targets.

CASE STUDY: JF-17

The Joint Fighter F-17 Programme is a low-cost multi-role lightweight fighter that can host modern electronics and precision-guided weapons. Developmental work on the aircraft commenced in 1999 and detailed designs were finalized in September 2001. After flight testing, a small batch of 8 aircraft were produced in 2007 and serial production of the aircraft started in Pakistan in the 2009. So far PAF's two Squadrons have been equipped with JF-17s. In 2014 Pakistan began production of a new version of the Jet featuring upgraded avionics and weapons system. Block-II will be manufactured at the Pakistan Aeronautical Complex west of Islamabad, which has so far produced 50 older-model Block-I JF-17s for the air force. There are four other planes in the super light category, India's Tejas, the Korean A-50, the FCK-1 from Taiwan and the Gripen – the market leader.

The first 50 jets have a late 3rd generation airframe but contain up-to-date systems. Pakistan Aeronautical Complex (PAC) holds the exclusive rights of 58% of JF-17 airframe co-production work. This is the only construction contributions Pakistan makes, besides assembling pre-prepared kits. The avionics are of the same generation as the latest F-16s, i.e.,

medium-to-long range radars, multi-track & engage, helmet mounted displays. This allows it to engage in beyond visual range combat and precision strikes. It can also data link with allied radars and aircraft, allowing for info sharing, encrypted communication. The Block II JF-17 has improved avionics, weapons load and carriage capability, a data link and an electronic warfare suite, plus an in-flight refuelling capability

The aircraft is assembled in both Pakistan and China, with the engines coming from Russia, and most of the other components from China. The JF-17 is comparable to the first version of the F-16 and will only replace Pakistan's French mirages and the F-7's that dominate Pakistan's fleet. This is the first time Pakistani engineers have dabbled in jet development and the JF-17 should be viewed in this light.

WMD's

Pakistan embarked on a nuclear programme shortly after India conducted its first test in 1974. This led to a full-blown nuclear arms race in the region. Both nations devoted a great deal of resources to developing and testing short-range and intermediate missiles. In 1998, Pakistan and India conducted a series of nuclear tests that earned international condemnation and officially nuclearized the subcontinent.

Since 1998 Pakistan has been rapidly developing and expanding its nuclear arsenal. Pakistan is moving from an arsenal of weapons based wholly on highly enriched uranium (HEU) to greater reliance on lighter and more compact plutonium-based weapons. The shift to plutonium based

weapons is being made possible by a rapid expansion in plutonium production capacity, with two production reactors under construction to add to the two reactors that are currently operating.

Pakistan continues testing and deploying a diverse array of nuclear-capable ballistic and cruise missiles, with ranges from 60 km to 2000 km. The use of plutonium allows for the production of lighter and more compact nuclear warheads, more suitable for use in ballistic and cruise missile warheads. Pakistan has cooperated closely with China and North Korea in nuclear weapon design and delivery system development which relies largely on expanding Scud technology.

On the delivery front Pakistan has a number of short-range, medium, and longer range, road-mobile ballistic surface-to-surface missiles (SSMs) and both liquid and solid-fuelled missiles. The maximum range among Pakistan's missiles is by Hatf V *(*Gauri) which is reported to do over 2200 kilometres. Pakistan's Hatf missiles are based on North Korean Rodong series of IRBMs. Pakistan has also developed a cruise missile - its Babur cruise missile has a reported range of 700 km and a maximum speed of 880 km/h (Mach 0.7).

Navy

Pakistan has a border along the major Sea Line of Communication (SLOCS) but lacks naval capability to project power due to its small size. At present, Pakistan's navy owns around 71 vessels, most of them of US or European origin which include submarines, destroyers, frigates, patrol and mine warfare boats. It operates from its sole naval port in Karachi.

Surface vessels consist of 11 Frigates and destroyers. Pakistan's brought 6 ex-royal British navy type-21 frigates, which Britain decommissioned in the early 1990's. These are being replaced with the modern F-22P Zulfiquar-class frigate. This class of ship is a general purpose frigate built by Pakistan and China, production has taken place at Karachi Shipyard and Engineering Works (KSEW) with technology transfer.

Pakistan's navy has 5 submarines in service, these are diesel electric submarines with an additional three mini submarines. The navy operates 3 Khalid class submarines, these are French Agosta-class submarines. Modernised versions were built for Pakistan by France - the Agosta 90B has a crew of 36 plus 5 officers and can be equipped with the MESMA air-independent propulsion (AIP) system. The French transferred the technology for this submarine to Pakistan, which in the medium to long term will allow Pakistan to develop its indigenous maritime capability. For the moment however Pakistan has no naval power projection capabilities and possesses a barely sizeable navy for domestic defence**.**

Conclusions

Pakistan's relationship with India has driven the need to acquire military technology and integrate this into its military posture. The need to face-off against an adversary which is quantitatively larger in every sense has led to the development of asymmetric forces, which has made regional nations take notice of Pakistan. Pakistan's ground forces regularly train in offensive scenario's to deal with a possible Indian invasion and this makes the army capable of conducting operations to take and

hold territory. Pakistan's ground forces have for over 60 years, postured, to conduct offensive operations rather than remain in static formations and focus on defending and holding territory. This means the ground forces are uniquely placed in any war scenario.

Pakistan lacks indigenous capability, as a result after 66 years of independence it has only been able to develop one platform – the al-Khalid tank. This has created a reliance on foreign procurement of military platforms. Sino-Pakistan relations have led to co-production of a number of weapon systems, the JF-17 has been the most important result but the armed of forces remain reliant on older versions of most categories of weapons.

Inter-service co-ordination remains a problem in the military. This is because the PAF's prime objective is to deny the enemy air superiority over Pakistan's airspace and the forward battle areas. This would consume most of its air assets. In any situation where ground forces called for ground support for its formations under pressure or strike corps counter-attacking, the PAF does not have enough assets available to support this.

The military's fundamental problem is the nation's economy. Civilian leaders one after the other have caused economic crisis and as a result the long term finance needed for armament and platform development just has not been possible. It is unique, almost miraculous that the military of Pakistan still has been able to develop the capabilities to balance India, when she has more personnel, more equipment – more of everything, with such a dysfunctional economy. The zenith of this was the development of nuclear weapons.

CASE STUDY: Pakistan v India

India is numerically seven times larger than Pakistan, but its nuclear programme and missile programme are in parity to Pakistan's. With over two domestic satellite launch vehicles already in service, India is much more advanced in space technology than Pakistan. Mobile land-based ballistic missiles are limited in quantities on either side. India and Pakistan are each thought to have the capacity for a second, or retaliatory, strike. India's recent military cooperation with Russia has stretched the qualitative lead. India's knowledge of rocketry is far ahead of Pakistan's, which relies largely on expanding Scud technology. India has fielded the most modern Russian main battle tank, the T-90, and has even begun to build the tanks under license. While Pakistan fields a significant number of older but still reasonably modern and capable Russian T-80s, it is qualitatively outmatched in terms of tanks. India's armoured formations also include more heavily armed armoured fighting vehicles than those of Pakistan, Pakistan however leads in vehicles which provide mobility. The Indian air force has begun to field the Russian Su-30MKI "Flanker," one of the most modern fighter jets in the world, and has more on the way. Pakistan's most advanced jet is the F-16, but it has begun production of its first indigenously produced jet, the JF-17, with Chinese help. India qualitatively and quantitatively outstrips Pakistan's conventional capability. However India has struggled with Pakistan's unconventional capability and this is Pakistan's real strength

2. Turkey

The Ottoman's ruled the vast Islamic Khilafah from modern day Istanbul. They dominated the Islamic world and the Mediterranean from 1500, only ending with WW1. Modern Turkey straddles Europe and Asia. It straddles the land bridge linking southeastern-most Europe with southwestern-most Asia. Most of Turkey's territory lies on the Asia side of the Bosporus, occupying the entirety of the Anatolian plateau. Turkey sits on the intersection between the East and the West, it also straddles energy consumers and energy producers. As a result of this geography the basic challenge Turkey faces today is securing its various territories around Turkey's core – the Anatolian plateau.

Doctrine

In WW1 the Ottoman's aligned with Germany against the allied powers of Britain, France and Russia. After the war was over – (the Ottoman's were in decline prior to the war), the Ottoman lost all territories beyond Anatolia. The founding of the Republic of Turkey in 1923 brought along radical changes to its security doctrine. Its forces were organised with the primary objective of preservation and protection of the independence of the country. During Mustafah Kamal's era the Turkish army shifted its guns from European enemies and turned towards Muslims, who he considered fundamentalists who resisted secularisation of the country.

This internal focus resulted in Turkey remaining neutral until 1945, when war was declared on the Axis powers in WW2. The rise of the Soviet Union as a global power and Turkey's entry into NATO in 1952 resulted in it being a bulwark against the Warsaw Pact from 1945 – 1991. Turkey mustered a large standing military through compulsory conscription. During this period Turkey was locked into a relationship with the US who was pursuing a strategy of containing the Soviet Union on a line running from Norway to Pakistan. Turkey was a key element because of its control of the Bosporus. A Soviet-allied or Soviet-influenced Turkey would have broken the centre of the American containment strategy, changing the balance of power. Along with Germany,

Turkey was the pivot point of US and NATO strategy. Throughout this period turkey's military doctrine was inherently defensive in its outlook, based on conventional force-on-force calculations with nuclear considerations relegated to NATO and the US.

Turkey's military doctrine hoped to meet the enemy at the border and fight a structured retreat from the frontier. This picture did not change until the early 1990s. Until then the Turkish military ranked Russia, Greece, Iraq, Iran, and Syria as the top threats to security based on their perceived claims on Turkish territory and ability to project conventional forces. Until the dissolution of the Warsaw Pact in 1990, the Turkish Army had a static defence mission of countering any possible attack on Thrace by Soviet and Warsaw Pact forces and any attack by the Soviet Transcaucasus Military District on the Caucasus frontier. The ground formations were organized into the First Army (2nd, 3rd, 5th, and 15th Corps), Second Army (4th, 6th, and 7th) and the Third Army (8th, 9th, and 11th Corps). The Third Army was responsible for holding the Caucasus line with about one third of the Army's total strength of one armoured, two mechanised, and fourteen infantry divisions.

With the fall of the Soviet Union in 1990, this lead to a rethink within the army regarding its posture and the capability of the nations armed forces. Turkey lacked an indigenous defence industry and was still using outdated equipment. Military planners envisioned a land force anchored by heavy armour and mechanized infantry that could move quickly by road or across open country with organic air defence. In place of static defence relying on overwhelming numbers of older weapon systems, Turkish officers decided to create a highly mobile manoeuvre force along the American model. The air force and navy were to play a secondary and supporting role in this military strategy. The new doctrine also introduced Turkey's military modernization programme, which is now into its second decade where turkey gradually moves to developing indigenous military platforms.

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At present, the Turkish strategy is in a transitional stage. It is no longer locked into its Cold War posture as simply part of an alliance system, nor has it built the foundation of a mature regional policy. As the power in the region, its doctrine remains defensive in nature, its only external focus is to take active part in a collective security system.

Industrial Base

Prior to the 1980's the Turkish armed forces was stocked with ageing weapons with very little defence industry to speak of. In 1985, the Undersecretariat for Defence Industries (SSM), was established which became Turkey's defence procurement agency. Established with the aim of modernising the Turkish Armed Forces (TAF) and nurturing the growth of a national defence industry, the SSM has successfully developed policies and carried out programmes to this end since its foundation.

Prior to the agencies establishment Turkey's defence procurement model was based mainly on direct procurement (off-the-shelf purchases), however as a result of the SSM's efforts and policies in support of local industries, the procurement model of Turkey underwent a gradual but significant change throughout the 1990s to co-production, and finally during the last decade to local production (i.e. developing its own designs) and system integration. One of the main tasks of the SSM was to re-organize and integrate the existing national industry so as to satisfy defence industry requirements, encourage new enterprises and channel them according to the integration requirements, seek possibilities for foreign capital and technology contribution, guide enterprises and make plans for state participation in this respect.

According to Defence Industrial Manufacturers Association (SaSaD) by 2010 there were 718 (+ around 1,000 sub-industry companies) public corporations (military factories and government controlled companies), private companies and foreign partnerships in the country, employing some 41,000 staff (including 10,978 engineers and 6,689 technicians). The Turkish defence industry product portfolio currently contains over 250 different products and systems, mostly designed, developed and produced by Turkish companies through R&D programmes, and mainly funded by the MoND/SSM and the Scientific and Technological Research Council of Turkey (TüBiTAK).

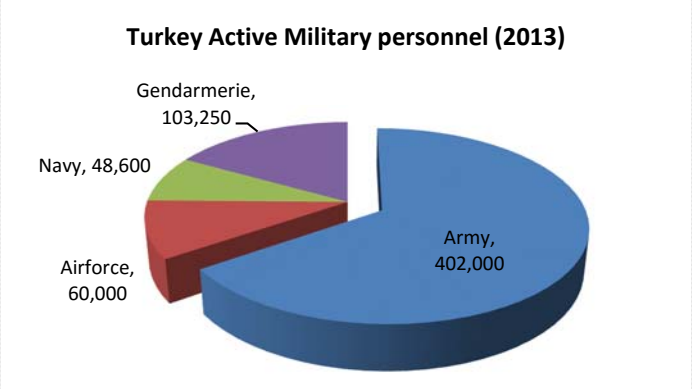
As a result of dedicated efforts of the Undersecretariat for Defence Industries, real achievements in the creation of a modern national defence infrastructure in Turkey is now taking shape. Key defence industrial institutions have been established to meet the requirements of the Turkish Armed Forces through local sources, each of which fill an important gap in their scope of activity. In 1998, this led Turkey to announce a modernisation program worth $160 billion over a twenty year period in various projects including tanks, fighter jets, helicopters, submarines, warships and assault rifles. Turkey is also Level 3 contributor to the Joint Strike Fighter (JSF) - F-35 program.

CASE STUDY – Turkey and the F-35

The highlight of Turkish defence capabilities has been its contribution to the development of the F-35 Joint Strike fighter jet. 10 Turkish companies developed aspects of the F-35, the most technically advanced were: **Ayesas** currently is the sole source supplier for the F-35's missile remote interface unit and the panoramic cockpit display. **Fokker Elmo** manufactures 40 percent of the F-35 Electrical Wiring & Interconnection System (EWIS). **Turkish Aerospace Industries (TAI)** currently supplies production hardware that goes into every F-35 production aircraft. In conjunction with Northrup Grumman, TAI manufactures and assembles the centre fuselages, produces composite skins and weapon bay doors as well as fibre placement composite air inlet ducts

Ground forces

The Turkish armed forces consist of over 1 million personnel, including 378,000 reservists. The Armed forces consist of the Army, the Navy (including naval aviation and naval infantry) and the Air Force. The Gendarmerie and the Coast Guard, both have law enforcement and military functions. Turkey's ground force of 402,000 personnel, overwhelmingly dominates the nation's armed forces.



At present, the primary main battle tanks of the Turkish army are the Leopard 2A4 and the M60T. There are also around 400 Leopard 1 and 750 M60 Patton variants in service, but the Turkish Army retains a large number of older vehicles. These tanks are all 1950 designs and significant upgrades have taken place, despite this they are ageing platforms. Turkey has made significant strides in its National Tank Production Project (MİTÜP - Milli Tank Üretimi Projesi), an initiative developed in mid-1990's to establish production, development and maintenance of main battle tanks. The project was initiated with an agreement signed between Otokar and Undersecretariat for Defense Industries in 2007, worth approximately $500 million in order to design, develop and produce 4 prototypes of a national Main Battle Tank, using only Turkish resources. Otokar produced its first prototype in 2009 and from 3 July to 10 July 2013 the 'Altay' completed testing. Over the next decade Turkey's 3000 (approx) tanks will be replaced by the indigenously built third generation Atley.

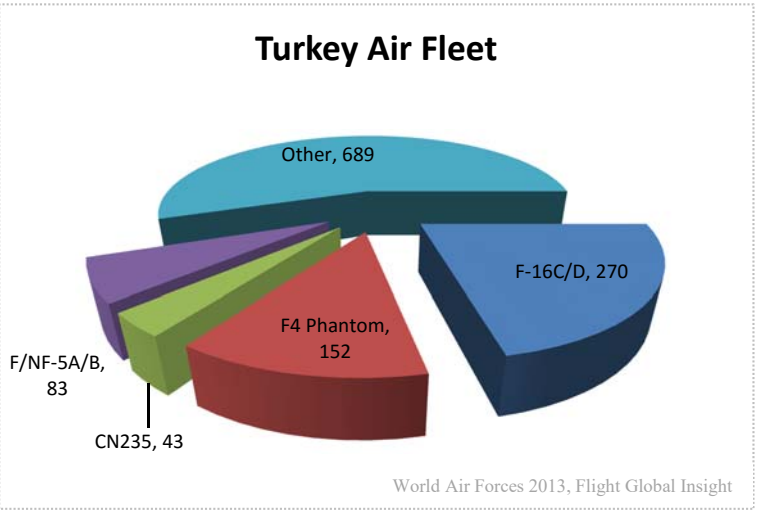
In addition to its MBTs, the Turkish army has armoured personnel carriers (APC) for troop movements. Turkey's APC's consist mainly of America's M113 APC's, developed during the Vietnam war, production has long ended for these, but remains the most widely used armoured fighting vehicle of all time. Turkey has also developed an indigenous APC – the ACV-300, Turkeys 1,381 APC's of this type are based on the American Advanced Infantry Fighting Vehicle, which is based on the chassis of the M113 armoured personnel carrier.

Turkey boasts NATO's second largest army, which is equipped with relatively modern battle tanks, self-propelled artillery and an increasingly capable army aviation force. Reinforcing all these capabilities is the Turkish defence industry. Despite some setbacks, this industry is developing and producing indigenous weapons systems. However the countries NATO membership means that the Turkish military has been set up as a defensive force to repel and absorb an invasion and is not predominantly configured to go onto the offensive.

Turkey's biggest problem which has acted as a drain on the overall armed forces is conscription. Conscription is mandated by the Turkish Constitution, but the legislature determines how it will be enacted. Currently, a healthy Turkish man with no college education serves for 15 months. Prior to 2003, the minimum requirement was 18 months. On October 21st 2013 the Turkish government voted to reduce the amount of time conscripted soldiers are required to serve to a term of 12 months. There are further exceptions, such as men with college education have a shorter commitment of six to 12 months, and men over the age of 30 buying their way out of service for a fee. Thus conscripts constitute the majority of Turkish service members, comprising some 500,000 soldiers. With such a short service time, many conscripts fail to gain experience after their basic training. As a result, the Turkish military has a small professional core surrounded by huge lightly trained forces.

Air Force

Turkey's air force consists of modern combat fighters dominated by the F-16, supplemented by 152 F-4 Phantoms, a 1960's jet. The Turkish air force trains intensively with US and NATO instructors on F-16 operations. It is now competent enough to train other air forces, such as those of Chile and the UAE, in those same F-16 operations.



Turkey continues to assemble F-16's under licence, however Turkey has ambitious plans for Turkish Aerospace Industries (TAI) to reduce dependence on US-produced fighter jets. In 2010 SSM provided TAI with $20 million, to design a new fighter aircraft, which TAI might then develop and produce in partnership with a foreign company by 2020. This ambitious undertaking has however been undermined by the Turkish governments selection of the F-35 Joint Strike Fighter Lightning II as one of its next-generation fighter aircraft types. Many Turkish companies are members of the Joint Strike Fighter consortium of nine Western countries, and are producing parts for the aircraft. Turkey will also receive 30 modern F-16 Block 50 fighters from Lockheed Martin as a stopgap solution until F-35 deliveries begin around 2015.

In 2010, Turkish Aerospace Industries (TAI) presented the first medium-altitude long-endurance (MALE) unmanned aerial vehicle (UAV) produced by a Turkish company. It is likely to be acquired not only by the Turkish Air Force but also by the Army and Navy, which altogether currently employ more than 200 MALE and Mini-UAVs.

Plans are afoot by Turkey's defence industry to indigenously develop its own air platforms. These include the T-129 Attack Helicopter – A joint program between Turkey and the Italian-British firm Agusta Westland, the T-129 is an attack gunship helicopter derived from the Agusta A-129 "Mongoose." Under the agreement Turkey will manufacture nearly 100 units.

Turkey's most ambitious and most expensive development program, the TFX is a Fifth-Generation stealth Fighter, expected to begin its test flights in 2023 the TFX is a next-generation fighter program in cooperation with Sweden's Saab, and designed to replace Turkey's fleet of F-16C/Ds starting in the 2020s.

Navy

Turkey currently has around 111 commissioned ships in the navy (excluding minor auxiliary vessels), these include; 17 frigates, 7 corvettes, 14 submarines, 27 missile boats, 22 patrol boats, 20 mine countermeasures vessels, 5 landing ships, and various auxiliary ships. Whilst this is a robust navy making it the most powerful fleet in the Middle East and North Africa, most of the platforms are ageing.

Turkey's largest ships are its 17 Frigates of the Gabya class with a water displacement of 4,100 tonnes. These are extensively modernized versions of ex-Oliver Hazard Perry class guided-missile frigates, mainly designed for air defence with a weapons configuration that is optimized for general warfare. The Oliver Hazard Perry class warships were designed in the US in the mid-1970s as general-purpose escort vessels inexpensive enough to be bought in large quantities to replace World War II-era destroyers.

Turkey's 14 submarines consist of 6 Atlay-class diesel-electric attack submarines developed exclusively for export by Howaldtswerke-Deutsche Werft of Germany. The original was designed in the late 1960s. Despite not being operated by the German Navy, five variants of the class were successfully exported to 13 countries, with 61 submarines being built and commissioned between 1971 and 2008.

Whilst the Turkish Navy does possess capability relative to the region these are some generations behind the world's powers. Plans are afoot for Turkeys defence industry to perform all the design and system integration of all naval ships in local shipyards, using indigenous capabilities. For the moment these have been limited to patrol and anti-submarine warfare and new type patrol boats.

The Area Air Defence Frigate "TF-2000" is an integral part of Turkey's naval modernisation program, the country will construct up to eight large multi-role warships with medium-to-long-range air defence capabilities. The program is expected to cost $7billion.

Conclusions

Turkey's armed forces are dominated by a land centric structure, which historically has been overwhelmingly defensive. The armed forces have been heavily involved in domestic politics and have spent significant years in power when it conducted military coups against civilian rulers. Maintaining internal stability, maintaining the power and influence of the army, protecting Mustafa Kemal's ideal of secularism has dominated the posture of the army who have effectively spent most of its history policing internal dissent. As a result the Turkish armed forces have only recently (since 2000) transitioned to a more mobile force and moved away from static structures. This is also

the reason why Turkey has no asymmetric or irregular forces. As such tactics are used for offensive manoeuvres.

Turkey's membership of NATO has only added to its armed forces remaining defensive in nature. Membership of NATO entails training scenarios in areas for which NATO has been established for. NATO was initially created to defend against the Soviet Union which is fundamentally a defensive operation in holding a static line against any Soviet advance. Once the Soviet Union collapsed NATO has gone through a period introspection but was deployed in Kosovo and then in the Afghan war. In Kosovo, NATO's mandate was to hold territories and ensure these were not taken by the Serb forces – a defensive operation. Similarly in Afghanistan most NATO forces were part of national forces holding territory.

Membership of NATO requires the integration of national forces into the overall structure of NATO's posture. As a result Turkey partakes in NATO operations which has forced it to develop capabilities suited to NATO operations rather than its own needs. A case in point is its air force, it assembled the F-16 and produced the fuselage and wings and has become experienced in conducting operations with this combat capability, this has however created a dependency on the US, which will be difficult to untangle.

Turkey continues to accept NATO's nuclear guarantee. Turkey received US nuclear gravity bombs and dual-capable US aircraft at its NATO air bases in 1957, followed by US medium-range Jupiter ballistic missiles in 1959. Today Turkey has no indigenous WMD capability, only in May2013, was a Japanese-French consortium selected to build Turkey's second nuclear power plant.[47]

3. Iran

Iran, and Persia before it, has played a recurring role in the global balance of power. Iran's basic challenge as a nation stems from a number of factors. Iran is the 17th largest country in world. It measures 1,684,000 square kilometres. This is larger than the combined territories of France, Germany, Holland, Belgium, Spain and Portugal. Iran is the 16th most populous country in the world, with around 76 million people. Its population is larger than the populations of France or the UK.

Iran, since the discovery of oil in the 19th and 20th century has been a key player in the region, oil remains Iran's most important and most strategic export. Oil is found in three locations: The southwest is the major region, with lesser deposits along the Iraqi border in the north and one near Qom. The south-western oil fields are an extension of the geological formation that created the oil fields in the Kurdish region of northern Iraq. Hence, the region east of the Shatt al-Arab is of critical importance to Iran. Iran has the third largest oil reserves in the world and is the world's fourth largest producer. Iran also possesses the world's largest Gas field – the South Pars, making it one of the world's largest gas producers.

Such wealth also attracted other powers to the region. The intrusion of European imperial powers into the region compounded Iran's difficulties in the 19th century, along with the lodging of British power to Iran's west in Iraq and the Arabian Peninsula following the end of World War I. This coincided with a transformation of the global economy to an oil-based system. Then as now, the region was a major source of global oil. Following World War II, the Americans and the Soviets became the outside powers who interfered in the region, but Tehran's basic strategic reality persisted. Iran faced both regional and global threats that it had to deflect or align with.

Whether ruled by the shah or ayatollah, Iran's basic challenge has remained the same: become the regional power with its resources, protect with defensive forces in order to deter foreign powers with eyes on the region, and engage in complex diplomatic manoeuvres.

Doctrine

Iran's doctrine under the Shah consisted of a large land force with modern equipment. The Iranian military, while very well armed and trained at this point was totally reliant on external suppliers for its equipment. By 1978 Iran had the world's 5th strongest and largest army and was the clear undisputed regional power.

When the revolution took place in 1979 the Iranian military experienced a 60% desertion from its ranks. The new revolutionary government sought to strengthen its domestic situation by conducting a purge of senior military personnel closely associated with the Pahlavi dynasty. As a result when Iraq invaded, Iran was at a severe qualitative disadvantage compared to Saddam Hussein's forces. In the years immediately preceding the war, Iraq had spent significant resources building a very capable military equipped with the most modern Soviet equipment available at the time. On the Iranian side, revolutionary forces had purged or executed much of the senior leadership of the Iranian military in the aftermath of the 1979 Revolution. As a result, when Iraq invaded Iran, it quickly became apparent that Iraqi forces were better equipped, better led, and much more capable. As a result of these combat experiences, the Iranian regime recognized that it fundamentally cannot and will not be able to compete with any of its adversaries in a head-to-head conventional conflict. The results of the Second Gulf War of 2003, in particular the use of precision guided munitions including cruise missiles, strongly reinforced this understanding. The asymmetric tactics the Iranian regime adopted during the Iran-Iraq war have become the foundation for the entire Iranian military doctrine.

The basis of Iran's current military doctrine was developed during the long Iran-Iraq war (1980-1988). Concepts such as self-reliance, holy defence and export of the revolution first entered the military lexicon during the Iran-Iraq War and were codified as doctrine in the early 1990s. These ideas mingled with concepts from pre-revolutionary doctrine, which was heavily influenced by the US, to form a unique hybrid that distinguished modern Iranian military doctrine from its largely Soviet-inspired counterparts in the Arab world.

With an effective embargo on military sales Iran's armed forces were tailored with war-fighting strategies to counter technologically superior adversaries, such as the US. Tacitly acknowledging it has little chance of winning a conventional force-on-force conflict, Iran opted for deterrence-based model of attrition warfare that raises an opponent's risks and costs, rather than reducing its own. The goal is to inflict a psychological defeat that inhibits an enemy's willingness to fight.

Asymmetric warfare now plays a central role in Iranian military and strategic doctrine. Iran's armed forces are focused on the development of niche capabilities that play to Iranian strengths - manpower, strategic depth and a willingness to accept casualties, while exploiting the weaknesses of adversaries, who are regarded as risk averse, casualty sensitive and heavily dependent on technology and regional basing facilities for access.

After the war with Iraq, Tehran gradually scaled back its efforts to export its revolution. As its foreign policy goals shifted, Iran's national security strategy also became more defensive. Iranian military strategists began to pay more attention to the principles of modern manoeuvre warfare, such as combined and joint operations. In the mid-1990s, there was even talk about merging its irregular forces with the regular military, to alleviate the command and control-related problems of having two parallel military services operating in tandem. Iran's military capabilities still lag behind its doctrine, but by 2000 its forces were gradually evolving into a professional force

Industrial Base

Iran's defence industrial base is dominated by the ministry of defence, consisting of 5 key organisations and a number of smaller companies that act as suppliers of critical components. Iran's military industry was born under the last Shah of Iran, Mohammad Reza Pahlavi through an import substitution strategy. Iran has learnt to produce, assemble, repair and maintain military equipment. Beginning in the mid-1970's, Iran signed co-production agreements for licensed manufacture of aircraft, helicopters, surface-to-air missiles, and computer and electro-optic equipment.

All military factories were placed under the Military Industries Organization (MIO) of the Ministry of War. Over a period of fifteen years, military plants produced small arms ammunition, batteries, tires, copper products, explosives, and mortar rounds and fuses. They also produced rifles and machine guns under West German license. In addition, helicopters, jeeps, trucks, and trailers were assembled from imported kits.

Iran was on its way to manufacturing rocket launchers, rockets, gun barrels, and grenades, when the Islamic Revolution halted all military activities. The MIO, plagued by the upheavals of the time, was unable to operate without foreign specialists and technicians. By 1981 it had lost much of its management ability and control over its industrial facilities. By 1990, there were over 240 factories and some 12,000 privately owned smaller concerns producing armaments, employing nearly 45,000 people.

After the Islamic revolution and the start of the Iran–Iraq War, economic sanctions and an international arms embargo led by the US coupled with a high demand for military hardware forced Iran to rely on its domestic arms industry for repair and spare parts. The Islamic Revolutionary Guards Corps (IRGC) was put in charge of re-organising the domestic military industry. Under their command Iran's military industry was dramatically expanded, and with the Ministry of Defence pouring capital into the missile industry, Iran soon had an arsenal of missiles.

Iran's defence base is organised around 5 key organizations:

Defence Industries Organization (DIO) – Founded in 1981 in a post-revolutionary effort to reorganize and expand Iran's defence industry. Consisting of a conglomerate of companies run by the regime whose function is to provide the military with the necessary manufacturing capacity and technical abilities. Since 1992, it the DIO has produced tanks, armoured personnel carriers a submarine and a fighter plane.

The Iranian Space Agency (ISA) **–** This government agency manufactures and launches national research satellites, guided missiles systems, approves space related state and private sector programs.

Aviation Industries Organization Aircraft (IAIO) - Currently, the IAIO is responsible for directing five aviation organizations: SAHA, HESA, PANHA, GHODS and Shahid Basir Industry. These five organizations have different and complementary roles in the Iranian defence industry and Iranian civil aviation and have progressed with the exception of Ghods, from repair and

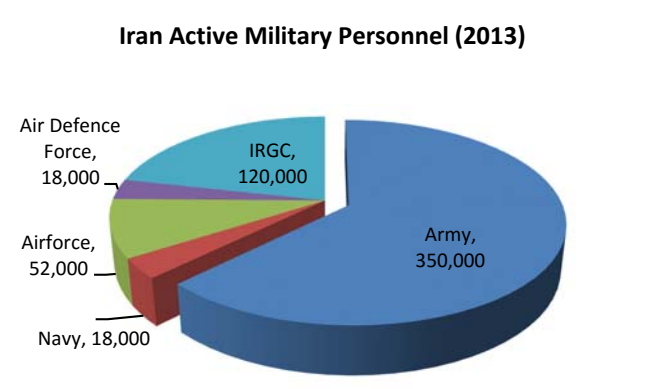
maintenance facilities to larger defence enterprises with several thousand employees. This agency has been responsible for Iran's indigenously designed and manufactured Azarakhsh and Saeqeh fighter jet to the mass production and launch of helicopters, turboprops, and passenger planes.

Marine Industries Organization Ships (MIOS) – This agency operates two companies - SADRA and Iran Shipbuilding & Offshore Industries Complex Co (ISOICO). SADRA has established itself as the leading shipbuilding and ship repairing company in Iran. SADRA specializes in building ships, docks and floating oil rigs. Iran Shipbuilding & Offshore Industries Complex Co (ISOICO) operates one ship yard,

Iran Electronics Industries Electronics (IEI) – This is a state owned subsidiary with operations in electronics, optics, electro-optics, communications, computer and semiconductors. The company currently maintains six further subsidiaries which are each responsible for operational scopes in high-tech fields

Ground Forces

Iran's armed forces consist of 520,000 active personnel, with reserves of 1.8 million. Its armed forces are made up of:



Iran's ground forces are organised into four corps, with four armoured divisions and six infantry divisions.

Iran also has a parallel paramilitary force - the Islamic Revolution Guard Corps (IRGC), which has an estimated 120,000 personnel, with its own Navy, Aerospace Force, and Ground Forces; and the Quds Force (Special Forces).

Iran's tank inventory consists of around 1,620 tanks, with its main battle tank 422 Soviet T72's and around 150 indigenous Zulfiqar MBTs. The remainder of Iran's tank inventory includes elderly British-made Chieftains, US made M-60s and Soviet-made T-54's, T-55s, T-59s and T-62s. These tanks were all captured from the Iraqis or acquired from North Korea and China. As many of these tanks are from the 1950's and 1960's their serviceability may be in doubt.

CASE STUDY – The Zulfiqar Tank

The Zulfiqar is the defence industry of Iran's most recent Main Battle Tank, named after the twin-pointed sword of Ali (RA). Born as the brainchild of Brigadier General Mir-Younes Masoumzadeh, deputy ground force commander for research and self-sufficiency of the armed forces, the vehicle has been developed from major components of the American M-48 tank. One of the features which has drawn the attention of the Defence Ministry is that indigenously-made parts have been used in it. The prototypes of the tank were tested in 1993. Six semi-industrial prototypes were produced and tested in 1997. The International Institute of Strategic Studies estimates that around 150 Zulfiqar 1's are now in service.

For mobility Iran has around 640 Armoured Personnel Carriers. Iran has been able to indigenously develop its own APC – the Boraq. This was reverse engineered and is an upgraded model of the Chinese Type 86 (BMP-1). The upgrades include a reduction in weight, a higher road speed, and stronger armour. The vehicle is fully amphibious and is fitted with an NBC protection system and infra-red night vision equipment. Iran's main APC is its 200 US M113 from the Vietnam era.

Whilst Iran's land forces are equipped, the vast majority of its major land weapons are aging, of low to moderate capability and lack modernization. Iran's land force posture still reflects a deep fear of US-led invasion that reached a height in years after the US invasion of Iraq in 2003. The Iranian Army is now trained and organized for defence in depth. Iran has large enough ground forces to make any US invasion of Iran problematic. It is not equipped to manoeuvre long distances outside of Iran or to sustain intensive operations outside the country. For this Iran has focused on its asymmetric capabilities. Iran does have large elements of its conventional forces supplement the forces it is developing for asymmetric warfare.

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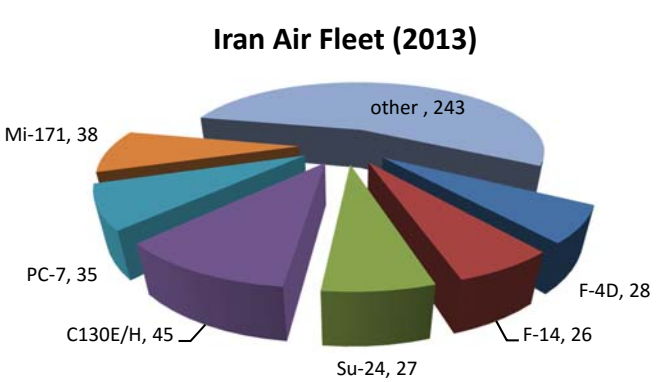
Iran has reduced the degree of separation between force elements, and practiced defensive operations where its regular forces first fight an invading enemy with support from the IRGC, and then disperse and join the IRGC in a more asymmetric form of lasting national warfare to defeat any initial successes by the invader. The regular army also has a number of independent brigades and groups. These include some small armoured units, one infantry brigade, one airborne and two to three Special Forces brigades, coastal defence units, a growing number of air-defence groups, five artillery brigades/regiments, four to six army aviation units, and a growing number of logistic and supply formations. The land forces have six major garrisons and 13 major caserns.

Air Force

Iran's air force has attempted to maintain in service the large number of American-built aircraft which it acquired during the Shah's regime. The Air Force then turned to purchases of Soviet and Chinese aircraft, as well as pressing ex-Iraqi aircraft into service. It has also attempted with little success to indigenously build aircraft, in order to maintain a capable force.

Iran's aircraft industries have managed to indigenously develop second and third generation aircrafts. The Saeqeh single-seat jet fighter, derived from the American Northrop F-5, is Iran's most modern indigenously developed jet, it is the second generation of the Iranian Azarakhsh fighters. Only 6 of these are known to have ever been produced.

Iran's combat capability consists largely of Soviet Su 24's from the 1970's. Whilst American F-14 Tomcat's from the 1970's and the 1960's McDonnell Douglas F-4 Phantom's form Iran's combat capability. Serviceability may be as low as around 60% for US aircraft types and 80% for Russian aircraft.



World Air Forces 2013, Flight Global Insight

Iran possesses more rotary aircraft then it does fixed wing aircraft. These are overwhelmingly dominated by US Cobra's from the 1970's. Most of these were delivered before the 1979 revolution, making them over three decades old. Iran has also been successful in developing unmanned aerial drones - UAV's, the Mohajer series of unmanned aerial vehicles is built completely by Iran and operated by Iran and Hezbollah. The Mohajer is primarily used to spy on military installations, enemy positions and is capable of guiding laser-guided munitions to their targets.

Iran's air force is extremely weak, lacking capability. Its aircrafts are mainly second generation with the rest of the world constructing fourth generation jets. Iran's air defence forces are the weakest link in the overall defence posture. This situation will remain until the modernisation of Iran's aircrafts occur where the numbers of such aircraft increase and the training of its pilots and depth of its repair parts inventory improve. The majority of the inventory of the replacements to its aging US manufactured fighters and fighter-bombers is a mix of Russian and Chinese aircraft. Iran remains vulnerable to attack from the air due to the poor state of its air defences.

Iran got around this problem by building up its strategic missiles. Iran's strategic weapons development program is its top military priority; by all indications, the portion of the budget devoted to this program remains substantial despite the fact that severe financial pressures have forced major cuts elsewhere.

Overall Iran continues to maintain its very old and aging equipment and even the best of Iran's platforms have limited capabilities relative to almost any comparable US Navy platform, in terms of weapons range, speed, countermeasures and detection range.

WMD's

Iran has continued in its endeavours to develop a nuclear device. It continues to enrich Uranium, but has struggled to enrich its stock of uranium to 95%, the amount required for a nuclear device. Much of this has been down to the quality of Iran's centrifuge technology. Due to sanctions Iran's has been unable to procure the various parts needed to develop high quality centrifuges and this continues to delay the development of a crude nuclear device.

Iran’s most successful military development has been in the realm of missiles. In 1991 Iran announced the first domestic production of ballistic missiles. Iran’s inability to modernise its airpower has meant its air defence is weak, due to this Iran built up its strategic missile forces as a cost effective way of countering the stronger air forces of its neighbours in order to compensate for its weakness in this area.

The Iranian leadership has stated that it operates several thousand short and medium range mobile ballistic missiles, including the Shahab-3 with a range of up to 2,100 kilometres, which is the mainstay of Iran’s strategic deterrent. The Iranian military industry started the missile development program in earnest during Iran's long and costly war with Iraq. At times, throughout the war Iran found that it could not strike certain Iraqi facilities or targets with its own forces. This resulted in an ambitious missile development programme that is still continuing. Today, Iran is developing space launch vehicles and sophisticated medium-range ballistic missiles. Iran’s ballistic missiles possess the capability to deliver a variety of conventional high explosives in its region and beyond.

The Shahab series of missiles are an indigenous design derived from the basic Scud. Rooted in Soviet Scud technology, which is based upon Nazi V-2 technology the Shahab series of missiles are accurate enough to hit specific large-area targets such as airports or port facilities and has a big enough payload to cause significant damage. There are a number of derivative designs of the Shahab series, including the Qiam 1 and the Ghadr-110, but for all practical purposes these can be considered part of the Shahab series of missiles. The Shahab-1 and Shahab-2 are essentially updated Scud missiles, and are classified as Short Range Ballistic Missiles (SRBM), but the Shahab-3 and Shahab-4 are much more capable versions and represent a significant improvement in range, payload, and accuracy. The Shahab-3 was the first Medium Range Ballistic missiles (MRBM) in the Iranian inventory. The Shahab-4, which is still under development, will have an increased range of 2000 kilometres.

The Sejil series of missiles are a derivative upgrade of the Shahab series of missiles with some important technological improvements. The most consequential feature of the Sejil series of missiles is that they are powered with solid fuel, giving them a significant operational advantage over the standard liquid-fuelled Shahab. Because solid-fuelled missiles are ready-fuelled, they do not need a separate liquid fuelling process. Therefore, solid-fuelled missiles have a much shorter launch cycle than liquid-fuelled missiles. In terms of range, the baseline Sejil is roughly comparable to the Shahab-4 and is classified as a Medium Range Ballistic Missile. In terms of operational effectiveness, it is significantly more lethal, as it has a shorter shoot cycle and is faster, giving missile defences less time to react. The Sajji-l purportedly incorporates two stages and solid fuel — both of which are significant steps in Iran’s missile program. Iran claims that it has a range of 1,200 km and significantly improved accuracy. This missile has been successfully tested.

Navy

The entire Iranian Navy fleet numbers about 175 combatant and logistics vessels. Of these, less than ten of the combatant vessels are over 750 tons displacement. Iran's navy is currently only equipped for short-range, asymmetric warfare, with numerous small, short-range vessels, but has relatively few vessels capable of long-range deployments.

Iran's conventional navy force consists of 3 fleet submarines, 3 frigates, 2 corvettes, 11 missile patrol craft, 5 mine warfare ships, over 60 coastal and inshore patrol craft and some miniature submarines, as well as 13 amphibious ships. From 2000 the regular Iranian navy was in a state of overall obsolescence and in poor shape because they had not been equipped with modern ships and weapons. The readiness of the three frigates is doubtful, and the two nearly 40-year-old corvettes do not have sophisticated weapons. The readiness of navy's three frigates is doubtful, and the two nearly 40-year-old corvettes do not have sophisticated weapons. As a result Iran's blue-water (non-coastal) capabilities are extremely limited. Its warships must be accompanied by a specialist ship, especially when venturing far. The other craft the Iranians use to project naval force is a replenishment vessel that provides fuel, food, fresh water and ammunition for extended deployments. This vessel is the Kharg, an aging Ol-class design built in the United Kingdom in the late 1970s and delivered to the Iranians in 1984. Without this vessel, the small number of Iranian frigates would be unable to embark on extended deployments without consistent and frequent port visits along the way, a method that the Iranians cannot rely on for long distance missions.

Iran lacks modern conventional naval forces with the exception of its submarines and some of its missile patrol boats. Iran has focussed more upon asymmetric capabilities when it comes to the sea. Whilst Iran's conventional naval forces are large enough to present a challenge during the initial phases of any major clashes. Iran has minelayers, as well as advanced mines that can be delivered by any surface vessel – including the stream of dhows that constantly crosses the Gulf. Most of the countries naval elements lend themselves to asymmetric warfare.

Whilst most Navies use a model of readiness based on highly trained personnel, equipped with advanced communications, transportation, and weapons systems, with significant time dedicated to complex training scenarios. The Iranian military recognizes that it cannot compete with potential adversaries. As a result, the entire Iranian military model of readiness is based on the concept of asymmetric warfare. This is largely a result of lessons learned during the Iran–Iraq war of 1980-1988.

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Because of this commitment to asymmetric warfare, the inability to purchase conventional maritime vessels from international vendors, and a lack of industrial capacity to produce conventional maritime vessels indigenously, Iran in the 1980s focused on obtaining or producing hundreds of smaller craft capable of conducting swarm attacks,

laying mines, and other asymmetric tactics. The Iranian model of maritime readiness, for both the IRIN and IRGCN, reflects this strategy of asymmetric warfare.

Islamic Revolutionary Guard Corps (IRGC)

Iran compensated its inability to modernize its conventional forces, the delays in its military production efforts, and the limits on its arms by building up different kinds of military force. Central to this has been the Islamic Revolutionary Guards Corps, viewed as the most loyal guardians of the ruling system, comprising around 125,000 men.

The IRGC was formed in May 1979 following the Iranian revolution in an effort to consolidate several paramilitary forces into a single force loyal to the new regime and to function as a counter to the influence and power of the regular military. Although the IRGC operates independently of the regular armed forces, it is effectively a military force in its own right due to its important role in Iranian defence. The IRGC consists of ground, naval, and aviation troops, which parallel the structure of the regular military. It is the most influential institution in the Iranian political system. To a large extent, Iran's ability to project power internationally and maintain domestic stability rests with this elite military institution.

Also contained under the umbrella of the more unconventional forces, are the Basij Forces (Mobilisation Resistance Force), a network of potentially up to a million active individuals who could be called upon in times of need. The Basij could be committed to assist in the defence of the country against internal or external threats, but by 2008 it had also been deployed in mobilising voters in elections and alleged tampering during such activities. Another element is the Qods Force, a special forces element tasked with unconventional warfare roles and known to be involved providing assistance and training to various militant organisations around the world.

Being a small force and not restricted to conventional army formations the IRGC is Iran’s main weapon in its region. Its importance can also been seen from the fact the IRGC air force operates Iran’s ballistic missile forces.

Conclusions

Iran as a nation is reliant upon its missiles and irregular forces to defend the nations from any foreign threat. Its conventional forces are poorly trained and poorly equipped and it is qualitatively outmatched by its irregular forces. Having advanced irregular forces gives Iran many advantages over its adversaries.

With a smaller irregular force Iran can deploy troops much more quickly as deployments will be smaller and not mechanised. This will give it a significant advantage over any adversary who will have to deploy large forces, with much more heavier equipment, which will delay any intervention. Irregular forces are also cheaper to maintain as they make use of lighter weapons and technology.
Unlike the US army, the Iranian forces do not require complex exercises to maintain readiness. Given that Iranian patrol boats, warships, and submarines are in position to fire their weapons as soon as they get underway from their home ports, the asymmetric maritime warfare model of Iran

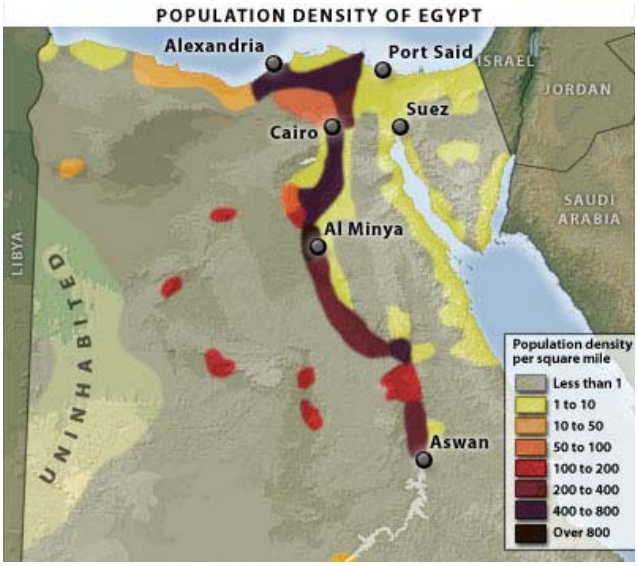
assumes that any maritime conflict will be fought at close range, without complex interdependent positioning of ships beforehand. Numbers and speed will be of greater importance in this context than advanced training.

Because Iranian maritime strategy does not require long-range deployments or complex, simultaneous ship movements at sea, Iranian naval exercises are focused on exercising basic capabilities, ensuring that if the conventional navy and IRGC navy need to fight, they can execute their short-range, short-duration, and technologically simple asymmetric warfare tactics capably. The conventional navy and IRGC navy are nowhere near as capable at traditional maritime combat as the US Navy, but they do not need to be; they only need to be capable of reliably exercising simple asymmetric tactics.

Iran's military strategy rests on a number of assumptions, it assumes state-on-state warfare is an impossibility, which is the Achilles heel of any asymmetric strategy. Due to this strategy Iran has neglected and struggled to modernise is conventional forces. The costs involved are too high for Iran's economy and budget to bear and as a result investment has all been in its asymmetric capabilities.

4. Egypt

As a nation modern day Egypt occupies over 1 million square kilometres (386,000 square miles) twice the size of France, but most of its territory is wasteland dessert. Just less than 35% of the 1 million square kilometres, a land area roughly the size of Belgium, is actually inhabited. This tiny portion of massive Egypt, from the Aswan High Dam to the Mediterranean shore is the Egypt's core and home to 99% of the nation's population of 83 million. Egypt which has the largest population of any country in Africa or Middle East is stretched thin, clinging to the banks of the Nile River in a strip that is almost always less than 30 kilometres (18 miles) wide.



Egypt does not have much territory to defend, however the small strip that travels the length and breadth of the country alongside the river Nile is the lifeline of Egypt and defending it when it can be attacked from the Mediterranean or the Red sea, has always represented Egypt's basic challenge.

Doctrine

When the Free officers overthrew King Farooq in 1952, they inherited an army that was organised on British formations. Strictly regimented, separated from civilian life, army personnel were isolated in barracks, military schools and training camps. Maintaining discipline with a strict punishment regime, soldiers were interned and isolated from outside influences.

Until the 1967 war with Israel, Egypt's military doctrine was centred on securing Egypt's key territories. Army formations were divided into four regional commands - the Suez, Sinai, Nile Delta, and Nile Valley up to the Sudan. The remainder of Egypt's territory, over 75%, was the sole responsibility of the small frontier Corps. Internal stability was the priority for Nasser leaving coastal defence to a small frontier force.

After the 1967 humiliation, the army was reorganised and a reorientation took place in Egypt's military posture. Two further field armies were organised from the existing ground forces - the Second Army and the Third Army, both of which were stationed in the eastern part of the country.
The Egyptian war doctrine, derived from Britain, was not suited to the battle problem Israel posed. In 1967, Israel was considered to have won its most complete victory over Egypt, as well as Jordan and Syria.

After the 1967 war and throughout the 1970's Soviet arms flowed into Egypt which also led to the restructuring of the Egyptian army which for centuries had been designed almost wholly for domestic control. This new posture led to the shock invasion of Israel in the 1973 war, where Israel was caught completely off guard. In a winning position Anwar Sadat pursued peace negotiations

and thus failed to push home the advantage gained from the territories captured from the 1967 war. In 1979 the Israeli-Egypt peace deal was signed, which normalised relations between the two countries, eventually leading to the Israeli's to withdrawal from the Sinai, leaving it as a demilitarized zone. State-to-state warfare effectively came to an end between the two countries.

Anwar Sadat's assassination in 1981 led to a state of emergency which remained in place for decades. This led to the army's posture to turn inwards and effectively protect the military regime from the people. This also led to the military to involve itself in the industrial and service sectors, including weapons, electronics, consumer products, infrastructure development, agribusinesses, aviation, tourism and security. Today the Egyptian military is considered to control up to 40% of the national economy.[48] These economic interests weaken the army's ability to wage war and effectively politicise the armed forces who today are heavily involved in the politics of the country.

The Arab spring only confirmed to Egypt's senior officers that the military doctrine should remain focused towards internal cohesion, which will ensure the continuation of the military regime.

Industrial Base

The Egyptian army is an institution - largely self-sustained through enterprises such as farms, factories, hospitals and the like with the dual purpose of defending the nation against external threats and preserving domestic stability. Egypt is the most important manufacturer of weapons and military components among the Arab countries. State-owned enterprises, under control of the Armament Authority headed by a major general, are the main domestic producers of Egypt's defence systems. The Armament Authority is responsible for selecting, developing, and procuring military systems. Acting on behalf of the military's branches, the authority assigns production to domestic factories or to external suppliers.

The National Organisation for Military Production within the Ministry of Military Production supervises a number of manufacturing plants, which are usually named after their location. These plants are:

- Abu Zaabal Company for Engineering Industries, which produces artillery pieces and barrels
- Abu Zaabal Tank Repair Factory, which overhauls and repairs tanks
- Al Maadi Company for Engineering Industries, which produces light weapons, including the Egyptian version of the Soviet AK-47 assault rifle
- Hulwan Company for Machine Tools, which produces mortars and rocket launchers
- Hulwan Company for Engineering Industries, which produces metal parts for ammunition, shells, bombs, and rockets
- Heliopolis Company for Chemical Industries, which produces artillery ordnance, bombs, and missile warheads
- Banha Company for Electronic Industries, which produces communications devices.

Ground Forces

The Egyptian army has a force of 468,500 active personnel, with reserves of 479,000. It is a land centric army, with the ground forces overwhelmingly dominating the whole force. The army formations consists of 3 field army units spread over 9 military bases consisting of armour, artillery and mechanized units. Egypt's armed forces equipment consists mainly of US equipment and older Soviet systems.

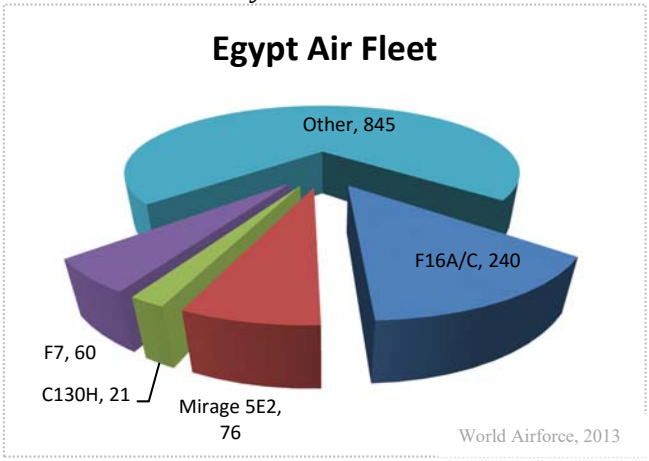
Egypt's 4,145 tanks are composed of 1,716 M60 Patton, first generation tanks. Another 1,130 tanks are the US M1 Abrams tank, most of these however are not used and remain in storage.[49] The M60 Patton was excess German stocks left after reunification took place. These have undergone several upgrades, including, new engines, extensive armour addition, armoured side skirts, fire control system with ballistics computers, infrared vision device, laser rangefinder and upgraded gun stabiliser. Egypt has produced the M1 Abrams tank on licence from the US, this involves kit assembly in Egypt but sensitive functions like adding armour are undertaken outside Egypt.

Egypt's Armoured Personnel Carriers (APC) are also from the Vietnam era and consist of Soviet and US platforms. The ground forces mobility is through 2,447 M113 APC's, made by the US during the Vietnam War. Egypt also has around 1000 variants of Soviet APC's of the Brone transporter class. Many of these were developed in the 1950's. Besides these the Egyptian army also has 57,235 logistical vehicles for its land centric force.

The Egyptian military is heavily involved in domestic politics and the domestic economy and thus plays a large internal role. Since ensuing peace with Israel in 1979, the Egyptian army has been more focussed on internal security in order to ensure its dominant position remains. For the small geography Egypt needs to defend – Just 35% of the nation's 1 million square kilometres is actually inhabited. The size of Egypt's ground forces is massively disproportionate and a huge strain on it's the nation's finances. Shana Marshall of the Institute of Middle East Studies at George Washington University highlighted: *"There's no conceivable scenario in which they'd need all those tanks short of an alien invasion."*[50]

Air force

The Egypt armed forces are dominated by its land forces, as a result its air force plays a small role in the overall military posture. Since 1977 it has seen virtually no combat, but has participated in numerous exercises. Egypt's combat aircrafts are dominated by 240 US F-16's, and then 76



French Mirages from the 1960's.

In 1962 Egypt undertook a major program with the help of West German technicians to design and build a supersonic jet fighter, but the government terminated the project because of financial strains caused by the 1967 Six day war with Israel. Egypt has crashed more F-16s than any other operator of them and the training of its pilots is considered by all experts as inadequate.[51] The Egyptian military thereafter focused on co-production deals and producing weapons systems on license.

CAST STUDY – Egypt's Struggle for Indigenous Capability

As early as 1949, Egypt unveiled plans to develop its own aircraft and armaments industry with the industrial base that emerged during World War II when British and American forces placed orders for equipment. Egypt entered into a number of joint venture projects to produce European-designed aircraft. The most successful of these led to the Jumhuriya basic flight trainer, of which about 200 were eventually made. In 1962 Egypt undertook a major program with the help of West German technicians to design and build a supersonic jet fighter, but the government terminated the project because of financial strains caused by the 1967 Six day war with Israel. In a separate program assisted by West German scientists and technicians, the air force built prototypes of three submarine designs. These designs, however, were never put into operational use. Egypt has ever since focussed on co-production deals or producing weapons systems on licence. This involves the assembling of kit provided by a foreign country but in Egypt's case, no technology transfer has taken place be it the M1 Abrams tank or the F-16.

Navy

The Egyptian navy is a young force. It was set up in the 1960's and was largely under neglect for more than a decade. The majority of the Egyptian Navy was created with the help of the Soviet Union and received ships in the 1980's from China and other western sources. The Egyptian Navy (EN) and coast guard currently consists of 221 ships and craft.

The Egyptian navy consists of 4 Romeo class submarines, which are a class of Soviet diesel-electric submarines, built in the 1950s. Only 20 of the Soviet Union's originally intended 56 were completed between 1957 and 1961 because of the introduction of nuclear submarines into the Soviet Navy. By today's standards Romeo class submarines are considered obsolete, but still have some value as training and surveillance vessels. Egypt's navy also possesses 10 Frigates of various classes all from the 1960's and 1970's

Overall considering Egypt has a coastline of 2000 km to protect it is an extremely small navy.

Conclusions

The Egyptian Armed forces are highly politicised which has distracted from its role of national security. As a result the army leadership has focused on maintaining the army's role in the economy and its economic interests rather than developing a highly trained force with the capability to wage war. These economic interests have acted as an obstacle in the military's development as was highlighted by Robert Springborg, Middle East expert at the Naval Postgraduate School in Monterey, California. He highlighted: *"It is a huge military by developing world standards, but its quality is not very good. It has crashed more F-16s than any other operator of them. The training of its pilots is inadequate. Much of the armour that is very expensive for it, including the M1-A1 tanks, has actually never been used – it's in storage.*[52]

The Egyptian military has played a central role in protecting US interests in the region ever since the military coup in 1952, the US has showered the Egyptian military with bribe money (aid) in excess of $30 billion to maintain the balance of power in the region through normalizing relations with Israel.[53] The greater the role the US has taken in building up and sustaining Egypt's army the greater the influence American has had on Egypt's posture. That influence has translated into making Egypt a manpower and resource intensive force. This has ensured that Washington maintains control over the countries strategic and decisive capabilities.

Egypt has also not pursued a WMD programme. In the era of Gamal Abdul Nasser Egypt took some tentative steps to acquire nuclear weapons, but his moves were obstructed by Russia and China. The Arab military defeat in 1967 led to the conviction that a nuclear Middle East would cause further instability and impact adversely on Egypt's quest for regional leadership. Since the 1970s, Egypt consistently advocated that the region become a Weapons of Mass Destruction Free Zone and has even sought to enhance its leadership role by promoting this agenda.

Whilst Egypt's forces are considered the strongest when measured relatively to the nations of Africa and the Middle East this metric does not encapsulate the fact that the regions militaries are generally weak and lack capability. The Egyptian forces purpose, posture, doctrine and capabilities are completely out of sync with what it can and should achieve. The Egyptian military is one of the largest in the world even though it is defending a territory smaller than Belgium. This large force rather than posture towards offensive operations is completely internal centric, to maintain the armies hold on the nation. Its only external focus is to protect US interests though protecting Israel. Every year, the US Congress appropriates more than $1 billion in military aid to Egypt. But that money never gets to Egypt. It goes to the Federal Reserve Bank of New York, then to a trust fund at the Treasury and, finally, out to US military contractors that make the tanks and fighter jets that ultimately get sent to Egypt.[54] Whether it's the US or Russia, Egypt's current military posture will only maintain this scenario no matter how much military equipment it purchases.

Egypt's relationship with the US has effectively rendered its posture ineffective. US military relationships are key tools in bringing different regions under its security umbrella. For the small geography Egypt needs to defend the size of its armed forces is disproportionate. Its large armed forces need to be trained and equipped and this is a tall order due to its size, with an economy not built upon its strengths much of this equipment is ageing and from three decades ago.

Muslim Military Capability

In analysing the current combat capabilities of the Muslim world the following can be deduced:-

Small defence industries – The military industries of much of the Muslim world are small and are unable to cater for the wide spectrum of weapons needed for a modern force. A modern defence industry includes the research, development, production and service of military materiel, equipment and facilities. Due to the small size of such industries critical gaps exist within the industries themselves. As much of the Muslim world have armed forces of over 1 million personnel the size of the defence industries cannot cater for these as a result older and cheaper weapons are used to equip forces. This has led to much of the Muslim world focusing to focus on the cheaper and lower end of the technology sophistication ladder such as guns, ammunition, grenades and artillery. The military industry is important because it is the heart of technological innovation. Common items such as the internet, the Teflon non-stick frying pan, plasma TV, Radio, personal computers and aeroplanes were all initially developed in military industries. When the defence industry is broken down it is in reality a supply chain that turn large sections of a country into an assembly line for the military-industrial complex. This brings jobs, contracts and money into every area of a country. Military technology is always generally ahead of other industries because military technology is at the higher end of the technology ladder due to its need to give a state a security advantage. Such technologies filter down to those industries considered the lower end of the technology ladder such as consumer industries which produce items such as fridges, air conditioners, automobiles and goods. This means a military industry can always be converted to meet consumer needs, whilst in times of war it can be quickly mobilised to meet the needs of war.

Platform Development – The Muslim world has struggled to develop its own military platforms. Developing an aircraft carrier, a fifth generation fighter jet or a missile defence system is a very expensive capital undertaking, which takes years to develop. As military systems can take decades to develop - It took 21 years for the F-22 raptor to be developed from inception to deployment. The costs involved, research needed and industrial facilities needed have been prohibitively expensive when they have been undertaken in the Muslim world. Iran, Pakistan and Turkey have been successful in developing single platforms but the costs involved have kept indigenous platform developing to a minimum. The result of this has been no development of the support industries needed to become self-sufficient and no development of the technical base needed to develop indigenous military platforms.

Reliance on foreign platforms – Unable to develop their own platforms the Muslim world has been forced to acquire of the shelf platforms. Due to the nature and length of defence contracts, they form and cement strategic relationships between participants. Defence contracts usually involve the production and delivery of platforms, as well as upgrades, repairs and maintenance over a number of years. Some contracts can include technology transfer too. America's F-16 is the jet much of the Muslim world possess as their strategic fighter jet, which has created a critical dependency on the US, which it has used to achieve its other strategic aims. This was encapsulated by Stratfor: *The greater the role the United States takes in building up and sustaining an ally's military force, as well as the more prominent and overt the US military's role in defensive scenarios and war plans, the greater the American influence will be in its allies' individual and collective defence. That influence can translate into significant US input in the structure, posture and disposition within an alliance. This can include orienting regional militaries to less critical, but manpower- or resource-intensive mission areas, while allowing Washington to focus on maintaining capabilities it considers more suited to its own interests and capabilities. This also ensures that Washington maintains control over strategic or decisive capabilities.*[55]

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US reliance - Much of the Islamic world has an unnecessary reliance on the US for its security needs. Saudi Arabia is dependent on US military assistance for its security needs. The United States Military Training Mission (USMTM) to Saudi Arabia is a Security Assistance Organization (SAO) which manages and is primarily funded by Foreign Military Sales (FMS) between the United States Government and the Kingdom of Saudi Arabia. The country's oil exports go through the shipping lanes of the Persian Gulf and are also protected by the US Fifth Fleet. Egypt has been the largest recipient of US military aid after Israel. General Anthony Zinni the former Commandant of the US Central Command (CENTCOM) once said, *"Egypt is the most important country in my area of responsibility because of the access it gives me to the region."* US relations with the Gulf States which include Kuwait, Bahrain the UAE and Qatar, rest on oil and security concerns. To facilitate this relationship of dependency the US has exploited the nuclear conflict with Iran and this has enabled America to retain bases and its destroyer ships active in the region with the aim of protecting the Gulf States from the alleged threat of Iran.

Military Equipment – The most advanced military industries in the Muslim lands **-** Pakistan, Turkey, Iran and Egypt, individually have combined military and internal security forces in excess of 1.5 million personnel. Keeping them well-equipped has proven to be a difficult task, this is why much of the military equipment utilized is extremely old. The basic infantry weapon of these

countries are from the 1950's and 1960's, with some considered obsolete by today's standards. Having large formations require huge stock of vehicles for mobility and armour for their protection. These vehicles need to be maintained, must be able to operate in diverse terrains – from the dessert heat in the Middle East, to the sub-zero temperatures in the Hindu Kush. Whilst Turkey, Iran and Pakistan have made some advances in Armoured Personnel Carriers, they still rely heavily upon vehicles for transportation from the Vietnam era. Having a large force requires them to be armed and transported, it requires new weapons and system to be introduced, inducted and integrated into the military's posture. Weapons systems that have been introduced have generally been more specialised requiring only a select section of the army to be trained for its use. There has been no communications revolution in Iran, Egypt, Turkey or Pakistan yet. Beyond Turkey who has adopted C^4ISR - Command, Control, Communications, Computers and Intelligence systems due to NATO, but Pakistan, Iran and Egypt continue to use outdated command systems which can be hacked. These countries have made some use of satellite communications, but these are insecure and inadequate for a modern force.

Training – The sheer size of the armed forces in the Muslim lands has not just impacted military equipment but also training and education. Having a large army means the adoption of new techniques, thinking and posture needs to be integrated into the armed forces and the pace at which all this is moving makes training even more complex.

Power projection capabilities - Power projection refers to the capacity of a country to conduct expeditionary warfare, i.e. to intimidate other nations and implement policy by means of force, or the threat thereof, in an area distant from its own territory. The US, Russia, France, Britain all do this and China and India are building their forces to achieve this. In the Muslim countries Turkey is at the beginning stage of trying to build power projection, Pakistan and Egypt currently lack power projection capabilities (Pakistan developed nuclear weapons due to this). Iran is the only country who has attempted to project power beyond its borders, but even this has been asymmetric power projection through its irregular forces rather than its conventional forces. Power projection is to a large extent driven by a nations political aims and as much of the Muslim countries are under US influence, America has made these armies focus on aims and capabilities more in line with its aims. In the case of Iran, its power projection has been through supporting, arming and training proxy groups like Hizbullah and using them to achieve its aims in the region. Iran for the moment lacks any conventional power projection capabilities.

Combined Forces – All of the armed forces in the Muslim lands are land centric forces and the 'jointness' between the ground forces, air force and navy is worryingly absent. Combined forces means the air force provides air cover to ground offensives and the navy plays a support role in a blockade or air defence. Such operations require rigorous training to ensure each force is effective in multiple battle scenarios. The French and British militaries have been able to shrink their forces to under 200,000 personnel as they have replaced the advantage of more troops with a smaller more mobile and effective force that uses its advantage of combined operations. In Egypt and Pakistan the air forces operate separately to the ground forces, their aim is for air defence and specific operations which do not take into account ground force operations. Even the training of pilots does not include scenarios such as providing air cover to ground troops. In Iran each service of the armed

forces has its own role in maintaining Iran's influence in the region, each service be it the navy, ground forces and air force have their own objectives which does not include working together.

Military Posture – Much of the armies in the Muslim world have been postured to achieve western interests despite stating independent military doctrines. Turkey for long was configured to be a conventional bulwark against the Soviet Union. Its membership of NATO consolidated this for the US. This role has continued after the Cold war despite statements to the contrary. Pakistan's military doctrine although directed against an Indian invasion didn't stop the army playing a central role in protecting US interests when the Soviet Union invaded Afghanistan in 1979. Similarly America's invasion of Afghanistan in 2001 and the subsequent decade long war, has led to Pakistani forces posturing towards the tribal areas aiding America's invasion. The Egyptian army has been completely postured towards achieving US interests in the Middle East.

WMD Capability – The ultimate deterrence in any scenario is nuclear weapons. In the Muslim world only Pakistan has been able overcome the challenges involved with developing a nuclear device and a similarly robust delivery system. Contrary to their popular portrayal in movies and the media, Nuclear bombs are actually difficult to manufacture and effectively deploy. Constructing a Nuclear weapon is not a simple exercise of money and brains it is a product of decades of testing, design and a massive investment. Building a Nuclear weapon requires a comprehensive commitment from any nation for its national resources to be deployed in such a manner. It is not just about one facility, it needs an industrial base. A nuclear program requires long term facilities, which are very energy intensive, years of experimentation, fissile material and high grade industrial machinery. After all of this a reliable miniaturised nuclear device (a warhead) needs to be combined with a similarly robust and reliable delivery system. Such integration is an immensely costly and complex process. A nuclear bomb would be useless if it could not be practically and reliably delivered with a high probability of success. For a nuclear bomb to be deployed as a ballistic missile warhead or as a cruise missile warhead a series of very significant technical hurdles must be overcome, these include nuclear physics, materials science, rocketry, missile guidance and the like. Aside from the costs involved there are technical hurdles that need to be overcome, Iran has struggled with its centrifuge technology to enrich uranium to the required levels. Egypt long abandoned its plans on developing nuclear weapons and Turkey has never pursued a WMD programme.

Constructing the Khilafah's Defences

War and the military capability needed to conduct it, is not left completely in the hands of the Ummah or the Khaleefah. The Islamic texts – the Qur'an and Sunnah have outlined the role war is to play and then outlined various specific rules for warfare. *Siyasah* – politics, in Islam is taking care of the affairs of a nation, both internally and externally. Taking care of the affairs of the Ummah externally, by the state, consists of her relations with other states, peoples and nations, and propagating the ideology to the world; and this represents the Khilafah's foreign policy. The basis of the Islamic foreign policy consists of taking the message of Islam to every people and every nation. For Allah سبحانه وتعالى says:

يَا أَيُّهَا الرَّسُولُ بَلِّغْ مَا أُنزِلَ إِلَيْكَ مِن رَّبِّكَ وَإِن لَّمْ تَفْعَلْ فَمَا بَلَّغْتَ رِسَالَتَهُ وَاللّهُ يَعْصِمُكَ مِنَ النَّاسِ إِنَّ اللّهَ لا يَهْدِي الْقَوْمَ الْكَافِرِينَ

"O Messenger! Proclaim (the Message) which has been sent to you from your Lord. And if you do not, then you have not conveyed his Message. And Allah will protect you from the people; surely Allah will not guide the unbelieving people." (Al-Ma'idah:67)

As foreign policy is a State's relationship with other states, this relationship entails looking after the foreign affairs of the *Ummah*. The Khilafah's foreign policy is based on a fixed concept that does not change. This is the propagation of Islam and the conveyance of the Message of Islam. This is the very basis of the Khilafah's foreign policy. The basis never changes and never differs or varies no matter who rules the Khilafah. This basis has always been maintained and it has been carried out at all times, from the time when the Messenger of Allah (saw) settled in Madinah to the last day of the 'Uthmani Khilafah.

The Messenger of Allah صلى الله عليه وسلم set up the policy of the Islamic State on the basis of spreading Islam since the very first day he صلى الله عليه وسلم arrived in Madinah. He صلى الله عليه وسلم signed treaties in order to concentrate on extending the Message in the Hijaz. He صلى الله عليه وسلم signed the treaty of al-Hudaybiyah with the Quraysh in order to spread the Message in the Arabian Peninsula. He صلى الله عليه وسلم sent envoys to the countries outside the Arabian Peninsula with the aim of establishing relations based on the spreading of Islam, by inviting other nations to embrace it. In the time of the *Khulafa'* they also established relations with states and people beyond the Islamic lands on the basis of spreading Islam, and they too continued to carry the Message of Islam to the world. All the Muslim rulers who came to power competed in the spreading of Islam. The Ummayads took the banner of Islam to Northern Africa and Spain, whilst the Abbasids took Islam to Afghanistan, Al Hind and the Far East. The Uthmani Khilafah then took Islam to most of Europe.

However, the return of the Khilafah and the defining of its foreign policy objective, would not in itself, practically project its message to the whole world without some kind of practical assistance or vehicle. In other words, although the Messenger of Allah صلى الله عليه وسلم had received these revelations from Allah (swt), it did not mean that Islam would be transferred to the world automatically by itself without some material action from the Muslims. The method to carry Islam to the world is through dawah' – invitation to Islam, and Jihad – the physical removal of all material obstacles standing in the way of spreading Islam.

Allah سبحانه وتعالى says regarding inviting people to Islam in the Qur'an:-

ادْعُ إِلَىٰ سَبِيلِ رَبِّكَ بِالْحِكْمَةِ وَالْمَوْعِظَةِ الْحَسَنَةِ ۖ وَجَادِلْهُمْ بِالَّتِي هِيَ أَحْسَنُ ۚ إِنَّ رَبَّكَ هُوَ أَعْلَمُ بِمَنْ ضَلَّ عَنْ سَبِيلِهِ ۖ وَهُوَ أَعْلَمُ بِالْمُهْتَدِينَ

Invite to the Way of your Lord with wisdom and beautiful preaching, and argue with them in a way that is better. Truly, your Lord knows best who has gone astray from His Path, and He is the Best Aware of those who are guided (An-Nahl:125)

With regards to fighting, Allah سبحانه وتعالى said:-

وَأَعِدُّوا لَهُمْ مَا اسْتَطَعْتُمْ مِنْ قُوَّةٍ وَمِنْ رِبَاطِ الْخَيْلِ تُرْهِبُونَ بِهِ عَدُوَّ اللَّهِ وَعَدُوَّكُمْ وَآخَرِينَ مِنْ دُونِهِمْ لَا تَعْلَمُونَهُمُ اللَّهُ يَعْلَمُهُمْ ۚ وَمَا تُنْفِقُوا مِنْ شَيْءٍ فِي سَبِيلِ اللَّهِ يُوَفَّ إِلَيْكُمْ وَأَنْتُمْ لَا تُظْلَمُونَ

"And make ready against them all you can of power, including steeds of war to threaten the enemy of Allah and your enemy, and others besides whom, you may not know but whom Allah does know. And whatever you shall spend in the Cause of Allah shall be repaid unto you, and you shall not be treated unjust." (Al Anfal:60)

وَقَاتِلُوهُمْ حَتَّىٰ لَا تَكُونَ فِتْنَةٌ وَيَكُونَ الدِّينُ لِلَّهِ فَإِنِ انْتَهَوْا فَلَا عُدْوَانَ إِلَّا عَلَى الظَّالِمِينَ

"Fight them so that there remains no (fitnah) and the deen becomes only for Allah. But if they cease, then there is to be no aggression except against the oppressors." (Al Baqara:193)

The Khilafah's foreign policy is to take Islam to the world. Allah (swt) has given detailed rules on how this can be achieved and allowed the Khilafah to determine through a whole host of manoeuvres, techniques and tools to achieve this. Carrying Islam to the world is primarily a political action, however the strength of one's economy, military and technological development all contribute towards attracting other nations and peoples. The US, today, uses a wide variety of styles to spread its way of life, these include economic aid and loans, propagating democracy, military intervention etc. the Khilafah also has at his disposal, both political and military tools. Possessing military capability, aside from defending the Islamic lands is also for conveying Islam through removing the physical obstacles that stand in its way. In this context Islam requires the Khilafah to build a military capability proportionate to achieve this foreign policy objective. The Khilafah's military development, capability and defence industries are directly rooted in the Islamic texts.

There can be no doubt there is a large gap from the capabilities present in the Muslim lands and where the Khilafah's military capabilities needs to be. In order to change this and close this gap the following policies can be pursued.

- The first aspect of the Khilafah's posture is to determine its military doctrine based on perceived threats. As the Khilafah's foreign policy aim will be to become a leading state capable of opposing the leading states, a significant military capability will be necessary. A military requires weapons, transport, logistics, training and education to perform its role. To be politically' and economically independent the Khilafah must have an independent military capability otherwise it will always be dependent on the will of other states. As a minimum the Khilafah must have a minimum deterrent, quoting British Prime Minister, Neville Chamberlain, *"Our best defence would be the existence of a deterrent force so powerful as to render success in attack too doubtful to be worthwhile."* All of this begins with the development of a military doctrine.

- The Khilafah's military doctrine needs to take into account perceived threats and incorporate this into its posture. The threats the Khilafah will face include attacks from the Capitalist nations, factions within the Muslim lands and those loyal to the former rulers. Taking this into account the Khilafah's military doctrine should include:

    1. The protection and defence of the Khilafah's territories
    2. The establishment of a minimum military deterrent
    3. Reunification of the Muslim lands

The development of a military deterrent requires significant capital investment and an economy that generates sufficient wealth to fund this. Due to this it makes sense fix the economy in the Khilafah prior to beginning any rearmament programme. This can be achieved as follows:

1. Currently most of the Muslim lands have economies that are not constructed upon their strengths. Most of the economies are lop sided where they are dependent on a handful of fossil resources or are service driven. In many cases the majority of the population work in sectors which play a minor role in driving the economy. This situation will need to be reoriented as it does not meet the needs of the ummah. This can be achieved through a number of 5 year plans to increase mineral production and increase industrial production. The initial production levels should be proportional to the production needed to develop national infrastructure.

2. The Khilafah needs to take control of its raw

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materials and expand its mineral processing infrastructure. The reliance on foreign companies only sustains such a dependency. The Khilafah's economy should be industrial led.

3. The oil rich countries of the Muslim lands currently possess just a handful of industrial complexes. Central government should promote those industries which aid the industrialisation drive. This includes heavy industry, steel refining, iron mills and chemical compounds. The non-oil countries should be driven through the mechanisation of agriculture which will allow them to also change their current situation.

4. Through integrating the economies of the Muslim world, duplication will be avoided. The North African economies are rich in agriculture, whilst the economies of the Hijaz are rich in fossil fuels. By one region providing for the other duplication will be removed and it also ends foreign dependency.

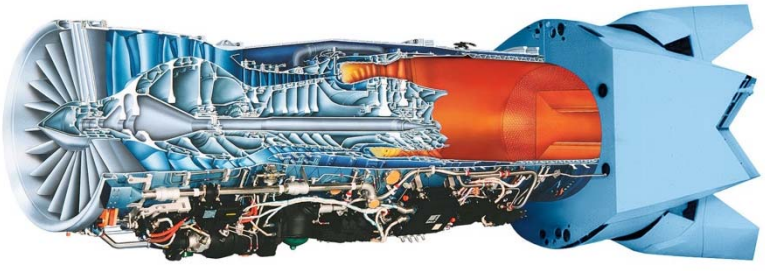
Much of the problems with the economies of the Muslim lands can be resolved by restructuring the Muslim economies and transferring them from single commodity driven economies and service sector focussed towards a manufacturing based economy. This will allow the Khilafah to develop the necessary technologies and mass produce them in order to meet its industrial needs.

Modern defence industries consist of a number of prime industries which develop military platforms and a large support industries which develop the components and parts that constitute military platforms. The Khilafah needs to immediately put in place a plan to develop the basic and critical industries needed for defence purposes, these are: Aerospace, Naval, Automobile and Information Technology.

Aircraft Industries

There are three key capabilities needed in order to start a basic aerospace industry:

Airframe - This is the central section of any fighter jet, and is made from durable and light metals such as aluminium and composite materials. Composite materials are constructed by using several layers of bonding materials. Titanium or Ferrous metals are also used in the most stressed and critical areas of the aircraft. Structural components are made of fabricated wrought aluminium (forged, machined, and assembled parts).



Engine - A modern jet engine has over 25,000 parts. The main components are the fan blades, the high-pressure compressor, the combustion chamber, the turbine and the casing that holds these components together. As air is compressed and heated though combustion to an extremely high temperature, strong, lightweight, corrosion-resistant, thermally stable materials are needed to construct aircraft engines which must

withstand extremely high temperatures. Modern jet engines are made of thousands of component parts that are made to exact measurements and have to be exactly perfect. The most important part is the turbine plate; these actually deliver the engine thrust and have to operate under immense stress and temperatures, as they produce 10 times more power than a car engine. They are exposed to temperatures approaching 2500 degrees. Very few countries actually manufacture fighter jet engines. Andrei Chang, a Hong Kong-based analyst of the Chinese military and editor of Kanwa Asian Defence Magazine highlighted why: *"Modern jet engine technology is like an industrial revolution in power. Europe, the US and Russia have hundreds of years of combined experience, but China has only been working on this for 30 years."*[56] Established manufacturers have laboured on research and development since the 1950s to build safe and reliable engines with thousands of components that function under extremes of temperature and pressure. This involves state-of-the-art technologies in design, machining, casting, composite materials, exotic alloys, electronic performance monitoring and quality control. Since then, the big players have collected vast stores of performance and operational data from existing engines that gives them a head start in designing new versions with improved fuel efficiency and reliability. So while Chinese engineers have been able to reverse-engineer Russian airframes, the engines have been much more difficult to copy without access to the complex manufacturing processes. Richard Margolis, a former regional director of Rolls Royce in northeast Asia said: "*The reason so few can do it is because it is really, really difficult."*[57]

Avionics - This is the communication systems and navigation systems fitted to perform multiple functions including radar technology to counter enemy aircraft. Aviation electronics are individual electronic systems performing a number of critical functions for the pilot. Modern aviation systems are made individually by electronic, hardware and software experts and brought together with hardware which is able to crunch millions of bytes of information.

Both Pakistan and Turkey have the most advanced capabilities when it comes to aerospace in the Muslim world. Whilst both nations do not currently possess their own fighter jets, both have started programs to eventually produce their own fighters and the capability to build their own jets in partnership with other nations. Both countries have experience in composite materials and in producing composite skins for the airframes. Turkey is attempting to take this a step further by attempting to build its first indigenous fighter jet by 2025. Turkey's aerospace firm Tusas has taken part in constructing the F-16[58] and has experience in a number of advanced fighter jet components this includes the avionics for the F-35. The Muslim world however has not produced its own fighter jet, however the basic experience on overhaul, design, maintenance and repair exists.

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- The Khilafah will need to begin the **development of an indigenous fighter jet** and invest in the design, development and manufacture of bombers, airlift planes and air superiority jets. This will takes at least a few decades and should bring together all the different industries across the Islamic lands for this aim.

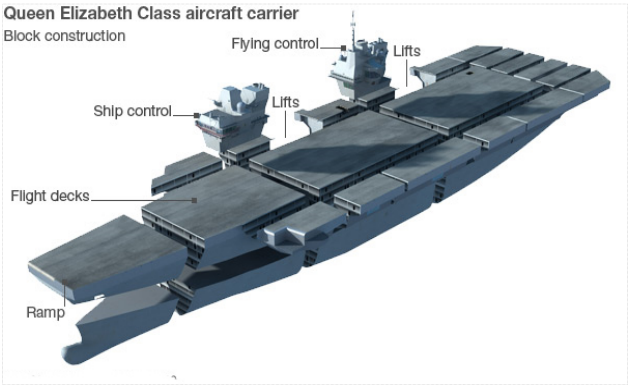
- The Khilafah **should expand the maintenance and rebuilding capability** already present in the Muslim lands in order to maintain much of the existing stock of fighter jets. This will allow it to develop the technical expertise necessary on all aspects of fighter jet development and remove the dependency on foreign procurement.

- The Khilafah should **collaborate with aircraft manufactures** within the Muslim lands first, and then friendly foreign nations as a starting point, so that all components are re-sourced from friendly countries or internally. This will ensure all key components are manufactured internally by investing in machine tooling manufacturers. From this it is possible to develop military fighter aircraft as well as developing other aircraft types. Additionally, banning the import of western manufactured aircraft would eliminate competition and allow the domestic industry to develop. This will ensure sufficient resources could be diverted to the aerospace industry to fund its operations and also to fund R&D that would lead to rapidly improving the industry.

- The Khilafah will need to **utilise the existing expatriate power** as millions of Muslims work in the Western world and have a genuine and deep-rooted desire to contribute to progress in the Muslim world — most have been unable to do so except remitting some foreign exchange and discharging advice without any practical way to implement any plans. The Khilafah state can utilise the breadth and depth of skills amongst these peoples by incentivising them to return to the state and aid it with their skills and knowledge.

- The Khilafah should **attract skilled individuals** and those working with friendly countries with the skills that are not available within the Islamic territories. No expense should be spared to achieve this. Many examples in history demonstrate that there are many foreign countries that will partake in transfer of technology if there is benefit in it for them.

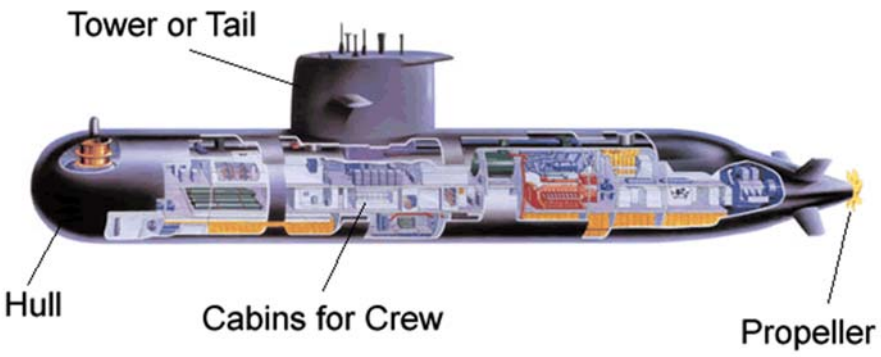
Naval Industries



A Naval industrial base consists of ship construction yards, construction workforce, a design and engineering workforce, combat systems and supplier base. Military shipbuilding starts with the engine space, which contains the most machinery, and then the rest of the ship is built around it. Building a ship requires precision sequencing, sections are built and outfitted in large manufacturing halls and then moved to a towering building where they are welded together to create a ship. Military ships are made up of extremely strong steel plates, measuring several inches thick. This heavy body is highly effective protection against fire and battle damage. This system allows workers ample space, light and access to heavy construction tools as they build each section, called a ship module, and outfit it with pipes, cables, insulation and other equipment, and apply coats of paint. Getting the modules as complete as possible before assembly is critical

because it becomes far more difficult to work in the cramped quarters of a ship. It costs roughly six times more to outfit a module aboard a ship than standing free.[59]

The higher and more complex end of a marine industrial base is the aircraft carrier. These are 20 stories high and over 1,000 feet long. They are powered by nuclear reactors rather than diesel engines. They house 6,000 crew members and 70 to 80 aircraft. They are constructed of about 1 billion individual pieces. Aircraft carriers are worth between $4 billion and $5 billion - it is a substantial investment by itself, carrying a small town's worth of people.



Developing a submarine is considered one of the most complex military tasks. This is because a Submarine is a sealed metal container that contains people and a limited supply of air. They are limited in how big they can be constructed as a result they are crammed with equipment, weapons and supplies. Over the past decades this military platform has become the premier naval weapon.

Submarines need to be powered to operate their propeller and internal electronics which provides the forward and reverse thrust in the ocean. Historically they were equipped with diesel engines that burn fuel, but in 1954 the US constructed the first nuclear submarine which used nuclear reactors, steam turbines to drive the main propeller shaft.

A diesel engine can run propellers or they can run generators that recharge a very large battery bank. Or they can work in combination, one engine driving a propeller and the other driving a generator. The submarine must surface (or cruise just below the surface using a snorkel) to run the diesel engines. Once the batteries are fully charged, the submarine can head underwater. The batteries power electric motors driving the propellers. Battery operation is the only way a diesel submarine can actually submerge.

Nuclear generators need no oxygen, so a nuclear submarine can stay underwater for weeks at a time. Also, because nuclear fuel lasts much longer than diesel fuel, a nuclear submarine does not have to come to the surface or to a port to refuel and can stay at sea longer. The challenge here is developing a nuclear reactor, and scaling it to fit into a cramped sealed container.

Submarines are built using modular construction. Each major compartment is built individually in separate sections. When completed to a certain point, the sections are brought together (they're constructed on a rail system) and then welded together. The manufacture of a submarine is highly complex and utilizes both manual and automated processes. Large sheets of steel are rolled and welded into the shape of the inner and outer hulls. All systems are connected as the compartments come together. Steel is used to make the inner hull that contains the crew and all the inner workings of the submarine, and the outer hull. Between the two hulls are the ballast tanks, which take in

water to make the submarine sink and eject water to make the submarine rise. In addition to steel, various parts of a submarine are made from other metals, such as copper, aluminium, and brass. Submarines have thousands of components as well as semiconductors which make up electronic equipment.

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Much of the naval platforms in the Muslim lands are procured from abroad but Pakistan's Karachi Shipyard has limited production capacity and it has built submarines with significant French technical and technology transfer. Turkey is currently able to meet 70%-80% of its naval needs, the exception being submarines and engines. The Khilafah will need to protect its water ways and the oceans that surround its territories and also work towards projecting naval power abroad and the logistics required for this.

Basic shipbuilding capability exists in the Muslim world. The Iron, Steel and material fabrication need to be built upon and expanded. The Khilafah should switch from suppliers such as the US, UK and France and co-produce the naval platforms the Khilafah needs. This can be achieved through incentivising joint projects with friendly nations and making technology and intellectual property transfer a condition for the projects. Whilst the worlds powers have more advanced military industries and platforms they have a long history of using military deals as a means to influence the evolution of the military structure in the Muslim world.

- The Khilafah should ensure the provision of raw materials and components are from within its territories, as this will lead to the development of a supplier base and eventually lead to indigenous capability.

- Skills – The Khilafah working with industry should recruit technical expertise from outside the Islam lands and to initiate joint projects with foreign ship-builders so as to ensure a transfer of skills and technology to the industry — government contracts can be awarded to facilitate this process

Electronic Systems

Central to modern military industries is the role a number of technologies play in storing, crunching, distributing and securing information. It was the demands of WW2 that led to the development of computers to calculate artillery firing tables and the British Colossus machines which were used to rapidly find key combinations for code breaking.

Turkey has the most advanced IT and electronics industry out of the Muslim nations. Its civilian industry has also been able to cater for the military industry and military platforms. Since 2010 Turkey has made considerable efforts to shape its network-enabled capabilities to suit its military. Turkey has invested substantial amounts in domestic tactical command and control systems in a broad information technology modernization programme. Turkeys Oliver Hazard Perry/G-class

frigates received the industries Genesis system, which was a successful implementation of a Turkish-built combat management system. Developed by the Turkish navy and implemented by the Turkish company Havelsan, a fully integrated management suite that encompassed all ship functions, including navigation, communications, sensors and weapons. The Turkish army is using new indigenous tactical area communication systems. A family of full software-defined radios has been built by Aselsan, and production tests are underway. This radio family comprises handheld, backpack, vehicle and ship-mounted configurations, and they are compatible with existing counterparts already in use in the Turkish armed forces. Higher up the chain of command, headquarters facilities are using new management information systems. The Turkish air force has received a new command, communication and information system that comprises an integrated software platform. This system, which was developed by Havelsan, after a long-term effort generated millions of lines of software code.[60]

Semiconductors

A technologically advanced 21st century military relies heavily on microelectronics and computers. There are very few defence-related end-items that do not require microchips or electronics. A short list of semiconductor-enabled capabilities would include all types of navigation systems, aerospace technologies, satellites, and communications systems – in addition to the computing capability needed to operate most of these systems. Any military's network-based approach to warfighting requires extensive systems integration. To establish the needed infrastructure and support systems for advanced systems integration in support of network-based operations, advanced microprocessors and other semiconductor devices will be needed

Silicon-based integrated circuits were first developed in the 1950s when the US Air Force sought sophisticated electronics capable of providing on-board guidance for rockets. Since then, microelectronics built from increasingly sophisticated semiconductors have become essential components of smart bombs, surveillance technology, advanced logistics, intelligence platforms, wireless communication, advanced navigation electronics, sensors, and unmanned aerial vehicles, amongst others.

Among computer hardware engineers, the term 'Moore's Law' has been coined to capture the unprecedented rapid rate of innovation. According to this law, the number of transistors that can be placed on an integrated circuit has doubled approximately every two years, while manufacturing costs remain constant. This trend was first described in 1965 and has continued to the present day. Currently, two-and-a-half billion transistors can be placed in an integrated circuit at about the same cost that was required for approximately 2,300 transistors in the early 1970s. It is predicted that in the future, microchips will even be embedded in living organisms, giving rise to a new field of bioelectronics for a wide range of applications.

US companies account for 48% of global semiconductors and thus dominate the global market, but they have shifted production abroad and mostly perform R&D in the US continent. Due to this dominance and also due to the importance of this technology for the military, the Khilafah should begin the development of its own semiconductors.

- Constructing a new semiconductor production facility has been expensive as many have attempted to achieve economies of scale and recoup the initial investment in a reasonable amount of time. A state-of-the-art semiconductor foundry can require close to $10 billion in initial start-up costs prior to becoming operational.[61]

- A semiconductor industry enables many other export-oriented industries, this was something several newly industrialising economies in East Asia realised and generously subsidised the start-up costs of new foundries. For example, Taiwan became the global centre of semiconductor fabrication with the help of government incentives to encourage investment.

- Chip-making is extremely complex, but it is also routinised and standardised. With accessible chip production technology, a potential start-up company needs only capital to acquire the technology. Taiwan is a good example of state involvement, as it turned the nation and East Asia into the primary destination for semiconductor manufacturing. Beginning in the 1980s, the Taiwanese government began pursuing development policies - including favourable tax laws, procurement policies, protection for intellectual property and access to capital sources - that encouraged the rapid growth of semiconductor manufacturing. Taiwan also recognised that advanced fabrication facilities stimulate the wider economy.

- Military Industries constitutes only a small portion of the overall demand for semiconductor devices. Consumer electronics, computers, and communication account for 85% of demand for chips. Other major consumers are the automobile and commercial aviation sectors. The Khilafah will require semiconductors that are produced according to military specification, highly specialised and custom-produced devices designed specifically for secure computing functions - for which there is no commercial demand. The Khilafah will need to develop the domestic knowledge base needed to produce these specialty components in a secure setting. Having a large reliance on imports could lead to critical systems being affected and as a result this requires the Khilafah to pursue its own capabilities in this area.

CASE STUDY: Manufacturing Semiconductors

The typical manufacturing process for semiconductors involves more than 300 sequential steps, with some elements of semiconductors so minute that they cannot be discerned with the naked eye. These involve patterning nanometer-length features onto silicon using high-precision and high-volume equipment.

The manufacturing process begins with silicon wafers, a natural semiconductor that can either conduct electricity or insulate. Silicon wafers are inexpensive to produce.

Silicon is abundant, being the second most available element in the earth's crust. Around six tons of inputs are required to produce one ton of silicon. Silicon wafers used in integrated circuits must be refined to 99.999999999% purity. High-purity silicon is melted in a crucible and then pulled into a single silicon crystal that solidifies as it is drawn. This crystal is then sliced to produce the individual silicon wafers.

Chips are designed in layers, each corresponding to a slice of silicon wafer and subject to three operations:

1. Film deposition, which includes Chemical Vapor Deposition (CVD),
2. Plasma-Enhanced Chemical Vapor Deposition (PECVD), and
3. Etching (Reactive-Ion Etching (RIE) Plasma).

A photolithographic process, similar to that of creating a photograph from a negative, transfers the designs for each layer to the silicon wafer. Layers of the chip are "printed" and then etched onto the silicon wafer. This process is repeated for each layer of the chip, generally 20 to 30 times for modern logic devices.

Individual chips are separated from the wafer, tested, and packaged. Testing and packaging are comparatively labour-intensive and often require manual labour. Most often, foundries ship the uncut wafers to a testing and packaging facility, where a machine slices the wafer into single semiconductors that can then be tested and packaged.

Telecommunications

No modern military can function without a communication system. Communications - the gathering and dissemination of information and the coordination of actions or decisions - are at the core of modern warfare. Military effectiveness requires up-to-date communications systems. Communications must remain secure from eavesdropping and interception to protect missions, objectives, and the lives of the Khilafah's soldiers. However, digital networks can be disrupted in many ways, and the increased military use of wireless communication only increases these risks. The United States historically has been the world leader in telecommunications but recently lost its edge in certain sectors to China.

The rapid growth of the Chinese telecommunications industry means that foreign-produced hardware is used throughout global telecommunications networks. This means not all sensitive communications can take place via secure lines, especially when military forces are deployed globally and communicating wirelessly. Utilising foreign telecom providers is not secure, and are

The Khilafah will need to develop its own telecommunications grid as the current grids were developed by western companies and thus are littered with back-doors and loop-holes which can be used to infiltrate and spy on communications within the Islamic territories. New platforms, standards and protocols can be developed with the help of Muslim entrepreneurs

open to many potential breaches, which can include surveillance devices planted or built into communications equipment, including routers and switches, while fibre-optic and wireless communications can be intercepted or jammed. Using foreign equipment runs the risk of interruption and interception.

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The Khilafah should create a separate infrastructure for the military in the interest of attaining military self-sufficiency. The military should maintain its own independent telecoms network.

Information Technology (IT)

Much of the world's IT industries are in civilian hands and it is commercial applications that drive this industry i.e. IT solutions for organisations. IT today plays a central role within leading military forces whether its command and control systems, networked warfare, avionics or military applications.

- The Khilafah will need to develop its own Operating System (OS) so there is no reliance upon Microsoft Windows or Apples operating system. This is because all of these operating system developed in the US have been designed with back doors which allow its founders to snoop on users

- The Khilafah should expand the use of IT across the Islamic territories especially within the civil service. This will practically drive the demand for IT development and allow for those with IT expertise to apply their skills and expand their capabilities.

- The Khilafah will need to drive the expansion IT through the Islamic territories through Investing in the creation and expansion of infrastructure, start-up's and signing contracts for IT development with those who have the skills to do so. With the Khilafah providing the investment this will drive the development of IT forward.

- The expansion of IT within the Islamic territories can be driven by central government but the technical skills needed to develop a broad spectrum of systems will need to be developed and found. As most of the developments in IT are driven by individuals and private sector the Khilafah should attract these individuals to apply their knowledge in the Khilafah.

- The Khilafah should establish in conjunction with IT experts a network of research laboratories, linked together and able to gain access to scientific and technological information from outside the Islamic territories. This endeavour should also be used to identify individuals and organisation who could be targeted for the skills.

- The Khilafah will need to establish institutes which conduct research and development (R&E) into information technology. These institutes should be networked with universities and the private sector to ensure new technologies are development for society. The Khilafah will need to aid this initiative with investment.

The need to digitalise the Khilafah and network the different territories will drove this industry forward, the Khilafah will need to aid this through investment and policy to ensure certain capabilities develop such as software development, powerful hardware and telecoms. It should be remembered however that IT is one industry within an economy, Microsoft founder Bill Gates once explained: *"99% of the benefits of having a PC come when you have provided reasonable healthcare and literacy to the person who is going to sit down and use it."*[62] Once the basic necessities of society are provided for, this will lead to developments across the economy as society look to better their standard.

Education and Training

Warfare requires a host of skills and knowledge including those relating to leadership, strategy and intelligence. Wars are won or lost often on the basis of strategies and leadership, rather than on military equipment itself. Russia overwhelmed all of the European countries in terms of troop numbers during WWI, sending over 15 million soldiers to war whilst no other country exceeded 5 million, but due to poor leadership and strategy, they lost most battles resulting in most of these soldiers being killed, injured or becoming POWs. Vietnam, Iraq and Afghanistan showed the world that US technological superiority on its own does not necessarily win wars.

Islam will need to play a central role in the Khilafah's military forces. All soldiers whether active or reserves will receive basic military training, which should consist of intensive Islamic indoctrination. All foreign ideas and values need to be rooted out. Beyond this all ideas on strategy, weapons and organization should be studied, irrespective of their source, as defence is a universal subject. All the latest trends and developments should be studied in order to incorporate them into the Khilafah's forces

In all military forces primary training consists of basic information and training in techniques necessary to be an effective service member. To achieve this, service members are drilled physically, technically and psychologically. The drill instructor has the task of making the service members fit for military use. After finishing basic training, many service members undergo advanced training more in line with their chosen or assigned specialties. In advanced training, military technology and equipment is often taught. Many large countries have several military academies, one for each branch of service that, offer college degrees in a variety of subjects, similar to other colleges.

Egypt, Pakistan, Turkey and Iran as well as all the other Muslim nations all have military collages and training

facilities. Much of the training is based upon nationalist tendencies to physiologically prepare troops for the battlefield. Many quality soldiers are either overlooked for promotion as well as those who do not view the role of the armed forces within the narrow political framework of the political establishment. Future senior leaders receive some training in the West, which is when they are usually earmarked by western nations.

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Technical Skills

On the Khilafah's emergence one big factor that the Muslim world lacks is certain technical skills. The Muslim world has not produced its own fighter jet, battleship or submarine. Whilst funding and policy explain to a large degree why such production has not taken place, some of the technical skills needed to develop modern weapon systems just do not exist in the Muslim world.

There are a number of policies that could be pursued to change this situation:

1. Joint ventures
2. Reverse engineering
3. Industrial espionage
4. Incentives
5. Trial and error

- Joint ventures take place when two nations share in the costs and skills in the development of a military platform. Any joint venture should ensure technology and skills are actually transferred, but this will only take place if nations are willing to undertake such ventures with the Khilafah. The Khilafah should work with these nation or companies from nations who do not have designs on the Muslim lands.

- Whilst all countries deny they engage in reverse engineering, most do. China and Russia have done this successfully on a number of military applications. The Khilafah should try to procure weapons systems in order to engage in reverse engineering.

- Industrial espionage allows a nation to develop much quicker by stealing technology blueprints. China has been very successful at this low cost strategy. This strategy is also what led to its development of cyber warfare capabilities

- Due to the reliance of much of the world on the Muslim worlds fossil wealth, this method should be used as an incentive to attract foreign skills and technology. This would an

attractive method for countries that have a big dependency on such minerals. Bilateral deals could be agreed which undercut the energy market price in return for technology.

Funding

The massive expansion of the military industry will require large funding as salaries will need to be paid and projects all require capitol. All the nations that industrialised made use of a combination of private investment and government funding to industrialise. Germany and Japan printed money to fund industrialisation. The Khilafah will need to make use of a number of options that will be available to it.

Direct Investments – building military platforms take time and carries large costs. This is why governments in the west play a central role in the defence industry. In critical areas such as heavy industry, engines, ship building, space research and railway systems, these should be funded and operated by the state.

Working in collaboration with industry – Where there is potential commercial value or government involvement is required to make the project work, the state should work in collaboration with industry. This method allows the state not to take on complete burden of a weapon system, but also allows commercial organisation to partake in the development of a weapon system and potentially develop technology for civilian use. In this way the aims of the state are met by the organisation of defence production.

Provide incentives to industry to take on projects - This is where profitability can be easily achieved by giving contracts to industry to manufacture weapons or by providing loans, grants or subsidies to industries that produce those items necessary for the defence industry.

Strategic Issues

1. **How will the Khilafah deal with US interference in the Muslim lands?**

The only way to end US interference in the Muslim lands is by eliminating the tools America uses. Since the US came to the Muslim lands it has used agent rulers, economic aid, money, funding and military sales as key tools in keeping influence in the region. Each of these will need to be deconstructed and removed.

Russia has successfully achieved this in its region. Since Vladimir Putin came to power in 1998 he has worked to remove the US from Russia's periphery, this is all the former Soviet States that the US showered with economic aid, deals and money to bring into America's fold, away from Russia. Russia achieved this by firstly stabilising its domestic situation, Putin brought all the oligarchs under the Kremlin's control, those that didn't are either in prison or have left Russia to go into exile. Russia used its energy reserves to bring the likes of Ukraine and Lithuania under its control. It used the Collective Security Treaty Organization (CSTO), a Moscow-led security group to integrate with and project influence throughout Kazakhstan, Belarus, Azerbaijan and Armenia via security coordination. Where such policies failed it waged war with some nations, as it did with Georgia, cut off energy supplies to Lithuania backed coups in Ukraine and overthrew the government in Kyrgyzstan. In this way Russia has frustrated American plans whilst strengthening itself.

The Arab world possesses over 70% of the world's oil and over 50% of the world's Natural gas, any reduction in global production would hurt the US economy significantly as it is one of the world's largest consumer of these. Using the regions resources strategically is the way to remove US influence

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Most of America's power today is a mirage. Unable to defeat a rag tag force in Afghanistan after a decade of war and unable to pull itself out of the 'great recession,' America even turned to the corrupt Arab rulers who wrote a cheque for $221 billion dollars, bailing out the US during the global financial crisis. The ace cards are all with the Muslim lands, America's trump cards of agent rulers and money can easily become impotent.

2. **How will the Khilafah resist an attack from the West?**

In a situation of foreign aggression the Khilafah like any country in the world would be in a state of war and any action that repels the enemy would be pursued. To mitigate such a situation the Khilafah will need to establish a deterrent so powerful to render success in an aggression too

doubtful to be worthwhile. The Khilafah would not tolerate attacks on its land or its people. Any show of force shall be met with an appropriate response, both political and militarily.

The last decade has shown not just to the world but even Americans that resorting to military action, as the Neocons did has actually weakened America's military prowess. The wars in Iraq and Afghanistan have exposed America's weakness. America has come to rely on the Muslim rulers, their airspace and supply lines. In Afghanistan the US failed to subdue the Taliban who lacked the military capability relative to the US.

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The Muslim rulers happily gave the US access to military bases and airspace to conduct its wars in Iraq and Afghanistan and these bases have allowed the US to supply its troops on the front lines in its war effort. Without access to such airspace and military bases in the region any invasion becomes a logistical nightmare and will in likelihood lead to something less than an invasion of foreign troops. In this context missile strikes etc, will not lead to the end of the Khilafah.

The Khilafah will need to mitigate the possibilities of such an attack ever occurring, this can be achieved by annexing and expanding very quickly, so the west will then be dealing with a much larger area. As Afghanistan and Iraq has shown, the longer the supply lines have to travel the weaker the front lines. It should also be borne in mind that the West makes use of a number of military bases that have been provided to them by the Muslims' rulers, cutting such supply lines will severely hinder western capabilities.

The wars of the last decades have also shown that despite possessing superior military technology, victory is not guaranteed. An attack on the Khilafah whether by the sea or the air on its own will not bring the Khilafah to an end, ground troops will be needed to occupy territory here the Muslim lands have the advantage in that they possess numbers, who are brave and determined and bleed any occupation to death.

Fundamentally, the Ummah will need to work for political unification across the Muslim world, which is an Islamic obligation and aspiration of hundreds of millions of Muslims. Unification would leverage the benefits of people, resources and geography. A unified Muslim world will then be better able to compete with the US, the EU and the growing powers of India, China and Russia.

3. **Currently the Muslim economies cannot sustain advanced defence industries, how will the Khilafah overcome this?**

Whilst some Muslim countries have made some advances in defence, many have not and this is because of various reasons. Many of the Muslim rulers never targeted military industries as they

were more concerned with looting the countries they ruled over, Most of the Muslim rulers were more concerned with internal stability and maintaining their dominance then projecting power externally. Some Muslim countries possess state of the art military platforms and continue to shower western arms manufacturers for more orders but never bothered with developing their own capabilities.

This situation can be reversed as it mostly requires a commitment to develop defence Industries, which is what is lacking from the Muslim countries.

With regards to sustaining defence industries there is no doubt this is an expensive endeavour. The US is able to sustain a large military industry due to its economy generating $16 trillion a year. Britain and France have struggled in maintaining their military industries due to the costs involved and sustaining expenditure on other areas within their economies.

This is why the Khilafah will need to fix the economy before embarking on a rearmament programme. The economies in the Muslim lands need to be restructured as they are not built upon their strengths and shift towards focusing on their strengths. The Muslim lands also possess significant mineral wealth which should be used strategically to develop military platforms and the industries needed to develop them.

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4. **How will the Khilafah deal with a possible nuclear strike?**

Modern warfare is conducted using a wide array of technologies and strategies. Some nations developed nuclear weapons as they had the ability to create mass destruction with relatively small amounts of matter. Nuclear weapons still today remain the ultimate weapon for war. For the Khilafah nuclear weapons are for deterring those who have designs on the Muslim lands. Islam has in origin forbidden the use of nuclear weapons as they cause widespread indiscriminate destruction whereas the Khilafah's foreign policy is to revive humanity with Islam not to exterminate it. Islam has however permitted the Khilafah to do with the enemy similar to what it does to the Khilafah. Therefore the Khilafah would need to develop and possess nuclear weapons as well as a retaliatory capability in the case of a nuclear attack. This is the only deterrent for a nuclear strike.

5. **The Khilafah on its inception will lack superior weapons systems relative to the West. How will this be overcome?**

As military platforms are an expensive endeavour western nations compete with each other to export their military platforms. As a result many of the world's military forces are composed of western military platforms, be they fighter jets, submarines or battleships. Military platforms from the 1950's and 1960's from the Soviet Union still form the bulk of many militaries in the world.

The Gulf States and Saudi Arabia possess advanced military platforms whilst Pakistan, Egypt and Turkey are largely composed of obsolete platforms with some modern platforms. Very few of these are manufactured in the Muslim world. Nevertheless a weapon is a weapon and for defensive purposes an enemy would still need to overcome another military whatever the level of capability.

This was a difficult lesson the US learnt in Afghanistan. Despite possessing advanced industries and trialling new weapons on the battlefield the US failed to defeat the Taliban. As the Taliban did not make use of modern communications and Information technology this undermined America's comparative advantage.

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The Khilafah will need a certain level of military capability on its establishment and work to increase this capability as its economy develops and in order to establish Islam as a player on the global scene. It is military capability the Khilafah will need rather than advanced defence industries. Advanced defence industries are a result of pursuing military capability.

6. How will the Khilafah deal with the rogue status label?

The rogue status label has been developed in the capitals of the West to justify interference in the Muslim lands and to subvert any call for the return of Islam. In places such as Pakistan successive regimes have joined the West in maligning Islam calling it Talibanisation or terrorism. The agenda by the West has been to link violence with Islam and therefore any call for Islam is a call for violence.

Dealing with this requires the Khilafah state to go on the offensive and expose this lie by exposing the plots, plans and actions of the West. The West has engaged in many heinous crimes that no state in the world has exposed or taken advantage of. The US lied about WMD's in Iraq in order to gain the countries coveted black gold. Its greed showed no limits when it was exposed in the Abu Gharib scandal. The West's cosy relationship with the likes of Ben Ali, Gaddafi and Mubarak has never been used by another state to embarrass the West.

There is no need for the Ummah to explain whether it is rogue or not, this discussion suits the Capitalist West as it keeps all discussion away from the West's colonialism and crimes in the Muslim world. Subverting all the countries where Islam is deeply rooted is a strategy by the West to malign the return of Islam. Implementing Islam and showing its true colours will be enough to refute Western claims.

7. Muslims lands are in indebted to the west, how will the Khilafah deal with this?

Whilst the Muslim world is full of mineral resources many leaders squandered such natural wealth and took loans to fund their own regimes. Their lack of policies for development has meant future

generations are due to repay such loans, this reality on its own has meant the West has a say and influence over economic policies in the Muslim world.

The Muslim world in reality never needed such loans. The Muslim lands are full of natural resources which would have generated billions for the government. By being bankrupt with any vision for their states the corrupt rulers continued to take loan after loan as they had no other sources of revenue to carry out the very basic of government functions.

As the Khilafah is a sovereign state it will independently decide on how such debts will be repaid (if they are at all). All IMF and World Bank as well as foreign free market influence will be deconstructed and removed. No foreign institutes are allowed to organise the Khilafah's economy or define for it the means to repay its debts. If repayment is taken as the policy the original sums will only be repaid, without the interest and the corrupt rulers who took out the loans will contribute to such repayments. Pakistan's coal reserves which are the equivalent of over 600 billion barrels of oil could pay of its debts 12 times over. Indonesia is amongst the world's largest exporters of coal, fresh fruit, tin and liquefied natural gas, the export earnings on their own could pay off their debts. Turkey's agricultural revenue from its agrarian exports is more than ample to pay off their debts. Such minerals when sold on the international markets would have brought in more than enough currency to repay the debts. It is in reality the bankruptcy of the Muslim rulers that has handcuffed future generations.

8. How will that Khilafah view the world's powers?

US - As the US is the world's superpower, it represents Capitalism, the Khilafah represents Islam and this difference leads to each viewing the other as a potential challenger to its superiority. As a result each will legislate in a manner that cements its position different to the other. The Khilafah will effectively be in a cold-war with the US and aim to challenge Capitalism.

The Khilafah will need to challenge, frustrate and divert US aims globally, this is important even for the Khilafah's own survival. The US is a colonial state and has designs all across the world. The US has used Iran's nuclear programme crisis to keep a substantial force in the region, it has used this as a basis to provide security for many of the Gulf States.

The Khilafah should expose the US as a nation, as much of its superiority is built upon lies. In 2010, in the US, a person was murdered every 35 minutes, raped every 6 seconds, a burglary was committed every 14 seconds and a robbery took place every 6 seconds. The Khilafah's relationship with the US will be built upon showing the fallacy of Capitalism and superiority of Islam

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Russia - Russia as a nation is on a resurgence since the collapse of the Soviet Union. It is highly unlikely Russia will enter into

any type of alliance with the Khilafah. Russia has a history longer than Britain and the US of colonising Muslim territories.

Russia's main concern currently is the US and its encroachment on Russia's periphery. Russia has made significant progress in rolling back US influence in its region. However Russia suffers from a declining population, where the Muslims make a sizeable minority and its military is composed of lots of obsolete equipment. Hence in the case of Russia the Khilafah should develop policies that ensure it continues to challenge the US.

China - China in its 4000 year history has never been a global power, it has never expanded its borders. China throughout its history was marred in internal conflicts between various competing dynasties and foreigners were viewed as devils. China historically has viewed Russia with suspicion and it currently views the US through such lens and competes with it in the Asia-Pacific.

Whilst many marvel at China's rapid economic development it is in reality a weak country, its size is one factor that weakens it. China has been unable to integrate non-Han Chinese as such secessionist calls is what leads China to use it military to maintain social cohesion. For the moment the rapid economic development allows for most Chinese to have jobs, but this export led economy is not sustainable. Even China's armed forces are configured mainly as a domestic security force, rather than an offensive force.

Based on such insecurities the Khilafah should ensure a wedge remains between China and the West and use its energy and mineral wealth, something China desperately needs to ensure it doesn't join the western camp against the Khilafah. Such relations should be used to deal with China's policy in Xinjiang.

France - France since the French revolution in 1799 has been a colonial state. The French today consider their nation to be the forefathers of Capitalism. It is this pride that drove France to colonise other lands and not just steal their resources but actually get the host population to like French culture. France has generally taken a very confrontational approach to foreign policy matters; it took France 17 years to actually conquer Algeria.

The Khilafah should directly challenge Capitalism in France as many consider French culture to be dead. Whilst France at the dawn of Capitalism was leading change in Europe, today most thinkers, new ideas and philosophers come from the US, this has created a very insecure France who has become very pessimistic about the future of the nation.

Britain - Britain has a long history of being a global power. It was the first nation to industrialise and engaged in many world wars to protect the global balance of power. Britain from its origins was a colonial state. Britain is an expert at exploiting nations and peoples for its own ends and using peoples and nations. The only way to deal with Britain is through confronting it alone ensuring it has no assistant or partner.

Germany - Germany has a history of relations with the Khilafah. In WW1 the Khilafah and Germany were allies. As long as Germany does not partake in occupation of Muslim lands the

Khilafah should take advantage of the countries very successful manufacturing base which has made it one of the world's largest exporters. The Khilafah should consider Germany as a possible candidate to fracture the Capitalist camp. Germany suffers from a raw materials shortage, which makes it more prone to enter into an alliance with the Khilafah in return for a stable supply of raw materials. The Khilafah can become a source for raw materials for Germany in return for its allegiance. The Khilafah could use this relationship to acquire technology that the Khilafah lacks.

India - The Khilafah's policy should be twofold with India, the first it to settle the Kashmir issue and the second to take Islam once again to the continent. Pakistan has used the issue of Kashmir for its own political interests. It has escalated and deescalated conflict in this area and this has led to no gain either for Pakistan or Kashmir. All the while the people of Kashmir have sacrificed much of their blood in a fight against Indian aggression. In the Khilafah, the people of Kashmir who have suffered under the oppression of India for decades, will not be abandoned as a result of political expediency. The Khilafah shall seek to unify with Kashmir just as it would with any other Muslim land.

When Islam came to the region in 714, Hind had an abhorrent caste system which differentiated between people on ethnic lines which lead to the supremacy of princely rulers who enslaved many to work on their lands in return for basic wages. As Hindu and Buddhist kingdoms came under the fold of Islam, the Khilafah became a highly centralising force that facilitated the creation of a common legal system that gradually replaced the caste system. Islam created a system where political power, law and worship became fused in a manner so as to safeguard the interests of all people. This stability led to the subcontinent to become the hub between the Far East and the Mediterranean.

Politically, India is a hugely fragmented nation with competing factions with varying interests pulling and pushing across various geographical, religious, caste-based and class-based fault lines. India's Hindu identity has today institutionalised the caste system which stratifies India into a system of hereditary groups. Islam solved this problem once before and the Khilafah should pursue the same policy again.

Israel - Israel was established by Britain as a policy of dividing the Muslim world and to keep the Muslims consumed with a never ending struggle. Ever since, the West has armed Israel and sided with her as she expanded her 'non defined' borders. Today Israel as well as the West have been unable to placate the Ummah in accepting Israel's legitimacy. In Islam, Israel is considered a belligerent state, where occupation still continues today, therefore the Khilafah would work to reverse such an occupation. The collaboration of the Muslim rulers has strengthened Israel and thus when this supply line is cut and due to Israel's lack of any strategic depth the Khilafah should end the occupation.

Conclusions

Building a capable military force is no small task. It requires the collective efforts of all of society through innovation, government support and policy. The current military industries of the Muslim world lag decades behind the developed world. At the same time the Muslim world has two advantages that even much of the industrialised world, on the eve of their development, lacked. The Muslim world possesses all the necessary resources to kick start an industrial revolution. The Muslim world possesses large energy resources and the minerals necessary for heavy industry. At the same time the Ummah numbers 1.5 billion personnel with over 50% of this under the age of 25. Both Germany and Japan lacked the necessary mineral resources for their development and they overcame this through territorial expansion. Britain lacked the population for industrialisation and this was overcome through colonising foreign territories and enslaving the indigenous population to work on the fields, mines and plantations of the British Empire. The Muslim world has no such problems as its population and resources are its strengths.

The secret to developing a capable military is to have a motive that drives a whole nation. In the past superiority for the people or the nation drove many nations, whilst in the modern era colonialism and resources drive many a nation. Islam took the dessert Arabs from the desserts of the Middle East to the far reaches of the planet. It was Islam that drove developments in science, physics, industry and economics. This made the Muslims a potent force and resulted in Islam removing all of the obstacles that stood in its way when traders, travellers, scholars and experts carried Islam across the world. All this shows that before any discussion on resources and how they will be converted into useful material can take place, the will is needed which will then give direction to a people and this all comes from a vision. Islam offers such a vision to Muslims globally as it makes the Islamic belief the central pillar for the people and makes dawah' to the world its mission. It also at the same time provides solutions to the issues society will face.

American attempts at curtailing and containing the Muslim world can only be overcome through one assured strategy that will almost certainly ward of the US and at the same time turn the Muslim world into a global power. Islam obliges only one state for the whole Ummah and this means reunification with the Muslim world is compulsory. With most of the Muslim world living under dictators in severe poverty unification is not a difficult task to achieve, however it does face challenges. Aside from Western agents who will want to hold onto their positions the challenge to a large extent will be the ability of the Khilafah to quickly expand and join the nations together through linking their governance, judiciary, administration and economies. The Soviet Union achieved such a feat in the past by building the Communist camp, The Khilafah will possess a very powerful motivation which will easily make different nations become part of the union and that is Islam itself.

It needs to also be borne in mind that war is just politics through other means and so a military capability is needed to engage in politics and influence the international scene. However matching the worlds powers in military platforms and weapons is not necessary, what is required is a strategy around what the aims of the Khilafah are and what it wants to achieve and ensuing a minimum

capability exists to project power against those who have designs on the Muslim lands. The Taliban and the Iraqi insurgency showed that military platforms of all capability can be overcome with a strategy built around ones aims and capabilities.

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