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➤ EDITOR'S NOTE

An Indian Army Brigade Camp in Uri [Jammu and Kashmir (J&K)] that was attacked by four Jaish-e-Mohammed (JeM) terrorists in the early morning hours of September 18, 2016, left seventeen soldiers dead (two more succumbed to injuries later). All four JeM terrorists were killed in the fighting that ensued. This was the biggest terrorist attack on an army facility in 26 years. The Indian Army retaliated, and on September 29, 2016, 'Special Forces' of the Indian Army crossed the Line of Control (LoC) and carried out surgical strikes against terrorists who had gathered at several launch pads, waiting to cross over to the Indian side to carry out attacks against the Indian security forces. The Indian Army neutralised these terrorists (estimates vary from 38 to 60 terrorists killed) as well as their support elements with clinical precision, and returned unscathed. The surgical strike carried out by the Indian Army posed a dilemma for Pakistan; if it were to protest against the strike carried out by the Indian forces, it would be acknowledging that it was indeed involved in abetting terror from its territory. This was blasphemy for Pakistan as it had to maintain a stance for the international community that it was a responsible nation that was itself a victim of terror; so how could it abet terrorism! The best course of action for the Pakistanis at that time, therefore, was to deny that the strike had ever occurred. In the bargain, they also failed to acknowledge the death of two of their soldiers during the surgical strike by the Indian Army. Plausible deniability of the role of the Pakistan Army in training/supporting militant cadres (as in this case) or during the Kargil conflict in 1999 (where it refused to take back the dead bodies of its Northern Light Infantry soldiers, passing them off as militants) had become the hallmark of the Pakistan Army. Not honouring its dead showed the level to which the Pakistan Army was willing to stoop in pursuit of plausible deniability.

The events that occurred in the Kashmir Valley during the first quarter of 2019 have ushered in a new form of terrorism that was 'waiting to happen'. On February 14, 2019, a local Kashmiri youth, Adil Ahmad Dar, deliberately rammed his explosives-laden car into a bus carrying 40 Central Reserve Police Force (CRPF) personnel at Pulwama (near Awantipore in J&K). The bus was completely destroyed. There were no survivors. This was the deadliest attack carried out so far against security personnel. The JeM claimed responsibility for the attack. Suicide terrorism had reared its ugly head in the Valley.

The Cabinet Committee on Security (CCS) met the next day. There were strong expectations from the Prime Minister (PM) for exemplary punishment to be meted out to Pakistan not only for abetting terrorism from its soil, but also for giving leaders of terror organisations like the JeM and the Lashkar-e-Taiba (LeT) freedom to continue their nefarious activities in Pakistan. The PM announced that he would give the armed forces full freedom to plan a reprisal in the best manner possible.

Based on intelligence inputs—both Technical and HUMINT—terror training camps of the JeM were identified. Reports indicated that a large number of terrorists (including some likely to be *fidayeen jihadis*) had arrived at one such facility. The place was identified as Jabba Top near Balakot, which lay in the Khyber Pakhtunkhwa (KPK) region of Pakistan. Balakot lies approximately 40 km from the LoC and is more than 10 km beyond the International Boundary (IB). This place had been under the surveillance of the Indian security agencies for long and was marked as an active training facility of the JeM.

Therefore, the Indian Air Force (IAF) was tasked to carry out a preemptive strike to neutralise the terrorist cadres undergoing training at Jabba Top. The location of the facility ensured that there would be minimal collateral damage as the facility was far from populated areas.

Target to weapon matching carried out by the IAF indicated that the weapon selection should be such that provides for high accuracy, should penetrate the roof and, with a certain time delay, explode inside the various buildings to cause maximum attrition to the terrorist cadres gathered at the Jabba Top facility. It was, therefore, decided to use the Rafael (Israel) supplied SPICE-2000 (Smart, Precise Impact and Cost-Effective) glide bomb kit that can be strapped on to a 'dumb' 2,000-pound bomb to make it highly

accurate and 'smart'. The SPICE-2000 permits the user to target high value targets like command and control centres, hardened aircraft shelters, deeply buried bunkers, etc. It is believed to be able to penetrate up to three metres of reinforced concrete before its time delay fuse operates to cause maximum damage to the 'contents within', i.e. the operations rooms, aircraft shelters, or sleeping quarters—dormitories—for personnel, etc. With a stand-off range varying between 60-100 km (depending on the weight of the bomb used), the SPICE glide bomb kit navigates to the target using a combination of Global Positioning System (GPS), advanced scene matching and correlation algorithms, and electro-optic/infra-red sensors for the final stages of the attack. This allows the weapon to achieve accuracies with a Circular Error Probable (CEP) of less than three metres—equivalent to hitting a pin-head, especially after travelling more than 60,000-100,000 metres.

The air strike was carried out by the IAF during the early morning hours of February 26. All the aircraft returned safely. Post-strike damage assessment revealed that all the targets were engaged successfully; the mission was a complete success.

Once again, the Pakistani establishment was in a quandary as it was faced with two questions: the first was, should it acknowledge that the strike did take place at all; and the second was, if the strike did take place, was it effective? Not acknowledging the first was out of the question, especially after the Director General Inter-Services Public Relation's (DG ISPR's) tweet on February 26, 2019, which mentioned that IAF aircraft had intruded into the Pakistan Occupied Jammu and Kashmir (POJ&K) sector (Muzaffarabad) and had released bombs that fell near Balakot. Of course, true to form, he praised the Pakistan Air Force (PAF) for a "timely and effective response" due to which the IAF aircraft "released payload in haste". To the second question, he stated that there was no damage, nor any casualties. Once again, the dilemma faced by the Pakistani establishment of plausible deniability is clearly visible in all their pronouncements. If they were to acknowledge that militant cadres did indeed get killed during the IAF's strike, it would shred their narrative of "Pakistan does not train terrorist cadres on its soil" to bits. Therefore, fearing adverse publicity and their lies being exposed, mediapersons were not permitted

to venture anywhere close to the facility at Jabba Top (near Balakot) that was the target engaged by the IAF. Till the time of this writing, Pakistan has maintained a stoic silence on any casualties at Jabba Top and has not permitted the media to visit the facility.

By attacking the JeM training facility inside Pakistan's KPK region, India busted the myth that a preemptive strike by the IAF against terrorist training camps in Pakistan's sovereign territory would invite nuclear retaliation by the adversary. Most significantly, the strike at Balakot indicated a shift in India's 'defensive' mind-set; this was the first time ever that the IAF, having been given a free hand to plan its operation, carried out what was described by the Indian foreign secretary as an intelligence-led, "**non-military preemptive action**". Why was it termed so? It was aimed at preempting further attacks on India by the various terrorist and *fidayeen jihadi* cadres (of the JeM) who had gathered at the facility, *inter alia* for celebrating the success of the Pulwama attack earlier in the month, for training, and for 'planning' future attacks against the Indian state. Based on credible intelligence that these cadres were being trained for further attacks—including suicide attacks—in different parts of India, action was required to be taken to eliminate the threat. The preemptive strike by the IAF, therefore, was in self-defence in view of the imminent danger posed to the Indian nation. No military facility had been targeted, hence, the term 'non-military'. The facility had been under surveillance of the Indian National Technical Research Organisation—the NTRO—since long. Once it was confirmed from all sources that indeed there was a viable target at Balakot, the IAF was given the 'go-ahead'. Planning by the IAF—that is believed to have been carried out since long—was given the final touches and aircraft were launched for the mission.

Post the strike, the confusion that arose amongst the Pakistani leadership—both political and military—during the hurriedly arranged emergency meeting of the Cabinet, was writ large, as was visible in the body language displayed by all who attended the meeting. The decision to respond was taken, and accordingly, a large force of up to 24 aircraft ingressed towards the Indian positions in the Rajouri-Poonch sector the next morning (on February 27).

There has been adequate debate since February 27 on what actually transpired during the dogfight that resulted in the first-ever shooting down of an F-16 by a MiG-21 (flown by Wg Cdr Abhinandan). His aircraft was also shot down in the bargain. He ejected over POJ&K territory and was captured by the Pakistan Army. He was returned to India on March 1.

The interesting aspect about this 'encounter' between a large force of PAF aircraft comprising 24 aircraft that included F-16s, Mirage-III/V, and JF-17 [supported by an Erieye Airborne Early Warning and Control (AEW&C) aircraft], and two Su-30s, two Mirage-2000s and six MiG-21 Bison aircraft of the IAF [supported by ground radar and the Phalcon Airborne Warning and Control System (AWACS)], was that the PAF used the F-16s in an offensive role against the IAF, including by launching as many as five Advanced Medium-Range Air-to-Air Missiles (AMRAAMs) against the Su-30 MKIs/MiG-21 Bison (one of which apparently claimed Wg Cdr Abhinandan's aircraft). The effective range of the AMRAAM (AIM-120C-5) possessed by Pakistan is greater than any Beyond Visual Range (BVR) air-to-air missile presently on our inventory. The Su-30s were, nevertheless, able to evade the incoming AMRAAMs that had been launched against them. This was largely due to the excellent training standards that the IAF has ensured over the years for dealing with just such a situation which is termed Large Force Engagement (LFE). The fighter controller-pilot team trains together routinely to cater for exactly such encounters and understands the nuances of the game, viz. when to go on the offensive and when to remain defensive. Any mistake by any member can be fatal. In the extant case, the pilot(s)-controller(s) team(s) need to be complemented for their actions.

The use of the F-16 and the AMRAAM by Pakistan is presently being examined by the US government to decide if there was any violation of US law in terms of their usage against India.

Another point that needs consideration is whether Pakistan had weighed the options of shooting down more IAF aircraft in the resulting melee? Would the Indian leadership have kept quiet if the IAF had lost one too many aircraft? Would India have enlarged the conflict to an all-out war, particularly at a time when the general elections are round the corner? Was the Pakistani state willing to run the gauntlet, based purely on media reports

that India had inadequate reserves for fighting a prolonged war? What about Pakistan's own war reserves, not to mention the state of its economy? These questions should possibly be best left unanswered as the frightening truth of it all would leave the Pakistani state realising that it should not bite more than it can chew! A sense of relief is, possibly, writ large on the face of the leadership in Pakistan as it analyses the events that unfolded on February 26 and 27, 2019, with the benefit of hindsight.

It is also possible that the PAF was smarting from the shame of not being able to 'detect' the ingress of the US Navy's Special Forces (SEAL Team Six) that had penetrated the Pakistani airspace on May 2, 2011, and neutralised Osama Bin Laden (Operation Neptune Spear) in Abbotabad—almost 200 km from the Afghanistan border to the west. After the Pulwama attack, fearing retaliation from the Indian side, it was expected that the air defences of Pakistan would be on high alert. Were they expecting the IAF to carry out a strike? What would provide the IAF a 'worthwhile target'? Would the IAF risk carrying out an attack inside Pakistani sovereign territory? Not a chance! This was possibly the answer at various scenarios that would have been war-gamed on the likely response from India. Targets in the Pakistan Occupied Kashmir (POK) region were fair game and cadres would certainly have been moved to the 'interior' to keep them safe. That their air defences failed—once again—to engage the ingressing large force that carried out a successful attack at Jabba Top, transgressing the LoC by tens of kilometres, without being engaged, is possibly the reason why the forlorn look was all too visible during the emergency meeting of the Pakistan Cabinet on February 26, 2019. And, finally, in as much as not hesitating to get at the trainers, handlers and terrorists who enjoy sanctuary on Pakistani soil, the rules of the game have been changed by India for a long time to come.

And, of course, Mission *Shakti* was a grand success on March 27.

Happy reading!



EVOLVING FACETS OF AEROSPACE POWER IN A CHANGING WORLD

BS DHANOA

INTRODUCTION

Good Morning, Ladies and Gentlemen. My special greetings to Air Mshl KK Nohwar, Director General, Centre for Air Power Studies (CAPS), former air chiefs, ambassadors and distinguished guests. It is always an honour and a privilege to come to CAPS and interact with so many senior serving and retired stalwarts as well as experts from the aerospace domain.

The seminar is a fitting tribute to one of the finest officers of the Indian Air Force (IAF), Wg Cdr KK Majumdar DFC & Bar. He has the achievement of being the first and only Indian pilot to have been awarded the DFC twice for his courage and daring leadership during World War II.

In the 20th century, air power had matured to the extent that it had started playing a decisive role in conventional conflict. The 38-day air campaign in the Persian Gulf War, followed by only four days' ground campaign was perhaps the best demonstration of air power's war winning capability.

The present debate on procurement of aircraft or equipment displays a lack of understanding on aerospace matters.

Air Chief Marshal **BS Dhanoa** PVSMAVSM YSM VM ADC is Chief of the Air Staff, Indian Air Force. This address was delivered by him at the Jumbo Majumdar International Conference organised by the Centre for Air Power Studies on January 31, 2019.

Hence, my compliments to CAPS for regularly organising thought provoking seminars on air power issues of contemporary relevance, involving intelligentsia from across the world.

The talks and interactive discussions we will have over the next two days will further our understanding on the role and utilisation of air power in the changing world.

In our subcontinent, air power initially played a very nascent role post-independence during the Kashmir operations (1947) wherein the IAF, under strict rules of engagement, not being permitted to carry out offensive action, air-landed 1 Sikh Regiment into the war zone. This timely action saved thousands of innocent citizens from the brutality of the Pakistan sponsored invaders.

In the following three wars against Pakistan, the IAF played a stellar role in defeating the enemy. In 1971, complete air superiority was achieved by the IAF over East Pakistan, permitting a free run to our ground forces (Tangail paradrop and Meghna helilift). Thus, the liberation of Bangladesh was achieved within 14 days.

In 1999, during the Kargil War, our Effects-Based Operations (EBO) targeting key Headquarters (HQ) and logistics dumps evicted the enemy from his well-entrenched defensive positions on our side of the Line of Control (LoC).

This war was fought not just on the ground but also in the media wherein embedded journalists tilted the perceptions in our favour. This was the first televised war in the Indian subcontinent.

The social media is already a tool of propaganda widely used by terrorists and non-state actors to plan attacks and spread discontent within the forces.

In future conflicts, our adversaries will pose challenges not just in conventional but also hybrid war which will have components of cyber, space and information warfare. However, air power will remain a major player in future conflicts.

Investment in air power is an expensive proposition: each Su-30 costs Rs 417 crore, even the Light Combat Aircraft (LCA) Mk I costs Rs 191 crore.

So the question is: "Can we do away with it?" The answer is "NO". Not only is superior air power needed for winning a conflict, it is required for deterrence:

as the well-known Latin adage goes, “If you want peace, prepare for war” (*“Si vis pacem, para bellum”*).

A lot is being suggested by many armchair warriors on what our nation should do about it. Some people suggest that we need to reduce our manpower and put the money in the capital budget. For your reference, the entire salary bill of the IAF is Rs 16,621 crore, while our capital expenditure is Rs 35,407 crore. We need Rs 8,870 crore in revenue for fuel and maintenance as flying is a perishable skill. Hence, there is no way we can cut down on our manpower to pay for our capital acquisitions. The total cost of ownership of a platform needs to be considered. The Su-30 MKI was purchased as a replacement for the MiG-21 aircraft. The present manning of a Su-30 squadron is nearly twice that of a MiG-21 squadron and the cost of per hour operation is 3.5 times higher. In fact, the per hour cost of operating a Su-30 MKI is 1.4 times that of 4th Generation aircraft such as the M-2000. In the other example, we are raising two Medium Range Surface-to-Air Missile (MRSAM) units on the establishment of a single Pechora unit, which we will phase out.

Many suggest we buy more inexpensive fighters, often quoting Stalin who had said, “Quantity has a quality of its own.” Firstly, Stalin’s son was captured and died in World War II and none of these so-called advocates of this theory have their children serving in the armed forces. Secondly, in air power terms, it doesn’t hold true. As can be seen in the 1982 Bekaa Valley operations, where the Syrians lost over 76 3rd Generation fighters against Israel’s 4th Generation F-16s that suffered no losses. Is such an exchange ratio acceptable to us? It’s not that the country can afford an air force made up of only high-end fighters—there has to be a high/medium and low tech mix. It’s the high-end fighters and other equipment that help you shape the air battle for the others to be able to carry out their tasks. The government’s decision to acquire the Rafale and the S-400 would do this for us.

INDIGENISATION

I am not suggesting that we give indigenisation the go-by. In fact, the Indian Air Force has a clear roadmap for indigenisation.

Our policy envisages a progressive improvement in the scale of indigenisation. We have procured and operationalised the indigenous Akash Surface-to-Air Guided Weapon (SAGW); are in the process of developing the MRSAM in collaboration with Israel; and will finally progress towards the Long Range Surface-to-Air Missile (LRSAM). In radars, we started with the Indra a long time ago and now make the Rohini and will progress to the Arudhra to ultimately make the long range surveillance radar in the future. Similarly, in the fighters: LCA Mk I—MK1A—MKII and, finally, the Advanced Medium Combat Aircraft (AMCA).

As an Indian, it was a matter of immense pride and delight for me to fly the indigenously manufactured LCA during the Aero India on February 14, 2017, at Bangalore. I would also like to share with you that I commenced my flying career in the IAF 40 years ago, learning to fly on the HT-2 and Kiran aircraft. Years later, as an instructor, I taught young budding pilots to fly the Kiran aircraft and flew close to 1,000 hours on this aircraft, accident free. All these were designed, developed and manufactured in India.

Prior to the LCA, in the 1960s-1980s, the Indian Air Force operated the indigenously designed, developed and manufactured HF-24 Marut fighter.

A crucial contribution to all the successes of indigenisation has also been the supreme sacrifice of the IAF's pilots in testing these aircraft to battleworthy standards. We have lost 17 pilots and engineers in air accidents during testing and evaluation of the indigenous Marut, Kiran, Ajeet, Saras and Airborne Early Warning and Control System (AWACS) prototype aircraft.

While indigenisation is important, it comes with a price. Out of the 19 Category-I accidents on the HF-24, 12 were due to technical defects, of which five were fatal accidents. But that did not stop us from encouraging indigenisation. It goes to the credit of the Aeronautical Development Agency (ADA) that designed and conceptualised the LCA, and the National Flight Test Centre (NFTC) which flight tested and further refined the aircraft without any major mishaps (touch wood!).

But to achieve competent levels of indigenisation, we need to also encourage manufacturing in India. Under 'Make in India' we are progressing

a case of manufacturing 114 fighter aircraft through a strategic partnership model and 40 x Airbus C-295 by an Indian production agency.

In indigenous manufacturing, we have contracted for 40 LCA Mk-I; the Request for Proposal (RFP) has been issued for 83 LCA Mk-IA; and we will be procuring 12 squadrons of the LCA Mk II and, then, finally, the AMCA. The IAF has not shifted any goal posts, as alleged. The development has taken such an incredibly long time that armaments and technology have become obsolete. To encourage Hindustan Aeronautics Limited (HAL) in manufacturing the LCA, we have maintained the Air Staff Qualitative Requirements (ASQRs) of the first 20 LCA Mk I at standards issued in 1985. Even though the squadron was formed in June 2016, it is equipped with only 10 aircraft. As of today, the backlog with HAL, due to the long overhaul cycle and delays in upgradation, is approximately of one squadron of the Jaguar, nearly two squadrons of the Su-30 and one squadron of the M-2000. In addition, production of the Su-30 is delayed by over two years, and the LCA production commitment by over six years. To make up for losses, HAL has to play a key role to step up manufacture and overhaul. We desperately need the HTT-40 to do our Stage II training, along with our basic training as the Intermediate Jet Trainer (IJT) project has not yet succeeded after 15 years. To overcome our production delays and the falling number of fighter squadrons, we, thus, had to make emergency purchases as we needed equipment for winning the high end fight, for which the government has sanctioned the purchase of the Rafale and S-400.

We are also mindful of our commitment towards conserving natural resources. The IAF, in collaboration with the Bureau of Standards, has realised international grade bio-fuel standards and this will not only reduce the carbon footprint by military and civil aviation but also bring an additional source of income for our farmers.

I am positive that the eminent speakers of the seminar will, over the next two days, generate discussions that will invoke new ideas and refine our present understanding on air power and its crucial role in the changing world.

Thank you and Jai Hind!

MULTIPLE APPLICATIONS OF GEOSPATIAL ANALYTICS

ARVIND PANDEY

INTRODUCTION

Geospatial information in the present era is driving not only our cars but our entire day-to-day living. The constant evolution of this technology and its integration into other utilities is taking centre-stage. Geospatial data consists of earth features, their locations and characteristics, and may include imagery, Global Positioning System (GPS) coordinates, addresses and other traditional data, i.e. photos, maps, charts, etc. In this article, the endeavour is to familiarise the reader with geospatial data, and its fusion with other domain data riding on the Geographical Information System (GIS) platform and its applications.

Major applications of geospatial analytics are of dual use in which similar data sets are utilised for national security (military and non-military) and environmental applications. Several geospatial analysis applications related to the military and internal security such as intelligence preparation of the battlefield, integrated air defence picture, common operational picture for joint operations, precision targeting and bomb damage assessment, border surveillance and movement control, surveillance of disputed border areas, security census of big and important events, coastal surveillance and navigation are some areas which utilise this technology.

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The need of the hour is information in real-time, population density analysis of the affected areas, adjacent environment (with details of water bodies and low lying areas), sensitive civil and military installations, satellite imagery annotating the real-time picture of the affected sites, highlighting community structures and healthcare facilities, location of the first responder on site agencies, crowdsourced information, social media inputs, and so on. This holistic elaboration defines the capabilities of geospatial analytics.

In this article, environmental applications, along with business and cyber applications are dealt with in detail. The relationship with Artificial Intelligence (AI) and the emerging geospatial activities will also be discussed.

GEOSPATIAL ANALYTICS

Geospatial technology¹ by itself is limited in its ability to provide solutions for the queries that demand additional knowledge and relationships between multiple geographic entities. For instance, availability of erstwhile geographical maps and imagery of flood affected areas cannot fully support the disaster support response. The need of the hour is information in real-

time, population density analysis of the affected areas, adjacent environment (with details of water bodies and low lying areas), sensitive civil and military installations, satellite imagery annotating the real-time picture of the affected sites, highlighting community structures and healthcare facilities, location of the first responder on site agencies, crowdsourced information, social media inputs, and so on. This holistic elaboration defines the capabilities of geospatial analytics and its applications.²

Geospatial analytics can enable the following critical activities:³

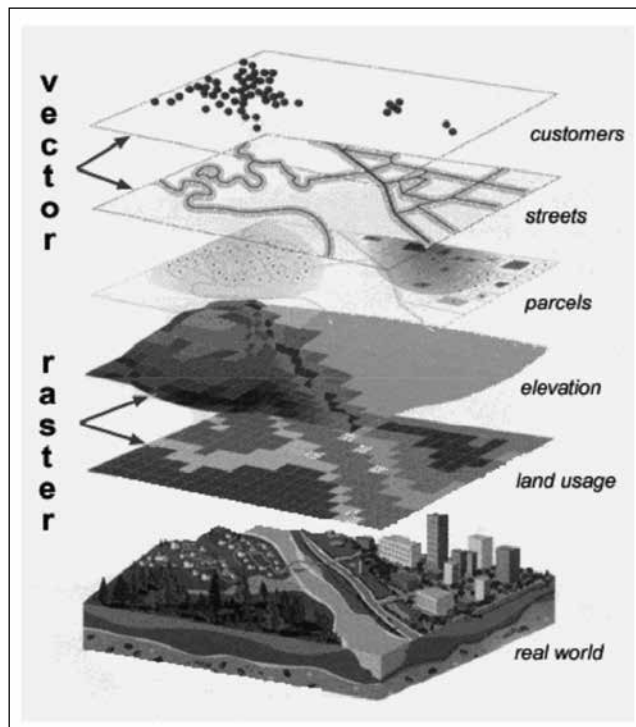
1. M J de Smith, M F Goodchild and P A Longley, *Geospatial Analysis: A Comprehensive Guide to Principles, Techniques and Software Tools* (UK: The Winchelsea Press), <http://www.spatialanalysisonline.com/HTML/index.html>. Accessed on July 26, 2018.
2. Geoint Capabilities, chap -3, Geoint basic doctrine; <https://fas.org/irp/agency/nga/doctrine.pdf>. Accessed on April 2, 2018.
3. "The Future of GEOINT, Dold an Groopman", *Geospatial Information Science*, vol 20, issue 2, 2017; <https://www.tandfonline.com/doi/full/10.1080/10095020.2017.1337318>. Accessed on April 3, 2018.

- Formation of a common platform for multiple civil/military agencies to share geospatial information.
 - Facilitate Intelligence Preparation of the Battlefield (IPB) and provide battlefield transparency.
 - Mapping of men and material movements across time, space and terrain for military tactical planning.
 - Analysing business advantages from trade insights (financial and trade secrets of business, decisions about establishing new infrastructure).
 - Managing production of significant national strategic assets (defence installations, power plants, refineries, etc.).
 - Activation of disaster support operations and planning logistics support for disaster response and other humanitarian assistance.
 - Assistance in town planning, humanitarian missions, military and cyber surveillance, internal security and precision targeting in war.
 - Forecasting to help avert dangers, counter conflicts and predict opportunities or adapt to shifting conditions.
 - Application in the use of multiple sensor technology and multiple types of geospatial data for visualisation and fructification of neutralisation missions. For instance, geospatial analytics applied towards identification of probable terrorist activities close to the Line of Actual Control/ International Boundary (LAC/IB), data mined from geotagged messages, human geography mapping, aerial and satellite image of the terrain, persistent drone surveillance and location tracking of cell phone devices enables real-time mapping and analysis of terrorist movements across time and space.⁴
- The value addition for digital geospatial analytics products is achieved by adding more layers of information to meet a stakeholder’s needs. Each layer has the capability to provide additional details and intelligence information to the desired end product.**

4 Sangeeta Deogawanka, “Geointelligence—Empowering Geospatial with Intelligence”, April 26, 2015, GIS lounge; <https://www.gislounge.com/geointelligence-empowering-geospatial-with-intelligence>. Accessed on April 2, 2018.

Information Layering Through GIS: The value addition for digital geospatial analytics products is achieved by adding more layers of information to meet a stakeholder’s needs. Each layer has the capability to provide additional details and intelligence information to the desired end product. This layering process allows the stakeholders to continually change or update the product to meet the growing needs and changing circumstances. GIS is used to facilitate the layering process. The data sets used are in vector /raster formats⁵ which are engaged by geospatial tools in the form of various layers. A descriptive image of the layering process is reproduced in Fig 1 below which clearly brings out the ingredients and the final product.

Fig 1: Process for Analysing Geospatial Information.⁶



5. Vector and raster are types of geospatial data sets. Vector data is made up of point, lines and polygons. It has vertices and paths for description. Examples of this could be borders, land parcels and streets. Raster data is made up of pixels or grids. Examples of this could be satellite or aerial imagery and elevation data.
6. Figure by <http://cherokeecountyiowa.com/offices/gis/index.htm>. Accessed on July 26, 2018.

GIS and Geospatial Analysis:⁷ GIS is a computer-based system which is involved in the acquisition, storage, management, transformation, visualisation, and analysis of information that pertains to a particular location on the earth's surface. Geospatial analysis involves extraction of information and knowledge from spatial and non-spatial data sets from the GIS through the application of a wide range of analytical techniques, including visualisation and data exploration. With the creation of *Google Earth* and similar services, both GIS and geospatial analysis are updating the geo-technology and internet to support location-based services. Technological improvements in elevation data such as the Digital Surface Model (DSM)⁸ and Digital Terrain Model (DTM)⁹ force the commercial suppliers to upgrade the geospatial tools. GIS is offered as a web service and several competitors are delivering solutions with standards of the Open Geospatial Consortium (OGC).¹⁰ Worldwide research in geospatial analysis is involving both human and physical phenomena, increasingly supported by massive quantities of data.¹¹ An example of this could be air pollution analysis, which, in the present context, is actively being geovisualised. Geospatial analytics is a tradecraft which utilises special abilities interlinked to art/science for comprehension.

Geospatial Analytics: Art or Science? The analyst community perceives that there are multiple views for explaining geospatial analysis. One view is that intuition, experience, and subjective judgment are the keys to analysis.

7. Otto Huisman and Rolf A de By. "Principles of GIS". https://webapps.itc.utwente.nl/librarywww/papers_2009/general/principlesgis.pdf. Accessed on March 7, 2018.

8. A Digital Elevation Model, or DEM, is a representation of the terrain (bare earth) with elevations at regularly spaced intervals. A Digital Surface Model (DSM) also contains elevations at regularly spaced intervals; however, the elevations represent the first reflected surface detected by the sensor. These first returns may be reflected by bare ground or by surface features such as trees and structures.

9. A digital elevation model is a 3D representation of the terrain elevations found on the earth's surface. DEMs are generated from variably-spaced Lidar ground points, or they can be created using a raster grid. A Digital Terrain Model (DTM) is a DEM in which terrain data has been further enhanced with break-lines, creating greater accuracy as it contains additional information defining terrain in areas where Lidar data alone is unable to do the job effectively.

10. The Open Geospatial Consortium (OGC) is an international not for profit organisation committed to making quality open standards for the global geospatial community. These standards are made through a consensus process and are freely available for anyone to use to improve sharing of the world's geospatial data.

11. *The Future of Geospatial Intelligence*, vol 20, 2017; <https://www.tandfonline.com/doi/full/10.1080/10095020.2017.1337318>. Accessed on March 8, 2018.

According to this thought process, analysis is an art and non-quantitative methods are followed for the final product. The other view is that quantitative data and analysis using tools such as GIS are most relevant. In this case, intelligence analysis is science-like, and quantitative methods as applied in spatial analysis are followed. For understanding these points of view, the definition in terms of the *Merriam-Webster Collegiate Dictionary*, tenth edition, is used:

- *Art - the conscious use of skill and creative imagination in the production of anaesthetic objects.*
- *Science-knowledge or a system of knowledge covering general truths or the operation of general laws, especially as obtained and tested through the scientific method.*

Experience says that integrative geospatial data tools, such as those found in GIS, act as primary aids to intuition and experience-based analysis. In this domain, there is no certain dividing line between art and science. Some geospatial analytics practitioners contend that there is no dividing line at all and a pure scientific approach to geospatial analysis is impossible. Therefore, a subtle combination of art and science is preferably worked out as a tradecraft.

Remote Sensing Capabilities: Geospatial analytics amalgamates a broad range of evolving and emerging remote sensing capabilities, including traditional imagery systems, sources associated with land-based and hydrographic surveying and imagery derived fusion systems. With technological advancements and a growing range of collection platforms and sources, it improves the access to earth observables and increases the ability to conduct persistent surveillance to obtain broad area coverage.

Airborne Imagery Platforms: Airborne imagery collection platforms, including Unmanned Aerial Vehicles (UAVs) with varying altitude, speed and sensing capabilities, provide persistent and responsive coverage of high-interest ground areas. Worldwide, high-endurance UAVs are dramatically improving the ability to conduct persistent surveillance of high-interest targets and support time-critical actions. Merging manned and unmanned

imaging capability is an emerging aspect which has been used in some conflicts by the North Atlantic Treaty Organisation (NATO) forces. In the Indian context, a wide range of airborne sensors and platforms is operated by governmental as well as civil agencies for achieving the desired tasks.

Commercial Imagery: The commercial imagery industry is an important emerging data source for generation of geospatial analytics. This helps in providing data sets to the users with no or limited capability in the field. It is now accepted that with growing capacity in both satellite and airborne imagery collection, commercial providers are able to produce a greater share of the data needed to support high resolution imagery needs for geospatial applications. Digital Globe and other such companies provide imagery as well as geospatial analytics applications for utilisation in the open domain. The high resolution commercial imagery provides an important advantage in joint operations and in internal security, as it can be shared with all the stake holders without compromising the capabilities and operating characteristics of reconnaissance systems. The availability of commercial data with crowd-sourcing¹² is becoming a boon to mankind.

GEOANALYTICS APPLICATIONS

With the availability of imagery data sets, geospatial information and other domain data sets, it is essential to visualise the applications supported by this technology. Several geospatial analysis applications related to military and internal security are:

- Intelligence preparation of the battlefield, integrated air defence picture: these applications use sensor specific data from surveillance platforms and a fused picture is generated.
- Common operational picture for joint operations, precision targeting and bomb damage assessment: these applications use a fused picture and prepare the data for utilisation by the joint forces as well as for targeting and battle damage assessment.

12. Crowdsourcing data collection consists of building data sets with the help of a large group of people. It is a process through which a task, problem or project is solved and completed through a group of unofficial and geographically dispersed participants.

The National Remote Sensing Centre (NRSC), Hyderabad—a part of the Indian Space Research Organisation (ISRO) – is the nodal agency for all geospatial related tasks. The NRSC Data Centre (NDC) is responsible for dissemination of all geospatial data to the users.

- Border surveillance and movement control, and surveillance of disputed border areas.
- Security census of big and important events.
- Coastal surveillance and navigation: these applications utilise data from all the sensors for national security purposes.

ENVIRONMENTAL APPLICATIONS

The geospatial analytics applications in day-to-day life are enumerated below, with details in the Indian context. The National Remote Sensing Centre (NRSC), Hyderabad—a part of the Indian Space Research Organisation (ISRO)—is the nodal agency for all geospatial related tasks. The NRSC Data Centre (NDC) is responsible for dissemination of all geospatial data to the users. These applications are growing at a fast pace, clearly defining the success of their technological utilisation and adaptability. Apart from attempts at the national level, regional remote sensing centres are applying and adapting to this technology; thereafter, depending upon the area of utilisation, different applications are developed. The major areas of work are in the fields of the following resources:¹³

- Agriculture.
- Water resources.
- Urban and infrastructure planning.
- Geosciences and ground water.
- Forestry.
- Disaster management support.

13. "Applications in Earth Observations", <https://www.isro.gov.in/applications>. Accessed on July 26, 2018.

The earth observation applications enumerated above have been derived from the ISRO and NRSC domains and the important characteristics are discussed hereafter.

Agriculture: Agriculture is the strength of the Indian economy and the crucial sector for ensuring food security. Timely availability of information on agriculture is vital for taking informed decisions on food security issues. India is amongst the few countries in the world that uses space technology and land-based observations for generating regular updates on crop production statistics and providing inputs

to achieve sustainable agriculture. Satellite-based optical, infra-red and radar imagery¹⁴ are used widely in monitoring agriculture. Radar imagery is especially used during the monsoon season. Hyper-spectral imaging tools have provided the requisite information which multi-spectral tools could not provide.¹⁵ Continuous monitoring and extensive utilisation of geospatial tools with different crop models and the on-ground observation network enables timely crop production forecasts and drought assessment and monitoring.¹⁶

The following primary areas are interdependent on geospatial analysis:

- Utilisation of space technology to provide crop forecasts and assessment of a drought situation.
- National agricultural drought assessment and monitoring.
- National agricultural land-use mapping.

14. Optical, infrared imagery utilises a certain portion of the Electromagnetic (EM) spectrum for imaging. Radar imagery uses a certain portion of the EM spectrum of radar which is used to create two-dimensional images, typically of landscapes. Increased usage of satellite-derived Synthetic Aperture Radar (SAR) data has occurred during the last few years.

15. Multispectral and hyperspectral imagery gives the power to see as humans (red, green and blue). The main difference between multispectral and hyperspectral is the **number of bands and how narrow the bands are**. Multispectral imagery generally refers to **3 to 10 bands**. Hyperspectral imagery consists of much narrower bands (10-20 nm). A hyperspectral image could have **hundreds or thousands of bands**.

16. Hyperspectral Remote Sensing; <http://www.csr.utexas.edu/projects/rs/hrs/hyper.html>; Accessed on Apr 15, 2018.

Satellite images, with embedded information of spatial, temporal and spectral characteristics, help in extraction of information about the historical aspect of land-use/land-cover, enhancement of existing infrastructure, terrain characteristics, etc. The analysed information forms an integral part in facilitating infrastructure planning, monitoring and management in a timely and cost-effective manner.

- Glacial lakes/water bodies monitoring.
- Watershed management.

Urban and Regional Infrastructure Planning: Infrastructure forms an integral part of the growth and development of any region. Satellite images, with embedded information of spatial, temporal and spectral characteristics, help in extraction of information about the historical aspect of land-use/land-cover, enhancement of existing infrastructure, terrain characteristics, etc. The analysed information forms an integral part in facilitating infrastructure planning, monitoring and management in a timely and cost-effective manner.

The following primary areas are interdependent on geospatial analysis:

- Imagery data provides the necessary information on topography, vegetation cover, and water bodies, etc., which are vital for infrastructure planning.

Water Resources: Water is a key driver of economic and social development and one of the fundamental elements in sustaining the integrity of the natural environment. Water, being an indispensable constituent for all life supporting processes, its assessment, conservation, development and management are of great concern for all those who manage, facilitate the availability (of water) and its utilisation. It is the major renewable resource amongst the various natural resources

The following primary areas are interdependent on geospatial analysis:

- Irrigation infrastructure monitoring and performance assessment.

- Urban and regional planning, route alignment (road, rail, oil/gas pipeline, etc.), site suitability analysis (hydroelectric project, new township), etc.
- Smart cities planning and development can be greatly enabled by geospatial analysis.

Geosciences and Ground Water: Satellite images offer a wide variety of applications in the field of earth sciences, e.g. geological and geomorphological mapping, hydrogeology, mineral exploration, monitoring of mining activity, geohazards, etc. The geosciences group at NRSC is the pioneer in this field.

The following primary areas are interdependent on geospatial analysis:

- Ground water prospects mapping.
- Coal fire mapping.
- Mineral exploration.

Forestry: Forests are the natural resource which provide mankind with numerous benefits in both goods and services. The task of managing forest data can be a daunting one without the utilisation of the proper spatial tool. Space technology has immense influence in the decision-making processes, especially in areas like forest resource management. Remote sensing as a tool has facilitated a systematic and hierarchical approach of forest resources assessment and its monitoring, using sensors of different spatial and spectral capabilities. It has also helped in the characterisation, quantification and monitoring—including specific

Remote sensing as a tool has facilitated a systematic and hierarchical approach of forest resources assessment and its monitoring, using sensors of different spatial and spectral capabilities. It has also helped in the characterisation, quantification and monitoring of different natural habitats/ecosystems.

efforts towards understanding the structure, composition and function – of different natural habitats/eco-systems.

The following primary areas are interdependent on geospatial analysis:

- Forest cover assessment.
- Vegetation type mapping.
- Biodiversity assessment.

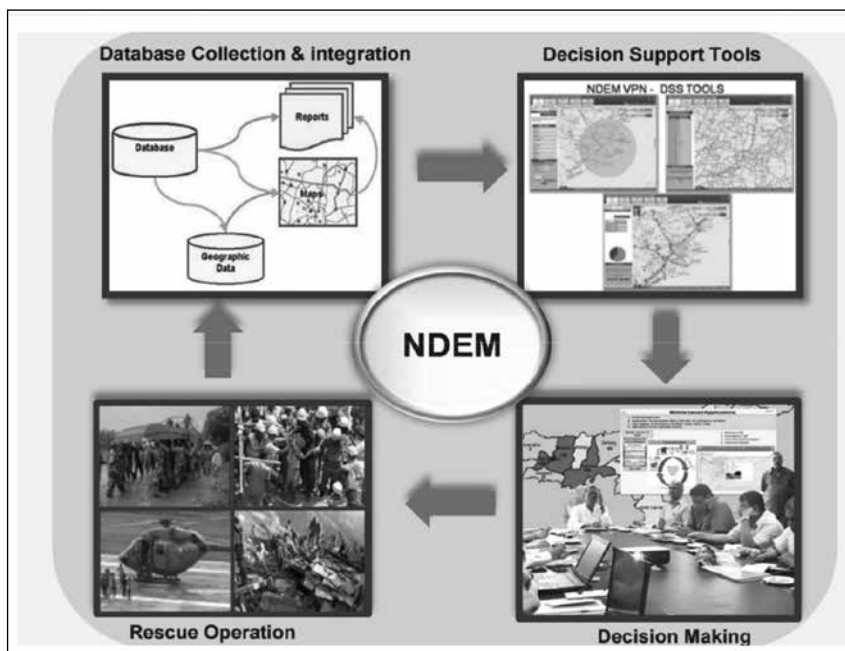
Disaster Management:¹⁷ Disaster management falls under the dual applications of geospatial analytics domain, and the data provided by the NRSC is taken as the base data for any immediate and long-term assistance. A Decision Support Centre (DSC) has been established at NRSC which monitors five types of natural disasters, viz. floods, cyclones, forest fires, earthquakes and landslides, and acquires satellite/aerial data on the affected regions. The data of the affected area is analysed and assessments, along with value added products, are disseminated to the Ministry of Home Affairs (MHA) and nodal ministries. The armed forces are a part of the support system, based on air, land and sea requirements. The National Disaster Response Force (NDRF) is the specialised force structure available as the first responder. The National Disaster Management Authority (NDMA) is the agency responsible for the overall coordination and administration.

A GIS based database termed as the National Database for Emergency Management (NDEM)¹⁸ has also been established for disaster management in the country. The data base provides all necessary geo-information for enabling GIS tools at all levels. This is also hosted on ISRO's *BHUVAN* platform. A descriptive image of the process involved is depicted in Fig 2.

The database has layered geoinformation with high resolution satellite imagery for visualisation and analysis, and also contains specific disaster layers for analysis of all natural disasters.

17. DSC, ISRO; https://nrsc.gov.in/ISRO_DMSP. Accessed on April 15, 2018.

18. Data base, NDEM; <https://nrsc.gov.in/NDEM>. Accessed on April 15, 2018.

Fig 2: NDEM Operational Loop¹⁹

APPLICATIONS IN DAY-TO-DAY LIFE

Artificial Intelligence (AI)²⁰ is **intelligence** displayed by **machines**, in contrast with the Natural Intelligence (NI) displayed by humans and other animals. In geographical contexts, AI and big data solutions always follow the same pattern. The first step is to import information from various sources. This dataset is then used to build a multi-layer model for applying geospatial tools.

Analysis based on geoprocessing involves the use of tools like the “spatial join” operation²¹ which enriches a model by appending information from different layers. If this process is applied to road safety, then, by analysing

19. Ibid.

20. Demetrio Barragán, director at Strategy Big Data, director of the management programme in Big Data, and professor at IE Business School, and Pedro Torres, chief marketing officer at Esri Spain; February 23, 2018; <https://www.ie.edu/corporate-relations/insights/location-analytics-big-data-and-artificial-intelligence-the-genesis-of-the-new-data-scientist/>. Accessed on June 21, 2018.

21. A spatial join is a GIS operation that affixes data from one feature layer’s attribute table to another from a spatial perspective. Spatial joins begin by selecting a target feature and comparing it spatially to other feature layers.

and correlating data—human, natural, and climatic factors, type of road, etc.—it is possible to create a map that minimises the risk of accidents at a particular spot and improves our understanding of the environment. Such a map can be used to predict accidents and optimise resource management, for example, by dispatching ambulances to the most dangerous areas. The most common AI applications in our day-to-day life are Amazon’s *Alexa*, Apple Inc’s *Siri* and Microsoft’s *Cortana*.

The dependence on AI in the geospatial domain is increasing day by day and to proceed further in the Indian context, the National AI Task Force²² on Defence submitted its report on June 30, 2018, to the Ministry of Defence. The report identifies applications in the military and non-military areas. Development of expertise and products for defence, cyber, nuclear and biological warfare by public sector units, in conjunction with private entities, has also found mention in the report.

Business Intelligence: Business Intelligence (BI)²³ focusses on the strategies and technologies used by enterprises for the data analysis of business information. The common tools involved are data processing, data mining and predictive analysis. This technology is designed to process large amounts of structured and unstructured data to ascertain the development of existing and new business opportunities, as explained below.

BI and Spatial Analytics:²⁴ Businesses are now focussing on the ‘where’ of things, the integration of spatial analysis and BI is helping companies to make more informed decisions, thus, leading to better outcomes. Organisations today are collecting data at every level of their business and in volumes that in the past were unimaginable. Datasets are stored in different database systems or in files with distinctive formats, all reflecting the business process, application, programme software, or information type dependencies. It is an accepted fact now that most of the data has a spatial component. Traditionally,

22. “AI Task Force Hands Over Final Report to RM”; <http://pib.nic.in/newsite/PrintRelease.aspx?relid=180322>. Accessed on July 20, 2018.

23. Shimonti Paul, “BI and Spatial Analytics: A Collaboration We Can’t Do Without”, September 20, 2017; <https://www.geospatialworld.net/article/business-intelligence-spatial-analytics/>. Accessed on June 20, 2018.

24. *Ibid.*

such data would be presented to the user in the form of long reports, either with graphs and pie charts, or in a spreadsheet format.

Spatial Analytics and Traditional Methods: Humans think visually, therefore, spatially. In the traditional methods, the ways to represent information proved to be helpful, however, they have been limited in capabilities when it comes to performing a quick analysis and comparison of data. Ordinarily, maps represent spatial relationships and spatial visualisation for an area or region.

Scope of Spatial Analysis: With businesses now focussing on the ‘where’ of things—where products are shipped, where product inventories are stacked in stores, where products are advertised, or where products are consumed, etc.—every business transaction has a geographic dimension and is, thus, becoming essential for spatial analytics. A study carried out by Dresner Advisory Services in 2017²⁵ reveals that among 30 technologies and initiatives consisting of facets varying from strategic to business intelligence, spatial/location intelligence ranks 20th.

Pitney Bowes, a location intelligence solutions provider,²⁶ identifies that social media companies like Facebook and Twitter utilise location-based data and this data is also utilised by bigger entities like Google and Bing to process that geoinformation, so that they can do a better job of servicing their clients. Location intelligence, along with business intelligence, truly amplifies technology.

Advantages to Industries:²⁷ With the success of integration, more and more industries are adopting the new technology. The following are the major sectors that are engaging spatial analytics to the BI domain.

Energy: Enabling the energy industry to discover generation and usage patterns and identify gaps in the shortest possible time.

Transport and logistics companies: For identification of fastest transportation routes, optimising warehousing processes and stock flows

25. Embedded Business Intelligence Market Study, 2017 Edition, <https://www.microstrategy.com/getmedia/8cbce43f-22fe-4bb4-bcd4-9515ca7a8e15/Wisdom-of-Crowds-Embedded-Business-Intelligence-Market-Study-by-Dresner.pdf>. Accessed on June 20, 2018.

26. Pitney Bowes, “GIS Solutions”, <http://www.pbinsight.co.in/>. Accessed on June 20, 2018.

27. Paul, n. 23.

Like private enterprises, governments are also actively incorporating spatial analysis into decision-making processes. This integration is helping them in achieving speed, accuracy, and cost-effectiveness in information dissemination, urban planning, and service delivery.

based on the consumption rates of particular products by locality.

Real estate and commercial developments: Real estate is really about the location and, thus, focusses more on this field. Geospatial insight helps in determination of optimum sites for development and further planning, construction and maintenance of projects.

Telecommunications: It enables the industry to assess the strength of the current infrastructure and helps in understanding which locations will provide the best network coverage at the lowest price possible.

Retail and wholesale industry: It is helping the industry gain invaluable insights in stock delivery, store management, inventory management, marketing and sales along with physical store-level details.

Insurance companies: The companies analyse location-based data, such as crime rates, weather patterns, etc., for enabling them to identify high or low risk cases and develop marketing strategies and policies.

Finance and banking sector: The financial sector is using location data and analytics of customers to carry out customer segmentation and profiling which helps in the development of more successful marketing and sales campaigns and helps identify and actively retain and pursue profitable customers.

Airports and airlines: Globally, airlines use spatial analytics to track flight operations more closely and accurately. Airport, meteorological, and fleet data is monitored in real-time, and the operations crew re-route flight paths to optimise fuel and staff costs. The technology also provides the ability to geolocate any flight at any point of time.

Education: This sector is utilising geoinformation of student data to enable higher education institutions to develop more effective marketing

campaigns and better understand where to put facilities. This will also provide basic trained personnel in the domain for further utilisation.

Like private enterprises, governments are also actively incorporating spatial analysis into decision-making processes. This integration is helping them in achieving speed, accuracy, and cost-effectiveness in information dissemination, urban planning, and service delivery. It is now established that in the times to come, industries will benefit from emerging technologies like visual analytics, geospatial intelligence fusion, crowdsourcing and forecasting.

The relationship of cyber information with human geography defines the path taken by a GEOINT analyst. The analyst's role is to discover, describe, explain, and interpret geographic and cyber information in order to generate cyber geointelligence products.

GEOSPATIAL INTELLIGENCE AND CYBER SPACE²⁸ (CYBER GEO-INTELLIGENCE)

Geospatial Intelligence (GEOINT) and cyber space are interwoven and are equally applicable in the military and non-military arenas. This can also be classified as a dual use domain.

In the US Army's *"Cyberspace Operations Concept Capability Plan 2016-2028"*, cyber space has been categorised as one of five domains of warfare amongst the other domains (air, land, maritime, and space). Most importantly, cyber space nodes are physically present in all the other domains. It is possible that activities in cyber space may affect activities in the other domains, and activities in the other domains can also create effects in, and through, cyber space. The technology ensures an exponential increase in the volume, variety, and velocity of the available data for geointelligence extraction.

The relationship of cyber information with human geography defines the path taken by a GEOINT analyst. The analyst's role is to discover, describe,

28. GEOINT and Cyber Space, psu; <https://www.e-education.psu.edu/geog479/node/4>. Accessed on July 12, 2018.

explain, and interpret geographic and cyber information in order to generate cyber geointelligence products.

For this task, the analyst scans and analyses the internet. Geospatial tools like distance and neighbourhood are used for analysing data flow between cyber entities.

The analysis of an open source requires an approach which sieves through a massive amount of data from the social media or other sources to create finished information. There is a common practice of analysts, often using multiple sources of information to create actionable intelligence. Some developed countries clandestinely monitor the internet for keeping an eye on the usage. To link cyber information with geography, a working model has been taken into consideration.

Classic models of the cyber domain state that cyber space can be described as comprising three layers, i.e. the physical, logical, and social. With an aim to identify the relationship with the geospatial environment, the element of geospatial location is tagged in the operational loop. Therefore, for ascertaining the information flow within the loop, these three layers have been embedded with five mutually supporting components, i.e. geographic, physical network, logical network, cyber persona, and persona. The Information Technology (IT) infrastructures and data embedded within these layers define cyber space as two distinct environments, i.e. information and operational.

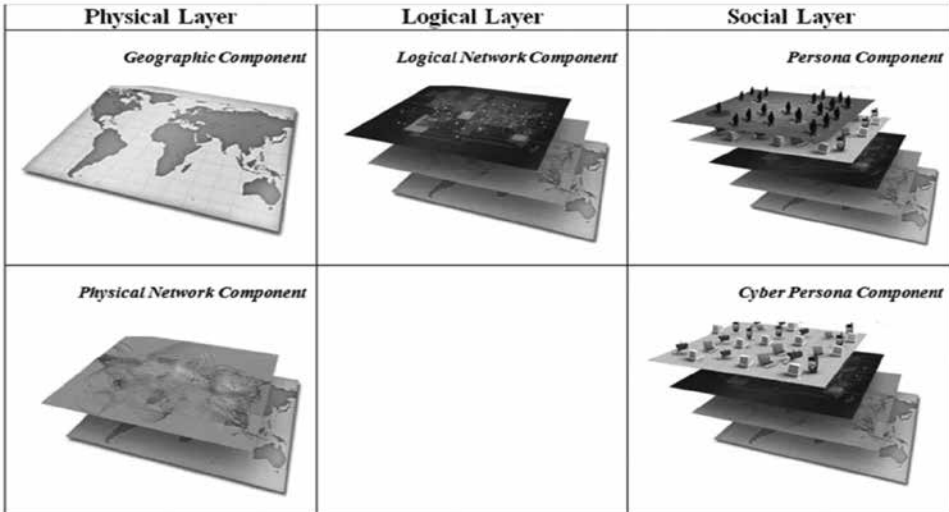
The relationship between all the layers is depicted in Fig 3.

The **physical network layer**²⁹ includes both geographic and physical network components. The geographic component consists of the geographical location of the cyber elements of the network. The geospatial signature of the entity defines the physical presence of the subject and subsequent identification of the network. The physical network component consists of the actual equipment associated with the physical infrastructure (wired, wireless, and optical) and the inter-connectivity that supports the transfer of the code and data on the networks and nodes. These components may

29. Layers of Cyber Space, FM 3-38, Cyber Electromagnetic Activities, February 2014. Accessed on July 18, 2018.

include any connector, system and other networked device where data is created, manipulated, processed, and stored.

Fig 3: Three Layers of Cyber Space (physical, logical, social) and Five Components (geographic, physical network, logical network, cyber persona, persona).



Source: The United States Army's Cyberspace Operations Concept Capability Plan 2016-2028, TRADOC Pamphlet 525-7-8.pdf and FM 3-38.

The **logical network layer** consists of the components of the cyber network which, although interconnected with each other, are distant from the physical network. The example may be of entities in the physical layer which are logically related to one another to form broader entities in cyber space that are not tied to a specific node, path, or individual. Another example could be of similar websites hosted on servers in multiple physical locations where content can be accessed through a single uniform resource locator or web address.

The **social layer** includes a cyber persona layer and a persona layer which are distant from the logical network, and it uses the domain of the logical network layer to form a digital signature of an individual or entity in cyber space. The persona layer consists of the individuals who actually operate the network and, therefore, have digital signatures that can be identified and attributed for any activity. These signatures may include various operational

elements like Internet Protocol (IP) addresses, social networking IDs, e-mail IDs and cell phone numbers. Cyber personas have important attributes in terms of fixing responsibility and targeting the source of a cyber space threat. It may happen that a single persona may have links to multiple entities of cyber personas, therefore, significant intelligence collection and analysis capabilities may be required for attribution.

Activities by the US National Geospatial Agency (NGA):³⁰ The US NGA supports its cyber community by providing imagery information to the cyber warriors. Experts defending the United States from a cyber attack utilise a new geospatial tool by being able to visualise the facility from where the digital activity is taking place.

The NGA has in the past provided a variety of value-added geospatial products to customers throughout the defence and intelligence communities. The NGA is of the view that the agency can help provide information about a potential location of cyber activity. The NGA helps find that site and it can also provide imagery products for efforts against cyber criminals. Bringing the location information to visualisation is the most useful activity for cyber warriors.

When a location where malicious cyber activity might be occurring is seen, it enables much better understanding of what might be going on at that site. The NGA is of the opinion that if the cyber community finds that some malicious activity is taking place, then, with the help of GIS tools, this geolocation can be identified. The issue of precise identification of the geolocation required a constant surveillance on the suspects and the information has to be correlated with other inputs. Stakeholders would have to approach the NGA with intelligence on potential cyber target areas, and the agency would need to incorporate this information to narrow down the location.

Customers usually request a simple description of the potential target—its appearance, its location and any other distinguishing features. This description could be very revealing—for example, a set of microwave dishes

30. Robert K. Ackerman, "Intelligence Generates a Cyber Picture", *Signal Magazine*, June 1, 2014, <https://www.afcea.org/content/intelligence-generates-cyber-picture>. Accessed on July 20, 2018.

on a building's roof could tip off analysts that a structure is more than just an innocuous building. In some cases, stakeholders ask the NGA to identify a specific location. It's an iterative process and is performed in collaboration and it sometimes helps the agency to narrow down to the target.

Geoanalytic tools are applied by the NGA to investigate cyber geo-intelligence missions, along with other areas of collection for fusion. The agency's partnership with the National Security Agency (NSA) and the US Cyber Command assures that the NGA strives to develop this tradecraft.

Cyber Threat Intelligence Assessment:³¹ The ingredients of geospatial information come in the form of feed from several sources. An insight to this is being provided by several cyber threat assessment sites which are operating and providing assessment services the world over, the important ones being Norse, Kaspersky, Fire eye, Fortinet and Checkpoint. Norsecorp IPViking claims to be providing geolocation assessments for the users. Questions are asked about whether these provide real-time data or not. As originator and target information is being provided, this leads to geolocating the cyber activity and enhances the situational and spatial awareness. There are several activities which go unnoticed but in the case of any suspicion, the inputs are to be correlated, fused and analysed.

Norsecorp is said to monitor all internet traffic routing through its honeypots³² and is able to identify most of the data. However, the threat assessment in terms of commercial and military use is required to be ascertained at each decision level.

Great Firewall of China (GFW) and Geolocation of China's Cyber Unit: The "Golden Shield Project", popularly known as the "Great Firewall of China (GFW)", launched in 2003, provides security at Internet Service Provider (ISP) level and ensures verified interaction between the global internet and the Chinese internet.³³ GFW is also said to be more liberal towards traffic inside China and operates mostly for traffic being tested at the Chinese

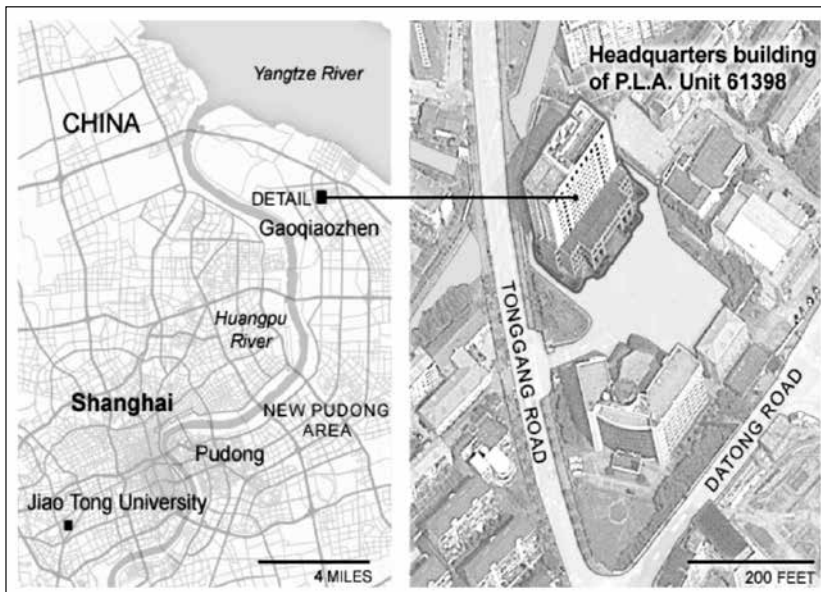
31. Real Time Visibility, IP Viking; <http://map.norsecorp.com/#/>. Accessed on July 24 , 2018.

32. In computer terminology, a **honeypot** is a computer security mechanism set to detect, deflect, or, in some manner, counteract attempts at unauthorised use of information systems.

33. R Bu, "The Great Firewall of China", 2015; <http://campus.murraystate.edu/academic/faculty/wlyle/540/2013/Bu.pdf>. Accessed on July 24, 2018.

borders. The structure of China’s internet is different from that of other countries, and it is said that the accuracy in geolocating the IP addresses is subject to certain restrictions by the GFW but the efforts put into this field by researchers are encouraging. By various mapping techniques and fusion of information, it has been possible for researchers in the USA to pin-point the location of activities of a cyber unit of the People’s Liberation Army (PLA) which has continuously been carrying out cyber activities against the USA. The location, as analysed, is shown in Fig 4.

Fig 4: the Location Intelligence: Unit 61398³⁴



Mandiant, a computer research consultancy firm, brought out in a report in 2013 that Unit 61398 was actively involved in cyber operations against the global network. It suggested that the cyber unit was operating out of a nondescript 12-storey white tower off Datong Road in the Pudong New area of Shanghai. The report claimed that the cyber unit represented one group of actors in a “long-running and extensive cyber espionage campaign”

34. Source: Mandiant APT1 Report; <https://www.fireeye.com/content/dam/fireeye-www/services/pdfs/mandiant-apt1-report.pdf>. Accessed on July 24, 2018.

that Mandiant contended could only be sustained with “direct government support.” Based on the size of this facility, Mandiant speculated that the unit employed hundreds and possibly as many as 2,000 people.³⁵

Fire eye³⁶ (of which Mandiant is a part now) has denied using a technology named as *hack back* in which the investigators turn on the web cams of the hackers during the process. However, Mandiant continues to stand by its report on Unit 61398.

EMERGING AREAS OF GEOSPATIAL ANALYTICS

*Geospatial Fusion*³⁷

Geospatial fusion is achieved by combining geographic information from multiple sources which may belong to various sensors, networks, databases and documents. Fusion is performed to evaluate spatial or spatiotemporal phenomena for purposes such as tracking, prediction or reconstruction of an environment. For example, a situational assessment of a major flood may fuse imagery data from airborne or satellite sensors, social media, news and reports from observers on the ground. In the present era of technological advancement, fusion is important because assessments of a phenomenon from multiple sources of information are likely to be better than those from a single source. In the military context, fusion is the most important part of warfare as it provides the necessary real-time inputs to decision-makers in the field.

CROWDSOURCING³⁸

The term crowdsourcing is defined in the 2011 *Merriam-Webster Dictionary* as “the practice of obtaining needed services, ideas, or content by soliciting contributions from a large group of people and especially from the online

35. Ibid.

36. <https://www.itnews.com.au/news/fireeye-denies-hack-back-against-chinas-unit-61398-495612>. Accessed on July 30, 2018.

37. National Academies Press, catalogue; <https://www.nap.edu/catalog/18265/future-us-workforce-for-geospatial-intelligence>. Accessed on March 7, 2018.

38. Crowdsourced GEOINT data, Penn State University; <https://www.e-education.psu.edu/emsc100s/node/828>. Accessed on March 7, 2018.

The application of visual analytics tools is used to extract inferences from huge, variable, and often contradictory geospatial data and other information so as to ensure that human intervention is limited and does not affect the analysis.

community rather than from traditional employees or suppliers.” Crowdsourcing is related to participatory sensing, which shares the same principle of collecting data from a set of users working collaboratively.³⁹The two terms (crowdsourcing/participatory sensing) are often used interchangeably, but the preferred term implies not only data collection but also other types of group activities, such as utilising professionals’ work. Spatial information provided by crowdsourcing is generally referred to as volunteered geographic information. As the

information is collected by volunteers, there is a huge challenge of accuracy, credibility, and reliability. With the increasing use of crowdsourced data, issues of data quality, purity and uncertainty will increase in importance. An example of this can be found in Digital Globe (a commercial imagery provider) providing its imagery for the search of the missing MH 370 flight. Tomnod, an analytics company, ran a campaign for the search of the flight in the open domain and approximately 60,000 counts were received.⁴⁰

VISUAL ANALYTICS

Visual analytics is the science of analytic reasoning, facilitated by interactive visual interfaces integrated with computational power and database capacity. Analytical reasoning is essential to the analyst’s task of drawing conclusions from a dissimilar set of evidence and assumptions. The application of visual analytics tools is used to extract inferences from huge, variable, and often contradictory geospatial data and other information so as to ensure that human intervention is limited and does not affect the analysis. Effective utilisation of the powerful human perception system for visual analysis tasks

39. Crowdsourcing; <https://www.digitalglobe.com/products/crowdsourcing>. Accessed on March 7, 2018.

40. MH 370, Search; <http://blog.digitalglobe.com/crowd/flightmh370possibledebris/>. Accessed on March 10, 2018.

requires the applicability of the appropriate human-computer interface. An example of this could be analysis of movement of people and objects on a large scale through the use of GPS.⁴¹ The application is presently widely used by different search engines like Google maps.

FORECASTING⁴²

Forecasting is a technique that uses observations, knowledge about the processes involved, and analytical skills to anticipate outcomes, trends, or future behaviours.

Geospatial and predictive modelling tools

are engaged for predictions and anticipatory intelligence. Predictions and anticipatory intelligence estimate what may happen, along with the odds of it happening (such as predicting reallocation of forces in the case of a changed operational scenario). Geospatial modelling may provide a hot spot analysis for events taking place on a regular basis. An example of this is obtaining data regarding smart city development.

In the geospatial domain, it is important to understand that forecasting addresses the concerns regarding what, where, when, and how events will unfold and how processes will evolve in space and time. The ability to forecast is in the core of many scientific disciplines. Geospatial events and processes are a result of real-time communication amongst the human natural artistic behaviour and scientific environments as well as social and cultural systems across global, regional, and local scales.

CONCLUSION

Geospatial data in the present times is an essential ingredient without which no geospatial application can be performed. The data, whether structured

Geospatial data in the present times is an essential ingredient without which no geospatial application can be performed. The data, whether structured or unstructured, provides ample time, space and tools to analyse and arrive at an informed and structured decision.

41. Information Visualisation, Visual Analytics Applications, p. 169; https://link.springer.com/chapter/10.1007/978-3-540-70956-5_7. Accessed on March 10, 2018.

42. Future work force for geospatial intelligence, n. 31.

or unstructured, provides ample time, space and tools to analyse and arrive at an informed and structured decision. GIS is the backbone of all such applications, and along with the analyst's capability, the technology is able to derive fused results for all the stakeholders and decision makers.

The applications discussed such as cyber, business, environmental areas, infrastructure development and disaster mitigation mostly cover the civil domain; however, some of these could be of dual use. The easy availability of commercial imagery, GPS data, business domain data and OGC compliant GIS makes the task goal-oriented. In the future, it is perceived that most of the businesses will actively utilise geospatial data driven by artificial intelligence for better competition and business prospects. Applications in support of military stakeholders in the external and internal security environments demand interdependent data sets for various fused products which can be utilised by different users in an integrated environment. The expertise in the military context also needs to be developed on the lines of the NRSC, which has proven its worth at the national level.

In the Indian context, the academia, industry and research institutes play a vital role as the applications are still at a nascent stage and the integration requires a holistic approach towards capacity building and development of this technology.

CAPABILITIES AND TRENDS IN CONDUCT OF COUNTER-SURFACE FORCE OPERATIONS IN THE FORESEEABLE FUTURE

JPS BAINS

As we look to the future of war, we must face one absolute certainty: any projection will prove faulty.

— Col Jeffery R. Barnett¹

INTRODUCTION

Historically, humans have always developed and used new technologies for military purposes. New technologies have usually created new military options which, in turn, required new procedures and concepts. The latter is the key to assessing whether technological superiority can be translated into winning a war. Technology can, and is likely to, play a significant role in accomplishing war objectives, but only if the application is done in a skilful manner and with a good understanding of what exactly one wants to accomplish. The last conflict fought by India, in the snow-clad peaks of Kargil, showcased the employment of Battlefield Air Strikes

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1. Jeffery R. Barnett, *Future War: An Assessment of Aerospace Campaigns in 2010* (Diane Publishing Co., 1996), p. xvii.

It is definitely expected that weapons will be more versatile and have greater ranges and stand-off capability; mission tasking would be less restricted by aircraft, weapons, weather and ground commanders; aircrew could have access to information from a common network that will electronically model the battlefield.

(BAS) and Battlefield Air Interdiction (BAI) in a high altitude environment. There were initial losses, which resulted in a change of tactics. Similarly, future wars will also bring a paradigm shift in strategy and tactics, greatly influenced by technology.

In the future, advances in technology and the restructuring of organisations and processes are likely to blur the boundaries between the air and space environs. The concept of aerospace power will get expressed in a better pervasive and seamless military use of the third dimension.² It is definitely expected that weapons will be more versatile and have greater ranges and stand-off capability; there may even be a possibility of a reconfiguration of damage mechanisms in-flight, as per type of target [based on Artificial Intelligence (AI) target recognition features]. Mission tasking would be less restricted by aircraft, weapons, weather and ground commanders; aircrew could have access to information from a common network that will electronically model the battlefield. One may even see the emergence of space docking stations and a complete transition to unmanned flights and robotics.

The possibilities are endless and while they may presently be nascent, cultured in wild imaginations, these may be a reality of tomorrow. With this background of vast uncertainty on the capabilities of the future and seeming unpredictability, there, however, needs to be a method in the madness. One may not, and should not, aim to predict 50 years hence, but definitely looking at the trends, one may be able to hazard a guess on the possibilities in the next two decades. By applying the trends of recent military conflicts to the evolving social and political world climate, it is possible to make some reasonable predictions. In line with this school of thought, this article would endeavour to examine the possible nature of conflicts in the next two decades

2. *British Air and Space Doctrine, AP 3000, Fourth Edition (2009), CAPS, Air Command, UK, p. 13.*

from where it would seek to derive the future capabilities that could enhance the efficacy of air land battle platforms, technologies and mechanisms.

POSSIBLE NATURE OF AIR LAND CONFLICT

The historic role of maritime forces has been to exercise sea control, while land forces close in and engage the enemy to take and hold ground. Air forces have traditionally supported the other components or acted independently for strategic effect. While the relationship between the maritime and air components

has remained largely unchanged, the linkages between the air and land components have evolved rapidly since the end of the Cold War, particularly as the capabilities of air forces have increased markedly in recent years, as demonstrated most convincingly in the 2003 Gulf War. One lesson emerging from the recent wars is that while air power remains an instrument of choice, its effectiveness depends to a large extent upon the adversary, the kind of target systems that can be engaged through the medium of air and the ability of the military and political leadership to use it for maximum effect.³

One lesson emerging from the recent wars is that while air power remains an instrument of choice, its effectiveness depends to a large extent upon the adversary, the kind of target systems that can be engaged through the medium of air and the ability of the military and political leadership to use it for maximum effect.

Conventional Land Conflict

The army increasingly views air power as indispensable to its future war-fighting concepts and seeks mechanisms to ensure that it is available and responsive to the needs of the land forces. For the air force, there is a concern to ensure that air power's unique ability to mass rapidly is not lost in efforts to provide on-call fires

3. *Basic Doctrine of the IAF*, Directorate of Operations (Space) Air Headquarters, New Delhi, 2012, p. 10.

to small ground elements spread across a large battle space.⁴ While air interdiction and BAI would continue to be important tenets of Counter-Surface Force Operations (CSFOs), with improvements in technology and weaponry, one would also need to relook at BAS, especially as attrition on the battle front would increase the political linkage to war-fighting. BAS produces the most focussed and briefest effects of any force application mission and, therefore, rarely creates campaign level effects. It is the least efficient application of air power, but, as was seen in Operation Anaconda, it may be the most critical for ensuring the success or survival of surface forces. The operational difficulties and the risks involved are greater and that is where the ultimate rationale for modernisation will lie. One of the most tragic lessons from recent combat experiences is that fratricide is still a problem on the modern battlefield.⁵ Combat identification and friendly-force tracking techniques will, therefore, enhance dramatically. Precision, information technology, space, intelligence and better command and control enablers will increase effectiveness and can help achieve objectives more efficiently. This would provide commanders a flexible capability to make other applications of military power more effective and drive an early end to conflict.⁶

The conventional land battle in the foreseeable future will be characterised by increased violence, lethality and destruction, with the battle being prosecuted with enhanced firepower, greater mobility, high tempo and manoeuvres by mechanised forces. In this battlefield of high fluidity, with no distinctive fronts, flanks and rear, the focus would be on joint application of air and land combat power. There will be an enhanced role for interdiction, surveillance, reconnaissance and target information, with fire being harmonised to operate within the enemy's decision cycle for neutralisation

4. Bruce R. Pirnie, Alan Vick, Adam Grissom, Karl P. Mueller, David T. Orletsky, *Beyond Close Air Support: Forging a new Air-Ground Partnership* (USA: RAND Corporation, 2005).
5. Leon E. Elsarelli, *From Desert Storm To 2025: Close Air Support in the 21st Century* (USA: Research Report, Air Command and Staff College, 1998).
6. "Counterland Operations: US Air Force Doctrine Document 2-1.3", September 11, 2006. Headquarters Air Force Doctrine Centre, USA.

of his Centres of Gravity (CoGs). Establishment of air superiority conditions over the battle area would, however, remain an inviolable and fundamental prerequisite.⁷

Technology Driven

Following the overwhelming victory of coalition forces in Desert Storm, some air power analysts have begun to declare that technological superiority has finally caught up with air power theory.⁸ One line of argument interprets that Operation Desert Storm confirms the decade-old Soviet prediction of an impending “military-technical revolution” driven by advances in microelectronics, automated decision-support systems, telecommunications, satellites, advanced sensors, lasers and other non-nuclear munitions; the effects so accurate and lethal that they could wreak levels of military damage comparable to those attainable with Tactical Nuclear Weapons (TNWs).⁹ Soviet theorists have argued that in the near future, the so-called “reconnaissance-strike complexes” would enable commanders to detect targets and attack them effectively at long ranges, and within minutes. These combinations of sensors and weapons would blur traditional distinctions between offensive and defensive fires and allow the conduct of war over far greater distances.

Air power’s contribution to future operations will be underpinned by a robust, networked air command and control system that is resilient to cyber attack, counter-Intelligence, Surveillance, Target Acquisition, and Reconnaissance (ISTAR) information and conventional attack. The responsive command and control system provided by air power that combines man-in-the-loop analysis, with machine-to-machine interfacing, automated target recognition and artificial intelligence will enable air and surface component

7 Kapil Kak, “A Century of Air Power: Lessons and Pointers”, *Air Power Journal* (IDSA), vol. XXIV no. 12, March 2001.

8. Elsarelli, n. 5.

9. Thomas A. Keaney and Eliot A. Cohen, *Gulf War Air Power Survey Summary Report* (Washington DC: Government Printing Office, 1993), p. 235.

commanders to operate as one. Operational headquarters would be required to adjust their structures, composition and procedures to exploit the opportunities provided by the network to tackle fleeting targets within an ambiguous battle space. Similarly, networking and the full integration of the joint headquarters will assure access to air power through a flexible, adaptable and more responsive air tasking order mechanism that enables precise synchronisation with the other components.¹⁰

Unconventional Conflict

Irregular and hybrid warfare have blurred the boundaries among the strategic, operational and tactical levels. Consequently, traditional air power roles have become less sharply delineated. Many operations that would once have been described as tactical, now have impact at the strategic level. For instance, air attacks in Afghanistan in 2008 were confined to limited target sets within a well-controlled battle space, yet their effects resonated strongly among the local population, who were sensitive to the asymmetric application of force and represented a centre of gravity at the operational or strategic level. Consequently, tactical engagements are now often fought amongst non-combatant populations and increasingly in urban areas, where situational awareness is no longer enough to conduct effective military operations; instead, commanders need to develop situational understanding. Understanding the enemy's perceptions, fears and motivations is now as important as building an awareness of his force dispositions and intentions.

Irregular Warfare

Pertaining to irregular warfare, air power can provide critical capabilities including persistent over-watch, security and force protection for land forces over large areas, where friendly or indigenous force ratios are low. The benefits include its capability as a force multiplier where its mobility and firepower reduces the requirement of surface forces and political

10. "Future Air and Space Operational Concept in Practice—The Next Iteration of Modern Air Power", undated article in *RAF Journal*. Accessed at <http://adastra.rafweb.raf.r.mil.uk/live/general/fasoc.htm>.

sensitivity, ability to bring precise and proportionate firepower to bear, speed of response, kinetic and non-kinetic effects and unique ability to exert psychological pressure through a show of force. Pitfalls include the misperception that its employment is disproportionate because of its destructive potential; a temptation to substitute air power for ground forces, beyond rational limits; and inadequate joint planning, when air operations are added as an afterthought to a two-dimensional plan that has already been conceived, rather than being integrated from the outset.¹¹

Hybrid Warfare

The concept of hybrid warfare has been used to describe conflicts where high-technology and conventional capabilities are mixed with irregular tactics. The Lebanon conflict of 2006 was the most recent example of application of this type of warfare. The Israeli Air Force's experience in fighting Hezbollah demonstrated that while air power is decisive in the prosecution of conventional operations, it must be applied with great care in such warfare. In this type of warfare, non-kinetic air power roles may be as important as kinetic effects and a truly integrated joint campaign is likely to be the best guarantor of success.

Warfare in Urban Environment

When an adversary chooses to hide and fight in an urban environment, collateral damage and unintended effects are the inevitable outcomes. Emerging technologies such as small diameter bombs and limited blast radius warheads, in conjunction with increased precision, confine, as well as allow, a better control of the direct effects which would minimise collateral damage and unintended effects.

Other Conflicts

Ethnic conflict in the Balkans, government turmoil in Haiti and famine in Somalia also provide lessons for CSFO employment. They stand in stark contrast to the Gulf War environment and demonstrate the need

11. n. 2, pp. 59-61.

to refrain from assuming that the scenario of Desert Storm is applicable to all future air power requirements. As competition for limited world resources intensifies, it can be assumed that these environmental stresses will bring states into conflict. Examples of these possibilities include oil reserves in the Persian Gulf, water supplies in the Arab-Israeli region and commercial access to the South China Sea.¹² Military confrontations in Yugoslavia, Angola, Burundi, Afghanistan and Georgia are but a few of the better-publicised conflicts that illustrate that ethnic conflict will remain high on the list of future trouble spots.¹³ Supporting such scenarios places unique constraints on the application of air power and CSFO in particular. These problems include close proximities of adversaries, target acquisition difficulties and very short response requirements. Air assets of the future must be just as capable of a graduated response in these situations as ground units.

The Indian Context

India currently faces, and will continue to face, the full 'spectrum of threats' ranging from nuclear confrontation, conventional war, conflicts (limited in area, scope or objectives), to lower end friction such as insurgencies, terrorism, etc. Moreover, India also needs to be prepared for an escalation of conflict from limited wars to nuclear wars. The spectrum will acquire complexity and technological sophistication, making it prudent and necessary to move away from a "threat-based" preparation, to a more accommodative and flexible "capability-based approach".¹⁴ Our own national security strategy recognises these potential threats and describes the need to be able to engage in not one but two major theatre wars with overlapping timeframes.

12. Patrick M. Cronin, *2015: Power and Progress* (Washington, D.C.: National Defense University Press), p. 80.

13. John L. Petersen, *The Road to 2015* (Emeryville, CA, USA: Corte Madera: Waite Group Press), p. 274.

14. Fali H. Major, "Indian Air Force in the 21st Century: Challenges and Opportunities", *Journal of Defence Studies*, (IDSA), vol 2, Summer, 2008.

FUTURE CAPABILITIES

Collation of Requirements

Capability development is essentially based on requirements. The nature and types of battles in the 20th century instigated certain requirements which, in turn, led to the development of evolutionary technologies. The 21st century is also being shaped in a similar manner. Collation of the trends of the previous century and a changing viewpoint, as brought out in a study by RAND Corporation is tabulated below.

Table 1:Table of Identified Requirements¹⁵

Old View (20th Century)	New View (21st Century)
Peace-time tempo	War-time sense of urgency
Reasonable predictability	Era of surprise and uncertainty
Single-focussed threats	Multiple, complex challenges
War against nation	Conducting war in countries we are not at war with (safe havens)
One-size-fits-all deterrence	Tailored deterrence for rogue powers, terrorist networks, and peer competitors
Responding after a crisis starts (reactive)	Preventive actions, so problems do not become crises (proactive)
Crisis response	Shaping the future
Threat-based planning	Capabilities-based planning
Focus on kinetics	Focus on effects
20th-century processes	21st century integrated approaches
Static defence and garrison forces	Mobile, expeditionary operations
Under-resourced, standby forces	Fully equipped and fully manned combat-ready units
Battle-ready forces (peace)	Battle-hardened forces (war)
Large institutional forces (tail)	More powerful operational capabilities (teeth)
Major conventional combat operations	Multiple, irregular, asymmetric operations
Separate military service concepts	Joint and combined operations

15. Paul K. Davis, "Military Transformation? Which Transformation, and What Lies Ahead?" Accessed from <http://www.rand.org/pubs/reprints/RP1413.html>.

Old View (20th Century)	New View (21st Century)
Forces that need to deconflict	Integrated, interdependent forces
Exposed forward forces	Reaching back to the continental United States for support
Emphasis on ships, guns, tanks and planes	Focus on information, knowledge, and timely, actionable intelligence
Massing forces	Massing effects
Set-piece manoeuvre and mass	Agility and precision
Single-service acquisition systems	Joint portfolio management
Broad-based industrial mobilisation	Targeted commercial solutions
Service and agency intelligence	Joint information operation centres
Vertical structures and processes	More transparent, horizontal integration (matrix)
Moving user to data	Moving data to user
Fragmented homeland assistance	Integrated homeland security
Static alliances	Dynamic partnerships
Predetermined force packages	Tailored, flexible forces
United States performing tasks	Building partner capacities
Static post-operation analysis	Dynamic diagnostics and real-time lessons learned
Focussing on inputs (effort)	Tracking outputs (results)
Department of Defence solutions	Inter-agency approaches

Technologies and Capabilities for Future

We shall seek to examine the technologies and capabilities that may unfold in the future starting from what is currently under development and known in the media; to certain technologies which are nascent and being applied in different fields but which could shape the manner of conduct or efficacy of CSFO operations.

Future Offensive Air System: Future Offensive Air System (FOAS) is the name given to a number of concept options which are being examined for the UK Ministry of Defence's requirements. The Future Combat Air Capability Programme will be looking at the force mix of aircraft and missiles

already under procurement, including the Strategic Unmanned Aerial Vehicle Experiment (SUAVE). The manned aircraft would operate in long range, low level missions, using stealth technologies and terrain screening. Electronic warfare research areas being examined include multi-sensor data fused networks, more powerful radar and counter-measures processors and the frequency dependence of stealth technologies, sensors and decoys. A possibility of using the Airbus Military A400M as a platform for Air Launched Cruise Missiles (ALCMs) is being examined. A range of Unmanned Aerial Vehicles (UAVs) would be deployed for surveillance, weapon targeting, command and control as well as for the electronic warfare and combat role. Studies of fire-and-forget missile technologies are underway on propulsion, guidance (using millimetre-wave and imaging infrared with focal plane arrays) and on robustness against counter-measures. Other concepts include a combination of advanced cruise missiles, modular carriage and release concepts, data linking to satellites, Joint Surveillance and Target Attack Radar System (JSTARS) or other Command, Control, Communications, Computers and Intelligence (C4I) assets and real-time battle damage assessment.¹⁶

Advances in Unmanned Systems: Unmanned systems are highly attractive in the air and naval sectors due to their favourable costs, covert nature and lack of associated casualties. They also reduce energy costs and logistical footprints through their lighter structure and heightened fuel efficiency. Developments are underway to improve autonomy and weaponisation for broader offensive and defensive deployment. Requirements for enhanced surveillance capabilities have also led to work on nano-unmanned aerial systems [nano-Unmanned Aerial Systems (UAS)], individually and as potential components of 'nano-swarms' or 'swarm drones'. It is estimated that the switch to all unmanned flights will take place two to three decades hence.

Weapon Advances: Weapons advances are in the form of integrating technological and electronic advances to increase range, lethality, speed, accuracy and stealth. There is a push for weapons technologies to counter

16. "Future Offensive Air System, UK", 2015, RAF Article. Accessed at www.airforce-technology.com on October 3, 2015.

Future systems are evolving towards making the soldier 'an individual C4ISR node on the modern battlefield', equipped with lightweight command, control and communications elements that can be worn on helmets, attached to wrists or used as tablets or smartphones.

'difficult air targets', such as UAVs and surface-to-air weaponry. Developments are ongoing in such areas as **kinetic, directed-energy and precision-guided weaponry.**

Advances in Intelligence and Surveillance Systems: Improvements in electronics and computing are being integrated to improve the quality, quantity and accessibility of actionable intelligence. Digital **electronic surveillance** is a highly sensitive area of technological development, with current research addressing jammers, geolocation techniques, radar and future challenges from engaging in urban theatres. Advances in **Geospatial Intelligence (GEOINT)** are occurring in the sea and land

sectors. GEOINT is benefitting from graphics and computing advances in the commercial electronics industry to enhance 3-D imaging and speed intelligence dissemination. General interest in **electro-optical systems** reflects the increasing importance of improved visual sensing capabilities and lighter, more sophisticated unmanned vehicles.

Advances in Radars: Radars have improved through integration of related technologies, with 3-D volume search radars capitalising on advances in transmitting and processing, waveform generation, digital beamforming and electronic scanning and stabilisation. These domains are also expected to expand as new detector materials reach maturity, as has been achieved with currently used compounds and micro-bolometers.

Advances of Man-Machine Interface Systems: To benefit from the heightened volume of intelligence and communications, the man-machine interface is becoming increasingly individualised and mobile in order to improve rapid and easy access to information. Future systems are evolving towards making the soldier 'an individual C4ISR node on the modern battlefield', equipped with lightweight command, control and

communications elements that can be worn on helmets, attached to wrists or used as tablets or smartphones. This is also true at the macro equipment level, an example being the use of commercially inspired touchscreen capabilities in new cockpits.

Additive Manufacturing or 3-D Printing: Additive manufacturing or '3-D printing' may have a transformative impact in a range of areas, enabling customisation of goods, localised production, added functionality and intricacy of design. This is more in the maintenance realm but could easily find resonance in most defence related equipment, including weapons in the future. It offers a revolutionary manufacturing technology that significantly reduces time scales for every stage of the design and production process. This technique enables quick innovation as well as rapid equipment replacement in an operational context.

Synthetic Environment:¹⁷ The Synthetic Environment (SE) is a multi-disciplinary technology area that may represent either natural or artificial environments, virtual reality technologies and is capable of modelling complex relationships and interactions between various actors and components of a given system. Closely linked to Information Technology (IT) developments, SE advances are occurring in the areas of visualisation, interaction and processing technology. New immersive and virtual reality technologies are improving the realism of the simulated experience, like 3-D capabilities, Augmented Reality (AR), network interoperability to involve multiple machines, multi-player and motion-sensor technologies and Graphics Processing Units (GPUs). SE is a valuable enabler of military training, particularly due to the reduced tempo of modern military operations and the lack of space for live training at a realistic scale. Live, Virtual and Constructive (LVC) training can

New immersive and virtual reality technologies are improving the realism of the simulated experience, like 3-D capabilities, Augmented Reality (AR), network interoperability to involve multiple machines, multi-player and motion-sensor technologies.

17. Maryse Penney, Tess Hellgren and Matt Bassford, "Future Technology Landscapes: Insights, Analysis and Implications for Defence". Accessed at www.randeurope.org/dstl.

Net-centricity and ability to collate fused information in real time from various platforms is the way forward. As seen from the recent wars, airborne and space-based sensors provided a constant flow of information about enemy force dispositions and activity.

be used at all stages of the training process: providing initial learning, preventing skills from fading and delivering post-mission recuperation. In defence acquisition, SE is useful across the full range of testing and development, from exploring initial concepts through to assessment, demonstration/manufacture and upgrading of equipment. SE enables equipment testing in controlled environments, decreasing the expense and risk of real demonstrations. SE is also useful in modelling disposal scenarios, such as in the UK's recent study on disposal options for a nuclear submarine. SE is valuable for defence testing and training capabilities, both by overcoming challenges of real-life scenarios (such as cost) and by enabling hypothetical situations to be modelled.

Nanotechnology: This is another priority area marked for rapid expansion as a key enabling technology. It has future potential to revolutionise material properties such as strength, weight, cost and conductivity.

Cyber Warfare: While cyber warfare has not yet matured, its future offensive and defensive deployment could transform the nature of battle. Reflecting this possibility, cyber security concerns continue to influence defence capability needs in C4ISTAR areas of information sharing, intelligence, espionage and 'cyber-situational awareness'.

Other Developments: A number of emerging technologies in the early stages of development and integration are characterised by both high uncertainty and high potential for cross-sector application. Identifying and applying **new materials with self-healing capabilities** to lighten and strengthen military equipment is a commercial-led area with wide-ranging possibilities. The technology's potential applications include reducing radar visibility, providing vehicular armour, offering coating for jet engine performance, and creating 'smart' materials that react to environmental conditions.

The possible technologies and future impact potential are tabulated below.¹⁸

Table 2: Future Technologies and Impact Potential

Technology	Impact Potential
Nanotechnology	Potential unknown, but possibly a game changer
Radar	Step by step advances from integration of new technologies which are rapidly maturing
Cyber warfare	Game-changing possibilities for evolving offensive and defensive techniques
New materials	Wide potential in many applications in both marginal and non-linear changes
Unmanned systems	Marginal improvements in functionality with some major steps possible in autonomous combat systems; swarms and nano will be game-changers in increasing surveillance and combat capacities without casualties
Hybrid/alternative energy sources	Potential game-changer but tangible application has been marginal so far
Electro-optical systems	Step by step improvements as new detector materials reach maturity
Simulation techniques	Step by step improvements for training programmes
3-D printing	Game-changer if incorporated across defence industrial base
Man-machine interface	Game-changing advances in usability and accessibility of informational inputs
Engines technology	Step by step improvements in power and fuel efficiency

18. Ibid.

Technology	Impact Potential
Electronic surveillance	Step by step improvements in surveillance and communications techniques in line with increasing civilian usage
Directed-energy weapons	Substantial improvements in accuracy, speed, and disruption
Geospatial Intelligence (GEOINT)	Marginal improvements in current mapping capabilities, data fusion and interpretation
Precision-guided weapons	Substantial improvements in accuracy, range, speed and lethality
Kinetic weapons	Substantial improvements in accuracy, range, speed and lethality

INFERENCES AND RECOMMENDATIONS

Based on a correlation of the factors as listed above, the following aspects emerge:

- India currently faces, and will continue to face, the full 'spectrum of threats' from nuclear confrontation, conventional war, conflicts limited in area, scope or objectives, to lower end friction, such as insurgencies, terrorism, etc. Moreover, India also needs to be prepared for an escalation of conflict from limited to nuclear on two fronts. The full spectrum in the foreseeable future implies both the conventional land conflict and unconventional conflicts. The unconventional conflicts can further take the shape of irregular warfare, hybrid warfare, warfare in the urban environment and other conflicts such as ethnic, counter-terrorism, low intensity, domestic insurgency and skirmishes over national interests. The application of air power in these will be technology and capability driven. Such threats find mention in the Indian Air Force (IAF) doctrines as well.
- There is a need to invest more resolutely in unmanned platforms such as Global Hawk high-altitude UAV and Predator type of UAVs armed with Hellfire missiles.
- Net-centricity and ability to collate fused information in real time from various platforms is the way forward. As seen from the recent wars,

airborne and space-based sensors provided a constant flow of information about enemy force dispositions and activity. This would also solve the persistent problem of attaining timely and correct intelligence. The security of networks from cyber attacks/electronic interference would be vital.

- It is seen that air forces are presently focussed on tackling only the conventional threat. The weapons and platforms are currently optimised for conventional air land battles and not optimised for unconventional warfare. Air forces need to develop capabilities to be able to tackle the full spectrum of threats. A failure to do that would lead to a comprehensive danger of the air force being left out of the other types of conflicts in the future or marginalisation of its role from a principal driver and game-changer to that of subsidiary support. This would not happen if the focus of air forces shifts from CSFO—which is a ‘subsidiary support’ role—to its primary role of ensuring compulsive deterrence by bringing about a behavioural change in the leadership of the enemy (by systematically neutralising his war-waging potential, economic targets and other centres of gravity—the most important being the leadership).
- The long pending capability enhancements that involve larger gestation periods, are lacking. Future capability build-up, procurement, training and procedures have to be optimised to truly cover the full spectrum of threats in their entirety.
- From the perspective of long-term perspectives and procurement plans towards capability enhancement, the IAF needs to look out for technologies that could enhance its capabilities in the future. This tasking could also be supplemented to extra-government organisations in addition to specialised in-service directorates.
- From the long-term perspective and procurement plans towards capability enhancement, the IAF can look into technologies such as

The IAF needs to develop capabilities to be able to tackle the full spectrum of threats as envisaged in the future towards which there is a need to set up mechanisms to seek commensurate technologies, alongwith a plan and roadmap to absorb such technologies.

advances in unmanned systems and nano-unmanned aerial systems for greater autonomy and weaponisation; swarm drones, weapon advances in the fields of kinetic, directed-energy and precision-guided weaponry; advances in intelligence and surveillance systems in terms of digital electronic surveillance, geospatial intelligence, more capable electro-optical systems; advances in radar; new lighter and self-healing materials; advances of man-machine interface systems to provide C4ISR capabilities on the modern battlefield and cockpits; additive manufacturing or 3-D printing, enabling customisation of designs, weapons, maintenance and localised production; synthetic environment systems with virtual reality technologies, network interoperability to involve multiple machines, multi-player and motion-sensor technologies for military training, battlefield replication and the full range of testing and development; nanotechnology, and, finally, cyber warfare.

- The tenets of ensuring seamless functioning of command, control and communication networks and in obstructing the adversary's C4, will remain relevant in the future as well.
- Air space management—especially over the Tactical Battle Area (TBA)—will increasingly need to be well networked and integrated, with control procedures demarcated.
- The IAF needs to practice Out of Area Contingency (OOAC) operations at certain periodic intervals as such capabilities now exist.
- Finally, the changing threat perception and military landscape of the future would require a certain degree of adaptability for the IAF to optimise in the expected threat scenario. In this new century, the IAF is faced with a dilemma in terms of needing to face the future with limited resources, but with an ever increasing need to enhance combat capability. It could, therefore, follow the route of designating units for the different roles as per the spectrum of conflict envisaged and could build up assets and capabilities accordingly. In creating such specialised units, the IAF as an organisation would thereby be able to handle a larger spectrum of threats both in the present and in the foreseeable future.

CONCLUSION

India's security environment is an amalgam of its history, geography, culture, politics, etc. The security challenges facing India are varied, complex and dynamic. The new millennium has witnessed sweeping changes with India emerging as a fast growing economy with a major stake and influence in the global arena. Air power, with its attributes of rapid mobility, reach and flexibility has in the past demonstrated the capability of being able to change the paradigm of warfare by ensuring that troops or marine vessels could be targeted despite the varied theatres of operation.

While perceiving the future, it needs to be appreciated that advancing technology has increasingly shaped the conduct of modern warfare and demands the use of military forces in concert with one another. Military forces on land, sea and in the air now reinforce and complement each other more than ever before. Modern technology has provided us the wherewithal to share capabilities in exactly the manner that we desire. By its nature, aerospace power is futuristic and increasingly utilitarian.¹⁹ However, it is important to discern from a wide canvas, the technologies which would be relevant and which could enhance the capabilities of the IAF in the future. The IAF needs to develop capabilities to be able to tackle the full spectrum of threats as envisaged in the future towards which there is a need to set up mechanisms to seek commensurate technologies, alongwith a plan and roadmap to absorb such technologies. The changing threat perception and military landscape of the future would require a certain degree of adaptability for the IAF to optimise in the expected threat scenario.

19. Major, n. 14.

HELICOPTERS IN THE INDOCHINA WARS: A “POLITICO-MILITARY” CASE STUDY

BS NIJJAR

People first, guns last. If we have people on our side, then we will have guns. If we have the people, we will have everything.

— Ho Chi Minh¹

THE EVACUATION

It was April 30, 1975, and Saigon had fallen to the Viet Cong (Vietnamese Communists). While the victorious rejoiced, the conquered faced a grim future with a limited prospect of survival. Fearing a backlash, and begging for help, a few fortunate ones became the boat people of Vietnam bound for the United States of America (USA). They clambered over each other to get onboard the safe confines of any US vessel, using any means possible. Some were lucky to have been airlifted to safety, onboard helicopters and fixed-wing aircraft. Some of the personnel belonging to the defeated Army of the Republic of Vietnam (ARVN) even flew in their own aircraft—many with

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1. Cecil B Currey, *Victory at any Cost: The Genius of Viet Nam's Gen. Vo Nguyen Giap* (New Delhi: Pentagon Press, 2009), p. 60.

The venerable helicopter had been used extensively in the entire range of operations and had clocked over 12,704,883 hours. A US government report states that 2,066 helicopters were known to have been lost due to various causes, including enemy action, resulting in at least 3,065 fatalities.

their family members—to land aboard the American aircraft carriers. In the ensuing chaos, with limited space aboard the ships, in one case, an ARVN helicopter pilot even intentionally ditched the helicopter adjacent to the ship, jumping out in the nick of time and swam to get to the safety of the ship.²

Between April 26-30, 1975, the helicopters of the Provisional Marine Aircraft Group 39 (ProvMAG 39) undertook desperate sorties to evacuate both US citizens as well as Vietnamese refugees from Saigon. The ProvMAG helicopters (34 CH53s, 29 CH-46s, 8AH-1Js, 6 UH-1E) flew a total of 682 sorties, including 360 by night and clocked 560 hours of flying and evacuated a total of 6,968 people. Of these, a total of 395 US citizens were airlifted from the compound of the Defence Attache’s Office (DAO)³ and 978 US citizens from the American Embassy.⁴

A total of over 58,000⁵ American lives had been lost in the fight that lasted more than two decades (1954-75). Millions of Vietnamese had been killed. North Vietnam and South Vietnam had merged to become the Socialist Republic of Vietnam.

The venerable helicopter had been used extensively in the entire range of operations and had clocked over 12,704,883 hours.⁶ A US government report states that 2,066 helicopters were known to have been lost due to various causes, including enemy action, resulting in at least 3,065 fatalities.⁷ These figures are

2. Maj George R. Dunham and Col David A Quinlan, *US Marines in Vietnam: The Bitter End 1973-75* (Washington DC: History and Museums Division, HQ US Marine Corps, 1990), p. 215.
 3. “Fall of Saigon”, Defence Attache Office, https://fallosaigon.org/orig/dao_compound.htm. Accessed on February 15, 2019.
 4. Dunham and Quinlan, n. 2 p. 204.
 5. National Archives, “Vietnam War US Military Fatal Casualty Statistics”, <https://www.archives.gov/research/military/vietnam-war/casualty-statistics>. Accessed on February 24, 2019.
 6. Mark Couch and Dennis Lindell, “Study on Rotorcraft Safety and Survivability”, <https://apps.dtic.mil/dtic/tr/fulltext/u2/a547531.pdf>. Accessed on February 17, 2019.
 7. Ibid.

at variance with the those put forth by the “Vietnam Helicopter Pilots Association” which pegs the figure of the numbers destroyed at 5,086 of the total 12,000 deployed.⁸ According to the same report, 2,165 of the 4,877 fatalities comprised pilots.⁹ The losses and the hours flown are indicative of the extensive role played by helicopters in this war.

The aim of this paper is to focus on the role played by the helicopter in the Indochinese conflict. It is proposed to be undertaken by contextualising its use in terms of the situation in which the contest devolved, from primarily between North and South Vietnam to a direct contest between the Communist North and the most powerful nation, the USA, backing the South. The contest was interesting, as it turned out to be one of conflicting strategies and ideologies.

The concept of Indochina has often been defined in anthropological terms to be a region in which both Indian and Chinese cultures have had their influence. In geographical terms, it is a continental region bound by the Gulfs of Bengal, Siam, Tonkin, the Straits of Malacca and Singapore and the Chinese and British Empires of the 19th and 20th centuries.

INDOCHINA: HISTORICAL CONTEXT

The concept of Indochina has often been defined in anthropological terms to be a region in which both Indian and Chinese cultures have had their influence. In geographical terms, it is a continental region bound by the Gulfs of Bengal, Siam, Tonkin, the Straits of Malacca and Singapore and the Chinese and British Empires of the 19th and 20th centuries.¹⁰

Present-day North Vietnam had been a Chinese outer province in 2 BC, and, by 40 AD, anti-China movements had started, succeeding only by 939 AD in an uprising led by Ngo Quyen. At the same time, South Vietnam known as Cochinchina, was ruled by the Hindu Khmers of Cambodia. The northern

8. Pierre Kosmidis, “5,086: Number of Helicopters Destroyed During the Vietnam War”, <http://www.ww2wrecks.com/portfolio/5086-helicopter-losses-during-the-vietnam-war/>. Accessed on February 17, 2019.

9. Ibid.

10. Pierre Brocheux and Daniel Hemery, *Indochina: An Ambiguous Colonization, 1858-1954* (California: University of California Press, 2011), p. 23.

Vietnamese region of Tonkin was invaded by the Mongols in 1284 and by 1406, had become a part of the Ming Empire. Subsequently, after a ten-year guerrilla fight led by Le Loi, the Chinese were defeated in 1418. Thereafter the region was ruled by various rulers indigenous to the region. By the mid-18th century, these Vietnamese rulers expanded southwards and controlled both North and South Vietnam. This was also the period when European traders and missionaries had arrived in the region and had started their work.¹¹

However, there were dynastic quarrels between the various multiple power centres and dynastic factions within the region and these faultlines were exploited by the French who backed Nguyen Anh of the Ngyun dynasty to emerge victorious in these struggles. By the mid-19th century, France had conquered "Cochin China" (South Vietnam), declaring it as the colony, and by 1863, had declared Cambodia as its protectorate. Thereafter, the French gradually consolidated their hold over the region and expanded northwards till Tonkin (bordering China) and also towards Laos. By the year 1900, the French colonisation had been completed with Cochin China (South Vietnam) as a colony and the regions of Annam, Tonkin (North Vietnam), Laos and Cambodia as its protectorates. This region now came to be known as French Indochina.¹²

FRENCH INDOCHINA AND INDOCHINESE COMMUNIST PARTY (ICP)

The French administered the region by using the populace to build up a road network and improved the agriculture practices and the health facilities but avoided any political developments from taking place. Higher education was available to less than 5 percent of the local population. The administration at the senior level was totally of French origin and the few Vietnamese (allowed to be educated by the French) were employed at a junior level. The French also had to deal with multiple nationalist movements.¹³ By this

11. Currey, n. 1, pp. 323-329.

12. Maj GG Dwivedi, *War In Vietnam:1945-54* (New Delhi: Magodena Farm House, Hoshiarpur, Chaman Offset Printers,1988), pp. 1-5.

13. Sanderson Beck, "Vietnam & the French", <http://www.san.beck.org/20-10-VietnamandFrench.html> Accessed on February 20, 2019.

time, the Russian revolution had taken place in 1917, and socialist thought had also spread within mainland France.¹⁴

On February 6, 1930, the Indochinese Communist Party (ICP) was formed by Ho Chi Minh¹⁵ in Hong Kong.¹⁶ This was the beginning of a well thought out nationalist revolution against the French colonial power which, at the same time, sought to bring about a class revolution against the “feudalists and *comprador bourgeoisie*”.¹⁷ This ICP thereafter transformed into the Vietnam Workers Party which led the National Democratic Revolution of Vietnam against the French occupation. The resources and active support were provided by the Communist junta of the Soviet Union as well as the Chinese. The ground work and international network was established by Ho Chi Minh by the time World War II started in 1939. This was also the time when Vo Nguyen Giap, later destined to play a key role in the struggle, was recruited by Ho Chi Minh and sent to Kangta in Yunan province of China to attend a course in “political and guerrilla warfare”.¹⁸

The defeat of the French by the Germans and the subsequent establishment of the Vichy government resulted in weakened French control of the entire Indochinese region and the Japanese were granted the right to station troops and aircraft in Indochina in September 1940. Sensing an opportunity, Ho Chi Minh, in May 1941, established the “Vietnam Doc Lap Dong Minh Hop (National Front for Independence of Vietnam)” or the Viet Minh, and ordered the Vo Nguyen Giap to organise a Communist military force.¹⁹ The seeds of the first Indochina War had been sown. However, the end of World War II was also recognised by Ho as an opportunity to create an independent “fatherland” of Vietnam.²⁰

14. The Communist International, “Communist Party of France”, <https://www.marxists.org/history/international/comintern/sections/france/index.htm>. Accessed on February 22, 2019.

15. R B Smith, “*The Foundation of the Indochinese Communist Party, 1929-1930*”, *Modern Asian Studies* 32, 4 (1998), pp. 769-805 (UK: Cambridge University Press, 1998), https://www.jstor.org/stable/313051?seq=1#page_scan_tab_contents. Accessed on February 18, 2019.

16. Global Learning: The Indochinese Communist Party, 5/12/2014, <http://www.globallearning-cuba.com/blog-umlthe-view-from-the-southuml/communist-party-of-indochina>. Accessed on February 18, 2019.

17. Ibid.

18. Currey, n. 1, pp. 51-53.

19. Vo Nguyen Giap, “People’s War, People’s Army”, <https://www.marxists.org/archive/giap/1961-pwpa.pdf> p.4. Accessed on February 22, 2019.

20. History Matters, “Declaration of Independence of the Democratic Republic of Vietnam”, <http://historymatters.gmu.edu/d/5139/>. Accessed on February 22, 2019.

In July 1941, the Darlon-Kato Agreement was signed between the Vichy French government and the Japanese, vide which Indochina was integrated into the Japanese military system.

FORMATION OF DEMOCRATIC REPUBLIC OF VIETNAM (DRVN)²¹

In July 1941, the Darlon-Kato Agreement²² was signed between the Vichy French government and the Japanese, vide which Indochina was integrated into the Japanese military system. This also resulted in the formation of other anti-Japanese resistance groups such as the Vietnam Quoc Dan Dang (VNQDD) or the Vietnamese Nationalist Party.

On the other hand, Ho Chi Minh was able to gain the support of Chiang-Kai-Shek (being actively supported by the US) and, at the same time, was able to establish a network of support, especially in the North Vietnamese region of Tonkin. The political aim was to achieve internal unification, with the military objective being that of establishing and equipping well camouflaged and concealed bases. In this, the Viet Minh, also received direct help (American instructors were para-dropped along with a significant quantity of arms and ammunition) from the American Office of Strategic Services (OSS).²³ As World War II progressed, the Viet Minh trained, consolidated and continued to harass both the Japanese and the Vichy French forces.²⁴

As the Japanese faced the prospect of a defeat, they manipulated the Vietnamese masses of Annam province, turning them against the “white occupiers” and on March 9, 1945, dismissed the Vichy French government in an event now known as “March Coup”, while declaring the three states of Cambodia, Laos and Vietnam independent. On March 11, 1945, the Emperor of Annam Bao Dai even proclaimed independence under a Japanese protectorate.²⁵

21. Ibid.

22. VNAPI, “The Japanese Presence in Indochina”, <http://www.anapi.asso.fr/index.php/contexte-historique/la-presence-japonaise-en-indochine>. Accessed on February 23, 2019.

23. Currey, n. 1 pp. 89-92.

24. Dixee R. Bartholomew-Feis, “The MEN ON THE GROUND; THE OSS IN VIETNAM, 1944-1945” https://etd.ohiolink.edu/!etd.send_file?accession=osu1488204276530675&disposition=inline. Accessed on February 23, 2019.

25. Anthony James Joes, *The War for South Vietnam 1954-1975* (New York: Praeger Publishers, 1990), pp. 13-17.

Ho Chi Minh sensed an opportunity to stamp his authority, and in April 1945, managed to unify all the revolutionary forces under the banner of the Vietnam Liberation Army (VLA). However, his military force, under Vo Giap, consisted of only 5,000 poorly equipped guerrillas.

As World War II ended, the big three i.e. the US, UK and Russia met in Potsdam, near Berlin, Germany, between July 17-August 2, 1945.²⁶ It was decided that the surrender of the Japanese north of the 16th Parallel would be taken by Chiang-Kai-Shek's Chinese forces and south of the 16th parallel by the British forces, effectively dividing Vietnam into two, North and South Vietnam, as an interim measure till such time elections were held.

On August 16, 1945, the Japanese officially handed over control to Bao Dai in Annam and to the United Party in Cochin China. Thereafter, on August 19, 1945, Ho Chi Minh's forces, moving swiftly, entered Hanoi and took over control of the North and, thus, controlled Annam and Tonkin provinces (North Vietnam); on August 25, 1945, Bao Dai abdicated and became chief counsellor to Ho Chi Minh, who, in turn, formed the National Liberation Committee of Vietnam. On September 2, 1945, Ho Chi Minh proclaimed the independence of the People's Republic of Vietnam, known as the DRVN.²⁷

In the South, a Vietnamese member of the ICP, Tran Van Giau (along with Cao Dai, Hoa Hao and others), with the tacit understanding of the Japanese, took over control.²⁸ By September 1945, the elements of a British Division (20 Indian Division) landed at Saigon, released all the French prisoners and accepted the surrender of the Japanese troops. On September

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26. History, Potsdam Conference, <https://www.history.com/topics/world-war-ii/potsdam-conference> Accessed on February 18, 2019.

27. Dwivedi, n. 12, p. 23.

28. Currey, n. 1, p. 105.

25, 1945, Giau's men kidnapped/killed 300 French nationals.²⁹ The situation thereafter rapidly deteriorated and the French sent reinforcements under Gen Le Clerc, and resumed formal military control of the South in January 1946. By February 1946, they reached the 16th parallel to find that after the elections held on January 6, 1946, the Viet Minh under Ho Chi Minh had gained majority in the North and, thus, had attained legitimacy.

Thus, the French had returned to their post-war colony and protectorates and had to deal with the aftermath of the "March Coup" orchestrated by the Japanese. They forcefully asserted control and thereafter assessed the situation. This can be summarised as follows:

Cambodia: The French had to recognise its formal independence but retained control over major affairs.

Laos: The French suppressed the China backed Lao-Issarak movement and thereafter declared its independence, but here too, they retained control over all major affairs.

Vietnam: Here the French faced an impasse in the form of opposition from Ho Chi Minh who wanted nothing short of a sovereign state: a "dictatorship of the people". There was also the problem with the Chinese not wanting to vacate the Northern Tonkin province. Therefore, by 1946, even though Ho Chi Minh's reputation had spread, there was very little he could do about getting the Chinese nationalists, who had disarmed the Japanese, to leave.

Ho Chi Minh thereafter chose to negotiate with the French between May to September 1946 and allowed them to enter the North (a former French protectorate) with a maximum of 15,000 troops in return for their assured withdrawal over a period of five years. This ensured that the Chinese Nationalists exited the North Vietnam territories and, in exchange, the French recognised the Republic of Vietnam as a free state, having its own government, army and treasury but belonging to the Indochina federation and French Union. The Chinese reluctantly exited owing to the arrival of

29. Daniel Marston, "The 20th Indian Division in French Indo-China, 1945-46: Combined/joint Operations and the 'Fog of War'" <http://www.nids.mod.go.jp/english/event/forum/pdf/2014/08.pdf> p.106. Accessed on February 24, 2019.

the superior French forces.³⁰ But near simultaneously, Ho Chi Minh ordered Giap to raise a regular army and instinctively knew that the only way to fulfil his dream of a unified Vietnam was to eject the French in an armed conflict. This set the stage for the first Indochina War.

THE VIETNAMESE PROTAGONISTS

Ho Chi Minh and Vo Nguyen Giap were the main protagonists of the Vietnam War. Both were unwilling to settle for anything short of complete unification and freedom from the influence of the Western powers, an all consuming desire to free their “fatherland”.

Ho Chi Minh was born on May 19, 1890, at Hoang Tru, Vietnam, then under the French administration. Before assuming the name Ho Chi Minh, he also used the pseudonyms Nguyen Sinh Cung (this was also his given name), Nguyen Tat Thanh and Nguyen Ai Quoc.³¹ At the age of 20, he worked as a dishwasher and cook aboard a French merchant vessel. At 30, he joined the French Communist Party and, at 40, he founded the Indochinese Communist Party at Hong Kong. At 50 years of age, he entered Vietnam to lead the resistance movement against the French.

Senior Gen Vo Nguyen Giap was born on August 25, 1911.³² Even though he was an intelligent student—in an education system strictly supervised by the French (with less than 5 percent of locals allowed to study beyond elementary school)—a fortunate series of events propelled him towards his destiny. These included him completing his higher education in one of the top institutions of the time, despite having been expelled for the anti-colonist “quit-school” movement and being watched by the “2nd Bureau” of the French secret police for suspected involvement in the dissident movement, under which he was jailed for two years, 1930-32. He, however, managed to survive and joined the Indochina Communist Party and quietly bade his time, till he was called by Ho Chi Minh to raise a guerrilla force for freeing

30. Currey, n. 1, pp. 120-121.

31. Jean Lacoutre, Encyclopedia Britannica, “Ho Chi Minh” <https://www.britannica.com/biography/Ho-Chi-Minh>. Accessed on February 20, 2019.

32. Currey, n. 1, p. 7.

the “fatherland” on May 3, 1940.³³ Much later, the French started calling him “Nui Lua”, roughly “volcano beneath the snow”³⁴ meaning “a cold exterior but boiling within”, an apt description of his personality, according to those who knew him. This was probably due to the fact that his sister-in-law, wife and father were tortured to death by the French—his wife in 1941 and father in 1947 (after being hounded for years).³⁵ He is also known to have been fascinated by Napoleon Bonaparte and had carried out an extensive study of his campaigns. These war studies provided him the knowledge, while the personal tragedy stoked the fire for revenge.

FIRST WAR OF INDOCHINA

By October 1946, Ho Chi Minh had convened a Constituent Assembly with himself as its leader and Giap as his defence minister.³⁶ By November 1946, Giap had managed to raise an army of 50,000 personnel trained by Japanese deserters.³⁷ The trigger was provided by what is famously called the Haiphong incident, when the Viet Minh and French clashed over a small boat carrying arms for the French.³⁸

By December 19, 1946, the war, which would continue for the next eight years, commenced. Both sides deployed contrasting strategies. The French deployed the principle of “attack swiftly and win swiftly”, while the Viet Minh, employed the counter-strategy of fighting a prolonged resistance war with a focus on building self-reliance, i.e. resorting to guerrilla tactics and hit and run warfare. By the end of 1947, over 1,00,000 French troops were fighting the Viet Minh, using tanks, heavy guns and aircraft.

Meanwhile, in China, by October 1949, Chiang-Kai-Shek had been defeated and the People’s Republic of China (PRC) formed. In January 1950,

33. Currey, n. 1 pp. 30-41.

34. VWAM, “Vo Ngyuen Giap”, <https://vwam.com/vets/nva/giap.html>. Accessed on February 21, 2019.

35. Currey, n. 1, pp. 43-44.

36. Pham Diem, Vietnam Law and Legal Forum, “The 1946 Constitution of Vietnam”<http://vietnamlawmagazine.vn/the-1946-constitution-of-vietnam-4443.html>. Accessed February 23, 2019.

37. Dwivedi, n. 12, p. 29.

38. World History, “The Haiphong Incident”, <https://www.worldhistory.biz/world-war-i/16465-the-haiphong-incident.html>

both Russia and the PRC recognised Ho Chi Minh's Viet Minh government, with Ho Chi Minh now being projected as a Communist statesman fighting French Western imperialism.³⁹ Militarily, the Viet Minh now had access to a free flow of arms, funding and, most importantly, safe sanctuaries inside China, where they could train, rest and recoup. Invigorated, the Viet Minh, thus, decided to seize the initiative, as the French had been forced to reduce the strength of their forces to suppress the rebellion in Madagascar. But they had formed the Vietnam National Army (VNA) to take on the Communist Viet Minh. In order to take on the elusive enemy, the French had also formed mobile groups and parachute battalions which could rapidly be inducted into the conflict zone. A series of battles continued, with the Viet Minh's learning curve, with Giap at the helm, causing severe strain on the French forces.

The Americans also got involved, and by 1950, started providing aid to the French forces. This, in all probability, amounted to nearly \$500 million annually as a part of an allocation of an overall amount of \$10 million approved by President Truman on May 1, 1950, to cover the early shipment of urgently needed military assistance items to Indochina, thus, taking the first crucial decision regarding US military involvement in Vietnam.⁴⁰ Meanwhile, the French revised their strategy to that of avoiding decisive engagements with the Viet Minh, expanding the VNA for deployment in defensive duties and to free troops for offensive operations. They also asked for troop reinforcements.⁴¹

The French government opposed the reinforcements and, at the same time, the US-led North Atlantic Treaty Organisation (NATO) alliance wanted to avoid a Korea-like situation recurring in the Indochinese region as well. However, concerned at the Communist designs, the US agreed to bear 70 percent of the cost of the Indochina War. But this support, while significant,

39. Christoph Giebel, *Imagined Ancestries of Vietnamese Communism: Ton Duc Thang and the Politics of History and Memory* (Washington: University of Washington Press, 2011).

40. The Pentagon Papers, Gravel Edition, Volume 1, Chapter 4 *U.S. and France in Indo-China, 1950-56* (Boston: Beacon Press, 1971) <https://www.mtholyoke.edu/acad/intrel/pentagon/pent9.htm>. Accessed on February 22, 2019.

41. Christopher E. Goscha, *Historical Dictionary of the Indochina War (1945-54)* (Copenhagen: NIAS Press, 2011), p. xvii.

All the French assessments of the Viet Minh’s capabilities proved to be wrong as also the deployment strategy, and the French forces were decisively defeated in a 55-day battle, suffering over 7,184 casualties, with around 11,000 having been captured. In comparison, the Viet Minh suffered over 20,000 casualties with 8,000 having been killed.

was conditional. France was to provide the additional troops, the training of the VNA was to be completed by 1954, and the US advice on the overall strategy was to be followed in fighting the Viet Minh.

The French agreed, and accordingly, 10 French battalions were inducted into the theatre and the French themselves created a French-Vietnamese guerrilla force. Also, the US started sending its advisers to the region.

The Communist bloc, on its part, also sent a Sino-Soviet mission to assist the Viet Minh in January 1954. Viet Minh Gen Vo Nguyen Giap, thereafter cleverly drew the French into the battle of “Dien Bien Phu”, by threatening Laos, with which the French had a defence treaty. All the French assessments of the Viet Minh’s capabilities proved to be wrong as also the deployment strategy, and the French forces were decisively defeated in a 55-day battle,⁴² suffering over 7,184 casualties, with around 11,000 having been captured. In comparison, the Viet Minh suffered over 20,000 casualties with 8,000 having been killed.

During 1953, with the availability of Chinese Anti-Aircraft (AA) guns, the Viet Minh had shot down over 10 French aircraft, with 240 more having been hit. During the battle at Dien Bien Phu, the French lost 48 planes (14 on the ground), and 167 were damaged.⁴³ The difference between the two sides proved to be the superior man (porter)-based logistics supply chain developed by the Viet Minh, which managed to transport heavy arms and

42. Ibid., pp. 141-148.

43. Charles R Shraeder, “A War of Logistics: Parachutes and Porters in Indochina, 1945–1954”, Book Extract Google Books, https://books.google.co.in/books?id=DNKQCgAAQBAJ&pg=PT372&lp-g=PT372&dq=french+losses+in+Dien+Bien+Phu+48+planes&source=bl&ots=yLabMYOg-Zw&sig=ACfU3U1H0HXDjJWLauPKCC_GDVtDqfTpzA&hl=en&sa=X&ved=2ahUKew-j2zankn9TgAhUYU30KHYkpAUkQ6AEwDHoECAyQAQ#v=onepage&q=french%20losses%20in%20Dien%20Bien%20Phu%2048%20planes&f=false. Accessed on February 24, 2019.

ammunition and war-like stores over jungle terrain where no roads existed.

The Armistice Agreement was signed on July 21, 1954, and was to be effective from July 23, 1954. Vietnam was again partitioned, this time along the 17th parallel, with the Viet Minh controlling the territory to the North and the Southern half to become the independent state of South Vietnam.⁴⁴

As per the agreement, the Viet Minh were to withdraw north of the 17th parallel. By October 5, 1954, the French handed over Hanoi to the Viet Minh and in South Vietnam, "Ngo Dinh Diem" was appointed prime minister in the Bao Dai government. The Armistice Agreement also had the provision of a political settlement and a general election in both the North and South, with a secret ballot, to be held in July 1956. The Americans were not signatories to the agreement.

During this war, helicopters had already made their presence felt due to the nature of the terrain which extended over 330,000 sq km, with over 45 percent of forested hilly/mountainous area, interspersed with rivers, valleys and fertile plains.⁴⁵

THE HELICOPTER IN THE FIRST WAR OF INDOCHINA

Helicopters were used in the first Indochina War for both Casualty Evacuation (CASEVAC) as well as communication duties. The Hiller Model 360 (UH-12A) were the first ones to arrive in Saigon in April 1950 and the first evacuation mission was flown on May 16, 1950, by Lt Santini (who had become the first French military helicopter pilot).⁴⁶ Doctors were trained to be parachutists as well as helicopter pilots, but were in short supply. One

44. Geneva Agreements, "Agreement on the Cessation of Hostilities in Viet-Nam 20 Jul 1954" https://peacemaker.un.org/sites/peacemaker.un.org/files/KH-LA-VN_540720_GenevaAgreements.pdf. Accessed on February 22, 2019.

45. CIA, "The World Factbook-Vietnam", <https://www.cia.gov/library/publications/the-world-factbook/geos/vm.html>. Accessed on February 19, 2019.

46. "Ventilators" Helicopters in Indo-China (1950-54), <http://indochine54.free.fr/cefeo/helicopt.html>. Accessed on February 19, 2019.

of the pioneers was Valerie Andre who also later promoted to the rank of general, the first woman officer from France so promoted.⁴⁷ Subsequently, in February 1952, seven H-23As arrived , followed by six H-23Bs (March 1952) and eleven WS-51 (December 1952). These were followed up by the induction of 18 Sikorsky H-19s. Having evacuated 10,820 casualties, of the 35-odd helicopters, at least four H-19s were destroyed by the Viet Minh (three by 105 mm artillery shells and one by anti-aircraft fire). A summary of the models and the approximate numbers is as follows:⁴⁸

Table 1

Model Name	Carrying Capacity	Numbers in Service	
Hiller UH-12A(360)/ H-23B Raven	One Pilot Two Litter Cases	UH-12A-Two H-23A-Seven H-23B-6	
Westland-Sikorsky WS-51	Two Pilot Two Litter Cases	Eleven	
Sikorsky H-19A Chicksaw	Two Pilots Six Litter Cases	Eighteen	
Piasecky HUP-2			For carrier-based rescue operations

The French forces had recognised the potential of the helicopter in the combat environs of Vietnam and had planned to induct around 50 H-19s for the reinforcements for the planned campaign for 1954-55. However, the armistice forced the French withdrawal and the campaign ended. Important lessons were, however, learnt by the French and on November 22, 1954, the French Army formed its own aviation branch, with both fixed-wing aircraft and helicopters. The French applied the lessons learnt in Indochina to fight another eight-year-long war in Algeria, which then became the first war in which helicopters were assigned the combat role by them.⁴⁹

47. Thierry Dubois, "Fighting Girl: Valérie André", Vertical Mag, June 15,2017, <https://www.verticalmag.com/news/fighting-girl-valerie-andre/>. Accessed on February 19, 2019.

48. n. 46.

49. Ibid.

But back in Vietnam, the end of the conflict was not in sight and the dreams of unification remained unfulfilled. Despite the withdrawal of the French forces and the formation of the DRVN, the Indochinese region had now become a zone of conflict between the Communist and Capitalist ideologies.

THE SECOND WAR: PROTAGONISTS ON THE VIETNAMESE CHESSBOARD

After the first Indochinese War, the US government immediately started supporting the Ngo Dinh Diem government (with Bao Dai as the chief of state) in South Vietnam, and, provided both advice as well as economic aid. This was also the period when the Central Intelligence Agency (CIA) had got involved.⁵⁰ The CIA had the task of carrying out systemic sabotage of North Vietnam's transportation and port facilities.⁵¹

Ngo Dinh Diem forced the last of the French troops to leave by April 10, 1956.⁵² The US hand, termed as "inexhaustible treasure", was evident to Ho Chi Minh, as was also the realisation that the promised elections were unlikely to be held.

In September 1955, Ho Chi Minh, in order to unite both the Communist and nationalist forces, constituted the "Fatherland Front of Vietnam", and pushed for unification. The indomitable Gen Vo Ngyuen Giap had also foreseen such an eventuality and had left a substantial network of underground workers, along with the hidden safe zones, in the South intact, while moving his regular troops to the North as per the terms of the armistice. This network was revived and reorganised gradually and was sought to be repressed brutally by the Ngo Dinh Diem-led Army of the Republic of Vietnam (ARVN) forces. The state repression of the ordinary Viet Minh was continued and the citizens were drawn towards the Communist ideology. The Viet Minh were also derogatorily referred to as the Viet Cong or the Vietnamese Communists by the Diem-led ARVN. Over a period of time, the Viet Cong held sway in

50. William S Turley, *The Second Indochina War: A Concise Political and Military History* (UK: Rowman & Littlefield Publishers, Inc, 2009), p. 60.

51. Currey, n. 1, pp. 215-216, The CIA element left Hanoi along with the last French troops on October 9, 1955.

52. Ibid., p. 225.

In September 1955, Ho Chi Minh, in order to unite both the Communist and nationalist forces, constituted the “Fatherland Front of Vietnam”, and pushed for unification.

the countryside and the Diem-led government’s control was limited to the population centres and ARVN concentrations. This was a result of the Viet Cong’s strategy in which the ordinary people had a major role to play as a part of its “people first” policy.⁵³

Meanwhile, the nationalists, aiming to oust the foreign power, continued to coordinate their efforts in both North and South Vietnam⁵⁴ and by 1960, the Communist-led National Liberation Front was formed. A guerrilla campaign was thereafter

ordered. The guerrillas now initiated a well crafted campaign of terror against lower state officials as well as the ARVN. Every attack was followed by a propaganda team which used to explain to the ordinary villagers why the killing took place. The strategy followed the dictum of Gen Giap which stated:⁵⁵

Political action is the soul of the army. The individual soldier must understand the political and psychological dimensions of the war and of its actions.

Accordingly, he geared up the already tested organisation and gave specific tasks for each of its units which were composed of village guerrillas, combat guerrillas, regional troops and regular troops of the National Liberation Army (NLA). The transformed Viet Cong also received indirect US military aid through subversion of supplies meant for the ARVN.

On the other side, the US Military Assistance Advisory Group (USMAAG) had been providing assistance to the French and now to the South Vietnamese Army since their 1954 agreement (pre-Dien Bien Phu debacle) with the French. The number of advisers as on December 30, 1960, totalled up to 900 and this number increased to 3,200 in December 1961 and further to 11,300 in direct proportion to the activities of the Vietnamese NLA which was being

53. George K. Tanham, *Communist Revolutionary Warfare: From the Viet Minh to the Viet Cong* (USA: Praeger Security International, 1961), p. 63.

54. *Ibid.*, p. 66.

55. *Ibid.*, n. 53, p. 77.

controlled basically by the Communists or the Viet Cong.⁵⁶

Gen Giap was also preparing for the inevitable conflict, with a new supply line to the South, with several thousand kilometres of camouflaged road and an air raid shelter every 100 yards, and underwater bridges across streams. A significant portion transited through the Laotian and Cambodian territories bordering South Vietnam/Republic of Vietnam (RVN).

On August 1962, Gen Paul Hoskins of the USMAAG issued orders for his units to take a direct part in the fighting. On September 17, 1962, a ship carrying 33 combat helicopters arrived in Saigon harbour, along with 500 officers and men.⁵⁷ As further engagements continued to ensue on January 2, 1963, during the battle of ApBac, the Viet Cong managed to shoot down five helicopters and caused damage to nine others.

Meanwhile, as most of the Vietnamese consolidated under the influence of Viet Cong propaganda, the religious faultlines in the societal structures came to the fore when Diem—himself a Catholic—banned the Buddhists from celebrating the birthday of Lord Buddha. Subsequent protests by the Buddhists were brutally suppressed which led to a public self-immolation by Thich Quang Duc, a 73-year-old Buddhist monk, on June 11, 1963.⁵⁸ Considering the position of Diem to be untenable, the US, on November 1, 1963, tacitly supported a coup by a few ARVN generals who took over, and murdered Diem.⁵⁹

With no end to the conflict in sight, the US was forced to intervene directly in the conflict and the designation USMAAG was changed to US Military Assistance Command (USMAC) Vietnam.

56. Currey, n. 1, p. 240.

57. Ibid., p. 241.

58. Rare Historical Photos, "The Burning Monk: 1963" <https://rarehistoricalphotos.com/the-burning-monk-1963/>. Accessed on February 22, 2019.

59. Currey, n. 1 p. 242.

The stage was set for a showdown between the Viet Cong and the USMAC. The Viet Cong, under Ho Chi Minh and Gen Vo Ngyuen Giap, the main protagonists, had prepared well for the contest. It was in this conundrum that the helicopters were inducted and made their mark, the foundation of which was laid during the first Indochina War. The impact of the helicopters was so profound during this war that there was hardly an image being published without the helicopter in the backdrop.

THE SECOND WAR: HELICOPTER OPERATIONS

On September 5, 1960, the North Vietnamese government under Ho Chi Minh gave public notice of support for the insurgency in the South, stating:

*In the absence of the state elections, only armed conflict will decide the issue.*⁶⁰

The war had begun.

The Viet Cong's preparations for waging war against the "occupiers of the fatherland" were structured along the lines of guerrilla warfare in contrast with those of the USMAAG trained ARVN that had followed Western concepts. The supply route dubbed "the Ho Chi Minh trail" was also ready, as were the promises of support from the Sino-Soviet Communist bloc.⁶¹

In the late 1960s, the first Vietnamese helicopter squadron was raised, equipped with 11 Sikorsky H-34s but they rarely took part in the military operations due to maintenance related issues.

As the situation evolved, the US president sent his military adviser Gen Maxwell Taylor in 1961, to assess the situation.⁶² Based upon the reported lack of mobility of the ARVN troops, President Kennedy ordered the deployment of two companies (8th and 57th Transport Companies) to deploy to Vietnam. Operating the Piasecki H-21 Shawnee (nicknamed "Flying Banana) helicopters, both these units reached Saigon on December

60. Ibid., p. 238.

61. History.com, "Ho Chi Minh Trail", <https://www.history.com/this-day-in-history/u-s-jets-bomb-ho-chi-minh-trail> accessed on February 23, 2019.

62. Jim Mesko, *Air Mobile*, Vietnam Studies Group, (Texas: Squadron/Signal Publications, Inc., 1984).

11, 1961, aboard the ship USNS *Card*. The helicopters, within two weeks of their arrival, and operating from Tan Son Nhut airport, north of Saigon, undertook their first operation against the Viet Cong named, "Operation Chopper".⁶³ They airlifted over 1,000 paratroopers into a suspected enemy base complex which became the first of the series of "air mobile" operations, forcing the Viet Cong to reassess and devise a counter-strategy. The demand for more such operations tested the single engine H-21's limited range and, thus, additional support in terms of the 93rd Transport Company was sent, along with fixed-wing Otters of the 8th Transport Company to provide utility support to the maintenance intensive helicopter operations. For further command and control support, these transportation companies were supported by the 45th Transportation Battalion. This was done prior to the induction of two more companies operating the H-21 which brought the total number of transportation companies operating the H-21 to five by mid-1962.⁶⁴

With the increase in the number of Americans involved in the operations, the Bell UH-1 (Huey) helicopters were inducted for Casualty Evacuation (CASEVAC)/medical support. The helicopters belonged to the 57th Medical Detachment.

In April 1962, the first Marine Squadron HMM-362, equipped with the H-34s, deployed at Da Nang. This was done as the area of operations against the Viet Cong had expanded in the mountainous regions in the North where the H-21s could not be deployed due to their operational limitations.

The only armament which the H-21 was configured with was a .30 calibre door mounted machine gun which had a limited firing arc. And with the Viet Cong now revising their tactics, after observing the vulnerabilities of the H-21, the need for better armaments aboard the helicopter, thus, became a necessary imperative.

63. "This Day in Aviation", <https://www.thisdayinaviation.com/tag/operation-chopper/> accessed on February 23, 2019.

64. Mesko, n. 62.

The Viet Cong under Giap had devised a counter-strategy and had started causing helicopter losses due to ground fire. Thus, an acute need was felt for these helicopters to be configured with the necessary armaments to respond.

ARMING THE HELICOPTER

While the effectiveness of the concept of air mobility had been proven, with the Viet Cong having been surprised and caught flat-footed, the vulnerabilities of the helicopter were also exposed, especially during the landing phase and while disembarking the troops.

The Viet Cong under Giap had devised a counter-strategy and had started causing helicopter losses due to ground fire. Thus, an acute need was felt for these helicopters to be configured with the necessary armaments to

respond.⁶⁵

A few years earlier, between June 1956 and 1958, Col Jay Vanderpool of the US military had conducted numerous experiments with a variety of helicopters and weapons in the US.⁶⁶ The success of these had resulted in the army convening a study named the “Rogers Board” to study the proposals for the possible expansion of army aviation.⁶⁷ This study was succeeded by the “Howze Board” in spring 1962 to study the concept of air mobility of troops. With the available combat experience of the operations in 1962, the “Howze Board”⁶⁸ report, which had been submitted in August 1962, was made a basis for establishing an Air Assault Division and the Air Cavalry Brigade by replacing the wheeled vehicles with helicopters and light aircraft. Additionally, the artillery and armour element was replaced by armed helicopters and OV-1 Mohawk aircraft. The orders to “organise, train and test” these units were thereafter issued in January 1963.

65. Currey, n. 1, p. 258.

66. Joseph Trevithick, “The US Army Designed One of the First Helicopter Gunships On a Napkin”, <https://medium.com/war-is-boring/the-u-s-army-designed-one-of-the-first-helicopter-gunships-on-a-napkin-c15c50b8a53>. Accessed on February 21, 2019.

67. Mark Albertson, “Army Aviation in Vietnam-The Rogers Board”, <http://www.armyaviationmagazine.com/index.php/history/not-so-current-2/713-army-aviation-in-vietnam-the-rogers-board>. Accessed on February 21, 2019.

68. J A Stockfish, “The 1962 Howze Board and Army Combat Developments”, <https://apps.dtic.mil/dtic/tr/fulltext/u2/a282756.pdf>. Accessed on February 21, 2019.

However, back in the Vietnam war zone, a plan for arming the helicopter was already being tested, involving the Hueys. These tests were undertaken by a new unit called the Utility Tactical Transport Helicopter Company (UTTCO), with 15 UH-1A helicopters configured with two .30 calibre machine guns and sixteen 2.75 inch rockets.⁶⁹ These were deployed to support operations by the H-21s. However, the UH-1A was underpowered for the retrofit, especially while flying with a full weapon load and fuel, restricting its operational deployment, as any deviation from the escorts would result in no possibility of these escorts catching up with the formation. Therefore, additional UH-1Bs with more powerful engines, were inducted by November 1962, with factory fitted M-60 machine guns. They undertook the escort missions and these armed missions resulted in a significant drop in the “hit rate” or the number of times the Viet Cong managed to hit helicopters. The success of these escorts resulted in the Marine H-34s also requesting for these armed escorts.

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However, the Viet Cong too had adapted. On January 2, 1963, they managed to shoot down four H-21s (of a total of 10) and an armed Huey escort (of a total of five) during an operation near the ApBac village. Over nine helicopters of the remaining ten were also damaged.⁷⁰ The Viet Cong broke off the engagement only after the Vietnamese and US Air Force (USAF) fixed-wing aircraft were called, with bombs, rockets and napalm. Thus, a vital lesson of the importance of the ready availability of fixed-wing support from the USAF was learnt.

69. Mesko, n. 62.

70. Currey, n. 1.

HELICOPTER OPERATIONS AND A PERIOD OF POLITICAL UNCERTAINTY

The year 1963 was important for another reason. Vietnamese President Diem was killed in a coup on November 1, 1963 (with the tacit support of the US, as covered earlier) and the US president was assassinated on November 22, 1963. Vice President Lyndon B Johnson took over as the US president.

The resultant uncertainty and the political turmoil gave space to the Viet Cong to consolidate and continue the battle of attrition against the US backed ARVN. The tactics included enticing the helicopters to land in an area where an ambush had been laid. They did this by using captured US radio sets over which they monitored the colour of the smoke marker requested by the pilots and lighting up the correct marker at the ambush site.⁷¹ Some of the landing zones had hidden pointed sticks and obstacles also, which caused significant damage to the aircraft and injuries to the personnel. In some cases, they attacked a remote outpost and thereafter waited for the helicopter-borne relief force which would then be ambushed from gun emplacements on the hillside.⁷²

Faced with mounting losses, the downed helicopters needed to be repaired and recovered, if possible. This aspect was addressed with the induction of the Sikorsky H-37 heavy-lift helicopters in 1964.

The US now was well aware, and knew that the root cause of the problem lay in the Ho Chi Minh's Democratic Republic of Vietnam. The Gulf of Tonkin incident was a perfect excuse to expand the envelope of US involvement.

THE GULF OF TONKIN INCIDENT: DESOTO MISSIONS AND OPLAN 4-A

DeHaven Special Operations off Tsingtao or DESOTO missions were highly classified intelligence gathering freedom of navigation missions carried out in the areas where the presence of the US Seventh Fleet had been restricted and initially were started in the contested waters off the Chinese coast.⁷³

71. Tanham, n. 53, p. 88.

72. Ibid.

73. RAdm, James W. Montgomery, U.S. Navy (Retd), http://ussdehaven.org/first_desoto_patrol.htm. Accessed on February 21, 2019.

One such mission, off the coast of the DVRN, was undertaken by the USS *Craig* (DD-885) in March 1964.⁷⁴

Under OPLAN 34-A, approved by President Kennedy just prior to his assassination in November 1963, commando raids were authorised to be undertaken into North Vietnam from the Da Nang base, duly supported by intelligence support by naval ships. These were contested by the North Vietnamese.

By a queer chance of fate, the area of conduct of two separate missions (one each under DESOTO and OPLAN 34A) and unknown to each other, coincided on August 2, 1964. The North Vietnamese attacked the US vessel undertaking the freedom of navigation mission mistaking it for a commando raid. The DESOTO ship, USS *Maddox* engaged the torpedo boats and also called for air strikes. On August 4, 1964, mistaking the recovery of the damaged torpedo boat as another attack, the US president thereafter authorised limited strikes on North Vietnamese territory, which were undertaken on August 5, 1964. The response by the DVRN was to position 30 MiGs from China into Phuc Yen airfield on August 7, 1964.⁷⁵ The escalatory ladder had been initiated with demands being placed for air support in various targets in Laos. The initial "tit-for-tat" missions were replaced with full scale air strikes against the North Vietnamese targets. The first of these strikes was conducted in February 1965.⁷⁶ It was only a matter of time that the American air power was now fully committed.

AMERICAN TROOP BUILD-UP AND FORMATION OF 1ST CAVALRY DIVISION (AIR MOBILE)

Even though the US special forces had been operating in South Vietnam since 1961, the ARVN forces were clearly in need of help. The US, therefore, committed additional ground forces to proceed to the region. Two US Marine battalions carried out an amphibious assault landing on Da Nang beach on March 8, 1965, only to be welcomed by garlands by the locals. This was

74. Carl Otis Schuster, "Case Closed: The Gulf of Tonkin Incident", <https://www.historynet.com/case-closed-the-gulf-of-tonkin-incident.htm>. Accessed on February 21, 2019.

75. Gen William W. Momyer, *Airpower in Three Wars* (US: Department of the Air Force: 1978), p. 15.

76. *Ibid.*, p. 18.

The CH-47 was a troop carrier and the CH-54 helicopter, besides being used to airlift specially designed detachable pods to be used as a communications facility, surgical room or a supply container, could also be used to deliver a 10,000 pound bomb on targets.

followed by more troops such as the 173rd Airborne Brigade which was positioned in May 1965 to provide protection to the air bases at Bien Hoa and Vung Tau. This brigade was the first to undertake two air assaults involving a large number of troops by using helicopters drawn from many helicopter companies (units) in June and July 1965.

The assessed success of these operations thereafter resulted in the formation of the 1st Cavalry Division (Air Mobile) on July 1, 1965, which was inducted into AnKhe, Vietnam, on October 3, 1965. The new equipment which arrived in Vietnam now included the Sikorsky CH-47 (Chinook) and the Sikorsky CH-54 Skycrane heavy-lift helicopter. The CH-47 was a troop carrier and the CH-54 helicopter, besides being used to airlift specially designed detachable pods to be used as a communications facility, surgical room or a supply container, could also be used to deliver a 10,000 pound bomb on targets.

The 1st Cavalry Division (Air Mobile) was the result of the Howze Board recommendations having been tested by a test unit called 11th Air Assault Division. This test unit, constituted in the US, developed tactics initially during various small scale exercises and derived inputs from the *"constant exchange of people, information and equipment between the units in Vietnam and the 11th Air Assault Division staff"*.⁷⁷ In the last quarter of 1964, the concepts were tested in Carolina as a part of an exercise called "Air Assault-II" which involved over 35,000 men. It was apparent that the battle of attrition in Vietnam needed an infusion of fresh tactics, in which the helicopters were to play a major part.

TACTICS AND COUNTER-MEASURES

The frustrations of the US troops and the success of the Viet Cong tactics could be ascertained from the following statement by a US Army officer:

77. Mesko, n. 62, p. 17.

*If the elusive Vietcong would just stand still and fight or form larger units and stop using ambush technique, the AVRN could handle them.*⁷⁸

The statement reflected the need for an alternate approach as a means to counter the Viet Cong menace. The response by Gen Westmoreland was on the lines employed by the French during the first war: a rapid response in strength to a situation by highly mobile forces to counter the Viet Cong, along with a disruption of their supply lines. The 1st Cavalry Division (Air Mobile) was the centrepiece of the effort.

The first battle test for the air mobile concept was in the Ia Drang Valley in November 1965, wherein search and destroy missions resulted in large force engagements with the North Vietnamese Army (NVA) and the advantage of the foot mobility of the enemy and his use of terrain was neutralised by the air mobility accorded by the helicopters.

The Viet Cong, understanding the dangers posed by the helicopters, then resorted to night attacks and infiltration, using the cover of darkness in order to attack air bases. This was countered by fitting the helicopters (UH1B Huey, nicknamed "Lightning Bugs") with C-130 landing lights and illuminating the perimeter to, thus, target the attackers.

Henceforth, the initiative was wrested from the Viet Cong and NVA regular forces by combining the air mobile forces with the ground forces to attack troop concentrations. During these assaults, commencing in January 1966, the helicopters, besides moving troops, and the armed helicopters in both the scout and attack roles, also helped provide artillery cover to the ground forces by moving artillery guns into temporary "fire bases" from

78. Tanham, n. 53, p. 80.

With rapid diversification and rotation of pilots resulting in varied training procedures and non-standardised methods of operational employment, a need was felt for a centralised unit to focus on these aspects. This responsibility to standardise training, procedures and methods of operation was thereafter entrusted to the 1st Aviation Brigade, formed on March 1, 1966.

which they provided cover to the ground forces. The Viet Cong thereafter adopted tactics to either remain beyond, or under, the ranges of artillery fire bases to counter these.

With rapid diversification and rotation of pilots resulting in varied training procedures and non-standardised methods of operational employment, a need was felt for a centralised unit to focus on these aspects. This responsibility to standardise training, procedures and methods of operation was thereafter entrusted to the 1st Aviation Brigade, formed on March 1, 1966. For maintenance support, a former navy tender *Albermale* was requisitioned and renamed as *Corpus Christi Bay*. It became an “army aircraft carrier” and was manned by a civilian crew and staffed by army technicians to undertake repairs and rectification of helicopters. It reached the area of operations in the spring of 1966 and was moored in the bay at Qui Nhon and later at Vung Tau (1967-69).⁷⁹

By 1967, the strain on man and machine was beginning to tell and the shortage of pilots as well as of helicopters was being felt, with many more divisions such as the 101st Airborne Division being in the process of being converted into air mobile status. Helicopters had proven themselves to be indispensable in cutting off the escape routes of NVA units and in searching for, and destroying, enemy bases.

The NVA and Viet Cong were forced to go back to resorting to ambush tactics rather than undertaking assaults in concentration.

To avoid wasteful effort and cover a wider area of operations, a concept of red, white, pink and blue teams was developed. A red team was composed of two gunship helicopters whereas the white team had two helicopters in a reconnaissance/scout role. In this role, while one helicopter would be at low level looking for the enemy, the other was at a height to act as a cover and a communication relay. The pink team would be a combination of a low flying observation/scout helicopter which would look for targets and draw fire while the gunship helicopter would be holding overhead in a circular pattern. The blue team would consist of a number of Huey “slicks” which would be carrying a rifle

79. Mesko, n. 62 and NavSource Online: Service Ship Photo Archive, “USNS Corpus Christi Bay (T-ARVH-1), <http://www.navsource.org/archives/09/41/4105.htm>. Accessed on February 22, 2019.

platoon or a ground cavalry group. The blue and pink teams combination was the most favoured, with the best area of operation within reach of an artillery fire base. These teams could always be in the air or in a position on the ground, ready to activate in case of “contact” with the enemy.⁸⁰

These efforts were proving to be very effective in countering both the NVA regulars as well as the Viet Cong. It was in September 1967 that the dedicated attack helicopters, the AH-1G “Cobras” were received by the New Equipment Training Team (NETT) of the 1st Aviation Brigade. These Bell manufactured helicopters had the necessary speed, manoeuvrability and firepower to do the job required. Their success on the battlefield resulted in them replacing all the armed Hueys by the late 1960s. The dedicated attack helicopter had arrived in the battlefield along with the Hughes OH-6A Cayuse light observation helicopter, which also found favour with the operating crew instead of the older OH-13 and 23, due to its ruggedness and dependability. The Viet Cong was forced to retreat to camps in Cambodia and Laos to regroup. Whenever the NVA attacked, the helicopter was used by Gen Westmoreland to effectively build up troop concentration and prevent the enemy from achieving its aims. The NVA and Viet Cong continued to resist fiercely, but the helicopters with their flexibility of use, proved to be more than a match. However, Giap studied the US military strategy to devise a counter-strategy. He instructed his troops to remain concealed in bunkers and tunnels till the bombing by the fixed-wing aircraft and the armed helicopters was over. The Viet Cong and NVA regulars emerged from their hideouts only when the helicopters started bringing in troops to engage them. As one of the Vietnamese Generals, Nguyen Xuan Hoang stated later in an interview:⁸¹

In Vietnam, your commanders never realised that there are limitations of power, limitations on strength.... the most intelligent of men can do the stupidest thingswe never stopped winning the war. Time was on our side. We did not have to

80. www.army.mil/IaDrang-October-November1965, http://webdoc.sub.gwdg.de/ebook/p/2005/CMH_2/www.army.mil/cmh-pg/books/vietnam/tactical/chapter2.htm. Accessed on February 22, 2019.

81. Currey, n. 1, p. 258.

defeat you militarily; we only had to avoid losing. A victory by your brave soldiers meant nothing, did nothing to change the balance of forces or bring you any closer to victory.

Then, Gen Giap was directed, by the Politburo led by Ho Chi Minh, to undertake a dramatic attack against his better judgement, with an aim to reveal the weakness of the government in the South and force the US to withdraw.⁸² This was backed by balancing the Chinese and Soviet interests. The Chinese help included over 100,000 logistic troops which increased the number of combat troops. The Soviets also promised shipments of armour and other weapons.⁸³ The Tet offensive was, therefore, conceived.

THE TET OFFENSIVE AND THE “MONKEY TRAP”

The Tet or the Vietnamese New Year, which is based on the lunar calendar is a major festival celebrated across Vietnam [Tết Nguyên Đán (𑜉𑜂𑜫), which is Sino-Vietnamese for “Feast of the First Morning of the First Day”]. The three-day festival was to be celebrated on January 31, 1968. A majority of the AVRN troops were on holiday. The meticulously planned operation was put into motion well before the Tet holiday. The AVRN and US intelligence was deceived into responding to a reported attack on the lines of the “Dien Bien Phu” attack on the French during March 1954. Only this time, it was reported by the US intelligence that the NVA and Viet Cong were concentrating around the US Marine base at Khe Sanh. Accordingly, Gen Westmoreland moved major elements of the 1st Cavalry to the Khe Sanh base, with all the elements now reoriented towards the threatened area. However, on January 31, 1968, the Viet Cong and NVA in substantial numbers attacked over 100 carefully selected strategic locations (including in 38 cities and towns) simultaneously, throughout the country.⁸⁴ This included the US Embassy in Saigon, along with office complexes and supply depots, which were usually lightly defended. The surprise was complete and the perimeter was breached in many heavily defended areas also. However, in the ensuing two days of fighting, the

82. Ibid., p. 269.

83. Currey, n. 1, p. 265.

84. William Weir, *50 Battles That Changed the World* (Delhi: Pentagon Press, 2008), pp. 270-274.

helicopters, especially the AH-1G Cobras, played a key role, with the Hueys dropping troops and reinforcing the defenders wherever necessary.

Gen Westmoreland, however, remained convinced that the main attack was still going to take place on Khe Sanh. Concentrating on Khe Sanh, a major large-scale air assault operation codenamed "Pegasus" was launched on April 1, 1968, but achieved very little. The "trenches" which appeared to have been formidable from the aerial photographs/observations and indicative of a massive troop build-up, were only 14 to 20 inches deep and obviously a part of a ruse. Gen Westmoreland, probably still desperate for success, thereafter committed his force of helicopters to operations in the "A Shau Valley" as a part of Operation Delaware. He committed both the 1st Cavalry and the 101st Airborne Division from April 19, 1968, onwards. The results were mixed at best, with the enemy losses at 900 against 100 allied soldiers killed, with an extensive cache of arms and other stores having been captured, at a cost of the loss of 21 helicopters and damage to most of the others involved.⁸⁵ It is likely that the supply depot was lightly defended, with the major force having been clandestinely positioned for the "Tet Offensive".

The NVA military successes included taking over the town of Hue which was the old imperial capital, and the destruction of almost 100 aircraft and helicopters on the ground, besides the freeing of prisoners. Its repeated appeals over Radio Hanoi of a general uprising had no effect. The failure of the offensive resulted in over 40,000 Viet Cong casualties compared to 1,100 US soldiers and 2,300 AVRN soldiers killed in action. Over a million people throughout the South lost their homes.⁸⁶

Even though the cleverly planned offensive, based on the Napoleonic strategy of splitting the superior enemy into several parts and attacking the "centre of gravity" with a superior force, as well as that of the "Monkey Trap"⁸⁷ (with Khe

85. Mesco, n. 62, p. 45.

86. Currey, n. 1, p. 269.

87. Gen Giap explained the strategy akin to how the Vietnamese monkey hunters used to catch monkeys by boring a hole in a coconut, placing a shiny bead inside it and leaving it where the monkey was last seen. A monkey seeing the bead would reach for it but the hole would be too small for the animal's clenched fist to pass through. But monkey wouldn't let go of the bead and, weighed down by the coconut, he would be easily caught by the hunter. A variation of the technique using an earthen pot and black gram is also used by Indian monkey hunters too.

Even though the cleverly planned offensive, based on the Napoleonic strategy of splitting the superior enemy into several parts and attacking the “centre of gravity” with superior force, as well as that of the “Monkey Trap” was defeated, it still yielded unexpected results for the DRVN dream of a unification. The failure was on account of the swift US response led by the rapid mobility accorded by the helicopters.

Sanh as a bait), was defeated, it still yielded unexpected results for the DRVN dream of a unification. The failure was on account of the swift US response led by the rapid mobility accorded by the helicopters.

THE FALLOUT

The failed Tet offensive had an impact on the psychology of the US populace as well as on the political landscape in the US. War reports being filed by the correspondents only fanned the resentment in the US against the war. The US measured its success on the enemy body counts and fed the public its “domino theory” of the spread of Communism in all of Southeast Asia.

The enforcing of the compulsory military draft was not helping the cause. It was in this background that the story of the failed “Tet Offensive” was broken to the American public and the public sentiment began to doubt the official reports about the progress of the war. The Administration of President Lyndon Johnson yielded, with a promise of not running for a second term, on March 31, 1968. The US began negotiations with the North on May 13, 1968, in Paris. The US policy drifted back towards “Vietnamisation of the War”,⁸⁸ a policy in which the ARVN was to conduct its own war albeit with US support. A rather diplomatic way of conceding defeat and announcing a withdrawal.

THE “VIETNAMISATION OF THE WAR” PHASE

A plan termed as “*jaunissement*” (yellowing, as described by the French in its

88. kubia, “The ‘Secret Plan’ of Nixon”, <https://thevietnamwar.info/vietnamization-theory-reality/>. Accessed on February 23, 2019.

earlier *avatar* of 1951)⁸⁹ was put into effect by President Nixon, who had won the presidential election on the poll plank of ending the war. The negotiations in Paris were the key. However, the North launched another Tet offensive on February 22, 1969. Despite suffering heavy losses, the Viet Cong had killed 1,100 Americans. On March 18, 1969, President Nixon, without the permission of the Senate or the Congress, ordered a bombing campaign codenamed "Operation Menu". It involved secretly bombing the Viet Cong's and People's Liberation Army's sanctuaries inside Cambodia.⁹⁰ The B-52s operating from Guam dropped 5,50,000 tons of explosives till 1973.⁹¹ On June 8, 1969, the US, claiming that Vietnamisation was working, ordered withdrawal of the 9th Infantry Division from Vietnam.

A peace treaty was finally signed in January 1973, and under the agreement, US military personnel were withdrawn. The helicopter operations reduced further owing to the threat posed by the SA-7 shoulder-fired missiles.

REDUCTION IN COMBAT POWER :ROLE OF HELICOPTERS

The Viet Cong had shifted base into Cambodia (the reason for the B-52 bombings) from where they were back to guerrilla tactics and the helicopters were moved closer to the Cambodian border to counter the threat. With reductions in the troop levels, the helicopter support attained even more significance. However, the last of the major air mobile operations undertaken by the ARVN troops, with US backing, was against the supply routes of the NVA in Laotian territory. The operation codenamed "LamSon 719," undertaken between January and March 1971, resulted in the loss of 168 helicopters, with another 618 being damaged. As the operation ended, over 55 US aircrew were killed, 178 wounded, and 34 were missing in action.⁹²

89. Spencer C Tucker, "Vietnam", [https://books.google.co.in/books?id=WZry2NaH2_sC&dq=jaunissement+yellowing+\(as+described+by+the+French\)&source=gbs_navlinks_s](https://books.google.co.in/books?id=WZry2NaH2_sC&dq=jaunissement+yellowing+(as+described+by+the+French)&source=gbs_navlinks_s) p. 61.

90. Anthony Lewis, "Menu For Disaster", October 4, 1976, <https://www.nytimes.com/1976/10/04/archives/menu-for-disaster.html>. Accessed on February 23, 2019.

91. William P. Head, "War From Above the Clouds: B-52 Operations during the Second Indochina War", https://media.defense.gov/2017/May/05/2001742911/-1/-1/0/FP_0007_HEAD_WAR_FROM_ABOVE_CLOUDS.PDF. Accessed on February 23, 2019.

92. DEWEY CANYON II / LAM SON 719, 29 JAN 1971-6 APR 1971, <https://one-six-one.fifthinfantrydivision.com/161pg12a.htm>. Accessed on February 21, 2019.

The losses could be attributed to a combination of factors, including better anti-aircraft weaponry as well as the weather and lack of fixed-wing air support. But the greatest number of losses were of the ageing UH-1 Hueys, especially when compared to the AH-1G Cobras.

By 1972, the bulk of the US forces had been withdrawn from South Vietnam. However, a few helicopter units remained to aid the Vietnamese. The attacks by the NVA were relentless and now consisted of armoured assaults using PT-76 and T-54 tanks. These were repulsed with the aid of the US-led air strikes. However, by now, three UH-1Bs were configured with Tube-Launched, Optically Guided, Wire-Guided (TOW) anti-tank missiles. These were tested during the armour thrusts, with 26 tank kills having been reported.

A peace treaty was finally signed in January 1973, and under the agreement, US military personnel were withdrawn. The helicopter operations reduced further owing to the threat posed by the SA-7 shoulder-fired missiles. But it was only a matter of time when the NVA overwhelmed all resistance by the AVRN and entered Saigon in April 1975, triggering the evacuation of the remaining Americans.

A FEW STATISTICS

A report was presented during the impeachment hearings of President Nixon in the US House of Representatives, giving an account of the total munitions expended by all American aircraft, including by helicopter gunships and C-130s; it was as follows:⁹³

Table 2

US Aerial Munitions Expended (In Tons)	
DRV	8,80,108
RVN	32,02,952
Laos	20,93,300
Cambodia	5,39,098
Total	67,15,458

93. Turley, n. 50, pp. 123-124.

In addition, the contingents of Australia and New Zealand also dropped 1.4 million additional tons of aerial munitions, taking the total load dropped to 8 million tons. This was more than double of what all the aircraft had dropped in the entire World War II. Most of it was dropped in South Vietnam.

During the bombing campaign, 818 US airmen had died, with 918 aircraft having been shot down; many US airmen were taken prisoner.⁹⁴

For the entire war (21 years: 1954-1975), the Killed In Action (KIA), figures were:⁹⁵

Table 3

Force	KIA
US Forces	47,378(+766CIA + 10,824 Non-Combat) Of these
ARVN	22,3748
South Korea	4,407
Australia	469
Thailand	351
New Zealand	55
NVA/VC	1,100,000 (+ 4,000,000 civilians, in the North and South 12-13% of the entire population)

Of the total of around 12,000 helicopters which served in Vietnam, 5,607 were lost, with the loss of 2,165 pilots and 2,712 crew members.⁹⁶ It is estimated that over 40,000 helicopter pilots served during the war. The helicopter types included the Bell 204B/205, AH-1G/J, AH-47A, CH-21C, CH-37B/C, CH-3C/E, CH-46A/D, CH-47A/B/C, CH-53A/C/D, CH-54A, HH-1K, HH-3E, HH43-B/F, HH-53B/C/E, OH-13S, OH-23G, OH-58A, OH-6A, SH-34G, SH-3A, UH-1/1A/1B/1C/1D/1E/1F/1H/1L/1M/1N/1P, UH-19, UH-2A,UH-2B, UH-34D⁹⁷

94. Ibid., p. 132, The bombing campaign ended on October 31, 1968, before being recommenced in 1972 to aid in the US negotiating position in facilitating the withdrawal of US troops, pp. 161-162.

95. Ray's Web Server, 1st Battalion 69th Armour - A Tribute to my Brothers, Casualties-US vs NVA/VC, http://www.rjsmith.com/kia_tbl.html. Accessed on February 21, 2019.

96. Vietnam Pilots Helicopter Association, Helicopter Losses in Vietnam War: Updated 31 December 2018, <https://www.vhpa.org/heliloss.pdf>. Accessed on February 22, 2019.

97. Ibid.

THE ASSESSMENT OF THE NATURE OF CONFLICT

The Cold War period was a time of serious power struggles between the Communist bloc and the Western powers.⁹⁸ Even the non-aligned nations had been drawn into battles of their own. The period between 1954 and 1975 also saw the three major wars involving India (1962-China 1965 and 1971-Pakistan). The rather simplistic view of the events in Vietnam along similar lines of the global struggle between Communist and non-Communist ideologies proved to be the decisive factor in Vietnam.

The case of the conflict in Vietnam was unique, and it was actually a continuum of a struggle under the leadership of its undisputed leader Ho Chi Minh since 1941, much before the Cold War. Even though the path chosen by Ho was based on the Communist ideology, he was prepared to be patient and was astute enough to take help from wherever possible, including other nationalist movements, with the aim remaining unwaveringly that of “freedom of the fatherland” and banishment of rulers not endemic to the region. No divisions between North and South were ever acceptable. This aim had pitted Ho Chi Minh against the French, the Japanese, the Chinese (KMT) and, finally, the Americans, and, along the way, he managed to obtain help from each of the forces, including the American OSS. Even though Ho Chi Minh died on September 2, 1969, without seeing his dream fulfilled, his death only fuelled prompt replacement of manpower losses (the Vietnamese joining in large numbers) faced by the struggle.

The path that was carefully chosen by Ho involved altering the cognitive behaviour of the entire populace. In 1941, at the start of the people’s struggle, with virtually no resources, he had stated:⁹⁹

We must rely on our own force, with some outside help. When our people absorb this beautiful idea of revolution, they will create the strongest of forces. Everything because of the people; everything for the people. People first, guns last. If we have people on our side, then we will have guns. If we have the people, we will have everything!

98. History, “Cuban Missile Crisis”, <https://www.history.com/topics/cold-war/cuban-missile-crisis>. Accessed on February 22, 2019.

99. Currey, n. 1, p. 6.

The response by the French and thereafter by the US only helped to consolidate the people, aligning them against the “occupiers”. Serious mistakes on the part of Ho during the period 1955-57 (land reforms, resulting in the rampant killing of 100,000, eliciting a public apology from Ho Chi Minh) in the DRVN were not capitalised upon. Instead, the backing of a corrupt regime in South Vietnam which suppressed the Buddhists, a mercilessly persecuted opposition in the general populace, by the Americans, only resulted in the success of the propaganda programmes followed by the underground emissaries of Ho. The US too, did not learn from the French experience and adopted a methodology of imposing “prohibitive costs” through military action which only served to strengthen the cognitive aspects of the people’s resolve. This was fully exploited by the well-oiled machinery of the non-state actors supported by the DVRN.

TO SUM UP...

Considered in isolation from the geopolitics and in a purely military sense, the induction of helicopters into the Indochinese conundrum by the US had a similar effect to that of the induction of highly mobile units consisting of parachutists and armoured vehicles by the French in the first war of Indochina. The effect produced in both cases was to outmanoeuvre the guerrilla by becoming more mobile than him, thus, defeating him in the strict military parlance. In the pitched frontal battles, the NVA and the Viet Cong had limited chances of success due to the vast amount of firepower available with the US-led forces.

Hence, while Gen Westmoreland was not inaccurate in reporting to his president that “*the enemy can no longer succeed in the battlefield*”, owing largely to the assault operations by the helicopters; he, along with the rest of Americans, however, misread what actually constituted the battlefield.

Unlike in the Dien Bien Phu (1954) case, in which the French were routed due to grossly underestimating the capability of the enemy (coupled with allowing the Viet Minh under Giap having seduced them to choose the battlefield), in the case of the Tet Offensive (1968), which was again planned by Giap (and described later as a “Monkey Trap”), the offensive was eventually crushed due to the ready availability of firepower wielded by the helicopters.

The concept of imposing unacceptable costs on the enemy had failed as a concept since the cognitive aspects of the populace had been altered to such an extent that the price meant annihilation of the entire population. That is, the battlefield was actually in the cognitive domain rather than in the non-cognitive military domain which was being targeted for decades at the cost of minimal measures being undertaken in the non-cognitive domain.

Eventually, Saigon was renamed as Ho Chi Minh city, after the charismatic leader of the people's war, who did not live long enough to witness the reunification. Senior Gen Vo Nguyen Giap lived to a ripe old age of 102 before his demise on October 4, 2013. Both were perhaps content with the fact that their creation had sufficient steam and acumen to take on the might of the French, Japanese, Chinese and US in defence of their "fatherland". They had been successful in converting a thought in the cognitive domain into a militant action in the non-cognitive domain and the thought remained a dominant binding force despite overwhelming odds and adversity. But the statistics prove that the costs were very high, which they consistently failed to acknowledge. The victorious rarely do.

The helicopter, which had become the face of the Vietnam War, and, in a way, somewhat ironically contributed to prolonging the war, had also played an important role in limiting the number of allied casualties. During the desperate evacuation of the US Embassy in Saigon (Operation Frequent Wind) on the intervening night of April 29-30, 1975, the last helicopter, a CH-46D, crashed near the USS *Hancock*. The two pilots were killed but two crewmen survived due to a heroic night water landing rescue by a CH-43D, helicopter.¹⁰⁰ Helicopters had won the battle, but the war was lost.

100. USMC Combat Helicopter and Tilt Rotor Association, "KIA INCIDENT: 19750429 HMM-164 VIETNAM", <http://www.popasmoke.com/kia/conflicts/vietnam/incidents/19750429>. Accessed on February 23, 2019.

DOCTRINAL APPROACH TO HADR BY INDIAN ARMED FORCES: TIME FOR REORIENTATION FOR EFFECTIVE DISASTER RESPONSE

A SHAJAHAN

INTRODUCTION

Unlike the well-developed traditional war-fighting doctrines, Humanitarian Assistance and Disaster Relief (HADR) missions have been largely underdeveloped from a doctrinal standpoint. HADR missions are carried out as an end in themselves¹ under the 'Aid to Civil Authorities' duty as mandated by Ministry of Defence (MoD) instructions of 1970. There is no developed literature or comprehensive doctrine for undertaking HADR missions by the Indian armed forces unlike the advanced nations such as the USA.² Rapid urbanisation and

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1. For the armed forces, conveying a relief material consignment as a part of HADR mission is an end in itself rather than a means to an end, as the mission ends with the delivery of the consignment to the civil authorities, without any assessment on what impact or effect it would have on the overall disaster situation as opposed to the delivery of a bomb which is preceded by exhaustive appreciation of the intended effect desired and is delivered as a means to produce that result.
2. The US military's joint doctrine, Joint Publication 3-07 establishes the MOOTW doctrine and identifies 16 different missions, one of which is Humanitarian Assistance (HA). No such doctrinal reference exists for the IAF or in the joint doctrine other than a passing reference to 'Aid to Civil Authorities' under which the armed forces undertake HADR missions.

The Indian subcontinent faced 1,860 disasters (894 natural disasters and 966 man-made ones) between 1990 and 2009 alone. The Indian armed forces have traditionally been part of the government's response mechanism for disaster relief during natural disasters.

climate change-induced increase in hydro-meteorological disasters since the 1990s have resulted in the loss of life and property in India. The Indian subcontinent faced 1,860 disasters (894 natural disasters and 966 man-made ones) between 1990 and 2009 alone.³ The Indian armed forces have traditionally been part of the government's response mechanism for disaster relief during natural disasters. The armed forces are called upon to assist the state/local governments when their handling capacity is overwhelmed. In spite of the enactment of the Disaster Management Act in 2005

(hereinafter, referred to as the DM Act, 2005) by the Government of India and subsequent creation of institutions like the National Disaster Management Authority (NDMA), National Disaster Response Force (NDRF), National Institute of Disaster Management (NIDM), etc., the dependence on the armed forces for disaster relief/HADR has not reduced. Headquarters Integrated Defence Staff ((HQ/IDS) is responsible for the participation of the armed forces in HADR, nationally and internationally. The Tri-Service Response Plan promulgated by HQ IDS in the year 2002 acts as the guiding document for the three Services in bringing their special capabilities and capacities to HADR. Since the 1990s, driven by United Nations initiatives, the legislative framework and doctrine development in the civil governance space has showed a definitive transition from a response-centric approach to a holistic one towards HADR⁴. This has had a ripple effect, as many countries (including India)

3. 'EM-DAT: The OFDA/CRED International Disaster Database, www.emdat.be—Université catholique de Louvain—Brussels—Belgium, sourced from Jyoti Purohit and C.R. Suthar, "Disasters Statistics in Indian Scenario in the Last Two Decades", *International Journal of Scientific and Research Publications*, vol 2, issue 5, May 2012, p. 1, ISSN 2250-3153.
4. 'HADR' is a military usage while in the civil-governance space, it is referred to as 'Disaster Management' (DM), 'Disaster Risk Reduction' (DRR), 'Disaster Risk Management' (DRM), etc. In the military, however, worldwide reference as 'HADR' is prevalent.

aligned themselves with the International Decade for Natural Disaster Reduction (IDNDR), 1990-99; International Strategy for Disaster Reduction (ISDR), 1999; Hyogo Framework for Action (HFA), 2005-2015; and Sendai Framework for Disaster Risk Reduction, 2015-2030. However, the Indian armed forces remained outside these global and national developments and showed no doctrinal change as the increasingly complex disaster response operations continued to be driven by civil- government agencies. The doctrinal approach by the armed forces towards HADR has, thus, largely remained static and unreflective of the enormous degree of evolution in the legal framework and doctrinal development for disaster management.

Military doctrine lays down the precepts for the development and employment of military power. It guides military planners in devising their respective strategies in support of national interests and national security objectives within the overarching national strategy.

AIM

The aim of this paper is to analyse the doctrines of the Indian Army, Indian Air Force and Indian Navy (IA, IAF and IN) for the approach to HADR and examine the IAF's doctrinal framework in particular, wherein air power employment is undertaken for HADR missions. The paper will also examine these doctrines for their limitations, contradictions and gaps vis-a-vis the national disaster management framework (DM Act 2005). Also, a comparative analysis will be carried out of the doctrines and approach of the US Air Force (USAF), the North Atlantic Treaty Organisation (NATO) and other armed forces that have vast experience in disaster response operations. This study has been undertaken through a review of the "Basic Doctrine of the IAF"⁵ and similar documents of the IA and IN to examine the 'doctrinal treatment' of the aspects of disaster response operations, with special emphasis on air power functions and effects.

5. Declassified for public access in 2012 by the IAF Headquarters.

DEFINITIONS

The word 'doctrine' has originated from the Latin word '*doctrina*⁶', which implies "a code of beliefs" or "a body of teachings". It is also referred to as "a belief or a system of beliefs accepted as authoritative by a group or school". It, thus, provides a framework of beliefs and teachings that guide a group in its actions. Military doctrine lays down the precepts for the development and employment of military power. It guides military planners in devising their respective strategies in support of national interests and national security objectives within the overarching national strategy. Some of the basic definitions of 'Doctrine', 'HA', 'DR', etc. are listed below for consistency and correlation within the framework of this paper:

- **Doctrine:** The Oxford Dictionary⁷ defines the term 'doctrine' as "a set of beliefs or principles held by a religious, political, or other group."
- **Humanitarian Assistance:** Humanitarian Assistance (HA) activities are actions conducted to save lives, relieve suffering, and maintain human dignity. HA is defined to be in response to human-caused disasters (e.g. nuclear accidents and chemical releases) and chronic natural disasters (e.g. droughts and famines). HA is not aimed at addressing the underlying socio-economic factors which may have led to a crisis or emergency as this is defined as development aid.
- **Disaster Relief:** Disaster Relief (DR) activities are actions taken during and immediately after a disaster to ensure that the effects of a natural disaster are minimised, and that the affected people are given immediate relief and support. While some DR activities may occur before a disaster (e.g. public warnings), for the purposes of this paper, those activities are not deemed to be DR activities. The terms 'disaster response' and 'disaster relief' are synonymous. DR activities are divided into three broad categories:
 - **Direct Assistance:** Face-to-face distribution of goods and services.
 - **Indirect Assistance:** Assistance that is at least one step removed from the population, including activities such as the transport of relief goods or relief personnel.

6. The Indian Maritime Doctrine (NSP 1.1).

7. *Oxford English Mini Dictionary*, Seventh Edition. 33rd Impression 2012.

- **Infrastructure Support:** Assistance that involves providing services, such as road repair, air space management and power generation, that facilitate relief but are not necessarily visible to, or solely for the benefit of, the affected population (emergency rehabilitation, restoration or reconstruction of infrastructure, such as road clearing, temporary bridge construction, stabilising damaged bridges, cleaning drains, construction of drainage channels to remove accumulated sea water, port clearance, debris removal from harbours and runways, and provision of potable water).
- **Disaster**
 - **UN Definition:** The International Strategy for Disaster Reduction (ISDR)⁸ defines *disaster* as “a serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources”. *Natural disasters* are disasters that follow natural hazards.
 - **Disaster Management Act, 2005:** The DM Act defines disaster as a catastrophe, mishap, calamity or grave occurrence affecting any area, arising from natural or man-made causes, or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of, property, or damage to, or degradation of, the environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area.

LEGAL FRAMEWORK FOR ARMED FORCES IN DISASTER MANAGEMENT

The armed forces, under the Ministry of Defence (MoD), are called out to assist the civil authorities. The armed forces respond to disasters as a part of their mandate, viz. **Aid to Civil Authorities⁹ or ACA** as specified in the **Instructions on Aid to the Civil Authorities by the Armed Forces, 1970**.

8. The UN International Strategy for Disaster Reduction-ISDR.

9. 'Aid to Civil Authorities' or ACA is a pamphlet issued by the MoD for the armed forces, IAF, IA and IN for their assistance to civil authority.

The key provisions that govern the armed forces' participation in DM are:

- Instructions on Aid to Civil Authorities by the Armed Forces 1970.
- Manual of Indian Military Law, Chapter VII
- Defence Services Regulations—Regulations for the Army, Chapter VII, Paragraphs 301 to 327.

The term “Aid to Civil Authorities” (ACA) is a British imperial usage¹⁰ referring to the process by which local authorities can request the central government to lend assistance in times of emergency. The British legacy framework was focussed on the employment of the armed forces for internal security as the British viewed internal security as a key construct for the continuity of the colonial rule in the light of the nationalist freedom struggle. ACA 1970 lists four types of assistance that the armed forces may be called upon to render in support of the civil authorities, viz.

- Maintenance of law and order.
- Maintenance of essential services.
- Assistance during natural calamities such as earthquakes and floods.
- Any other type of assistance, which may be needed by the civil authorities.

ANALYSING THE RELEVANCE OF ACA IN THE CONTEXT OF THE CURRENT DM FRAMEWORK

ACA has been a British Raj legacy, modified in 1970, at a time when the Ministry of Agriculture was the nodal agency for DM in the country. DM at that time was primarily oriented towards handling of recurrent famines and droughts. The capability in the civilian space was restricted to volunteers of the Civil Defence (CD) organisation¹¹ and there was almost inevitable

10. Brig PK Mallick, “Role of Armed Forces in Internal Security: Time for Review”, *CLAWS Journal*, Winter 2007, p. 68.

11. The civil defence policy of the Government of India, till the declaration of Emergency in 1962, remained confined to making the states and the Union Territories (UTs) conscious of the need for civil protection measures and asking them to keep ready civil protection plans for major cities and towns under the Emergency Relief Organisation (ERO) scheme. However, following the Chinese aggression in 1962 and the Indo-Pak conflict of 1965, the policy and scope of civil defence underwent considerable rethinking, which culminated in the enactment of the Civil Defence (CD) Act 1968. <https://ndma.gov.in/en/capacity-building/civil-defence.html>. Accessed on December 24, 2018.

dependence on the armed forces for all major and minor disasters. The DM Act of 2005 created a new structure of statutory bodies to implement a holistic approach as against the hitherto response-centric approach to accommodate multi-agency participation in DM in the country: the NDRF—the largest stand-alone response force in the world—and the NDMA, NIDM, etc. were established. However, the role of the armed forces has neither been defined nor articulated by the Act and the armed forces continue to operate under the framework of the ACA (1970) while all the other stakeholders operate under the framework of the DM Act (2005). Doctrinally too, the armed forces are in the 1970s mode and continue to function organically and organisationally only as ‘an on-call’ agency which will participate when called for. The lack of role definition in the DM Act 2005 has, in a way, ensured the 1970s’ continuum in the armed forces though practically they are part of almost every major DM crisis. The large ambit of ACA 1970 and how it is inadequate to cater to the complexities that define DM—especially the response segment—is highlighted in Table 1.

Table 1: Ambit of ACA 1970

Provisions of ACA	Roles/Missions	Legal Provisions
Maintenance of law and order.	Flag Marches. Curfew maintenance. Shoot at Sight orders, etc.	Area is declared as ‘disturbed’ by the civil authority
Maintenance of essential services.	Whenever essential services are jeopardised due to strikes or unrest, the armed forces are tasked by the government to provide the same.	Army Postal Service (APS) stepped into providing Post and Telegraph (P&T) services when the postal department went on a long protest strike during the late 1980s. The essential Services Maintenance Act (ESMA) is invoked by the government.

Provisions of ACA	Roles/Missions	Legal Provisions
Assistance during natural calamities such as earthquakes and floods.	Rescue. Evacuation, Medical services. Relief camps. Airlift of supplies and personnel, etc.	All other stakeholders, including the NDRF, who are routinely airlifted and inducted into calamity stricken areas, function under the DM Act 2005.
Any other type of assistance, which may be needed by the civil authorities.	Election duties. Shifting of new currency during demonetisation (2016). Airlift of heavy material for rail and road construction, etc.	Some of these tasks may fall in the ambit of mitigation efforts within the DM cycle, e.g. airlift of heavy machinery for the Kedarnath helipad construction (2016).

It is evident from the above table that ACA 1970 combines tasks and roles that are diverse and need different approaches to each one of them. Participation in the DM response especially entails a swift and effective response that is aimed at saving as many lives as is possible. Given the complexities, frequency of occurrence and ferocity of natural disasters, there is a need to separate assistance during natural calamities such as earthquakes and floods from the ambit of ACA and a redefinition, within or outside, the provisions of the DM Act 2005. The Tri-Services Plan (2002) that guides the armed forces at the ground level is also a pre-2005 document. It is clear that the armed forces have remained outside the post-2005 legal and institutional framework for DM in India, in spite of being key stakeholders, with critical capacities and capabilities.

INSTITUTIONAL FRAMEWORK FOR ARMED FORCES IN DISASTER MANAGEMENT

The institutional arrangement that is functional for the armed forces' participation in DM is the DCMG-Defence Crisis Management Group (RS Ahluwalia 2014) that functions from the Integrated Defence Staff (IDS) Operations Room (Ops Room). The IDS Ops Room is always in direct communication with the Army, Navy, Air and Coast Guard Ops Rooms.

This is the place from where all disasters—whether it was the tsunami, the floods or the recent earthquake—were tackled.

ARMED FORCES AND THE DM ACT FRAMEWORK

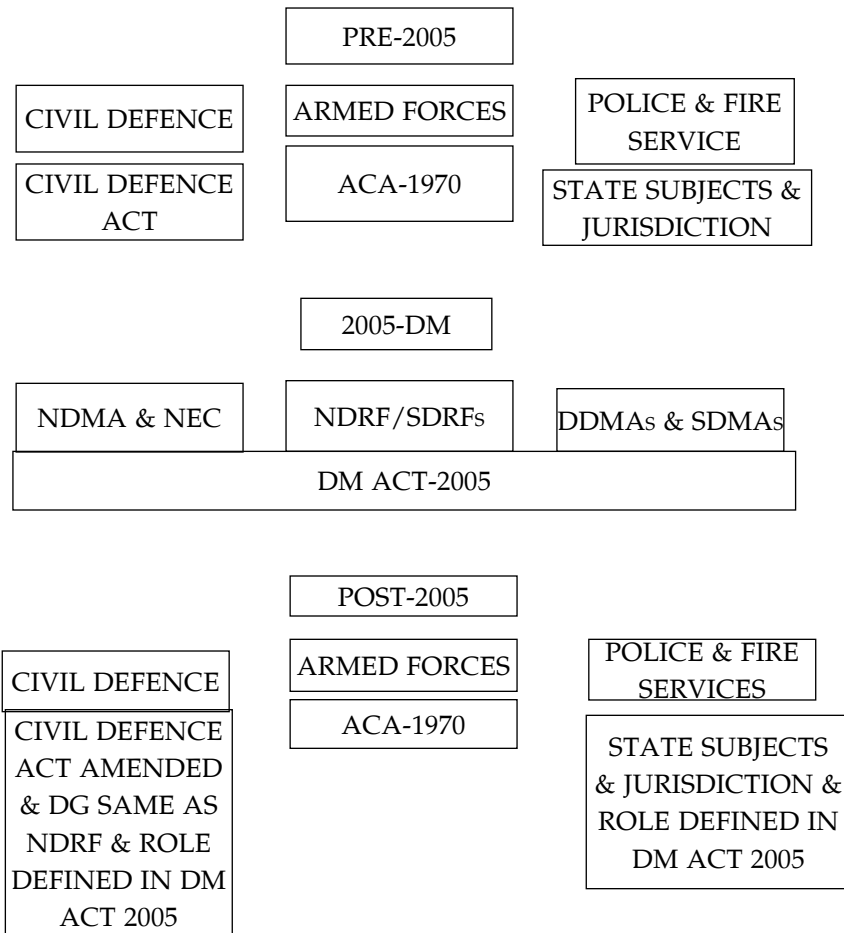
The only institutional arrangement for engagement of the armed forces is the National Executive Committee (NEC) of the NDMA, of which the Chief of Integrated Defence Staff to the Chairman Chiefs of Staff Committee (CISC) is a member. The National Crisis Management Committee (NCMC) in the Ministry of Home Affairs (MHA), a pre-2005 institutional arrangement, is still functional and takes over the functions of the NEC (a post-2005 body) during major disasters. There is no institutional role for the armed forces in the NCMC. However, the Task Force for Review of the DM Act, constituted under Dr PK Mishra, opined that the NEC has been ineffective and recommended its rescinding and incorporation of the NCMC (a pre-2005 institutional arrangement in the MHA) as the premier agency for DM.

Presently, the response scenario represents a complex maze of stakeholders who bring overlapping capacities, diverging command and control structures and different philosophies of operating and information sharing.

Armed Forces Pre- and Post-2005: Prior to the enactment of the DM Act 2005, the armed forces formed the core of the response mechanism of the government. It was to address this dependence and build/strengthen government capacities at national, state and local levels that the union government enacted the DM Act. Post-2005, the number of stakeholders has increased substantially, namely the NDRF, State Disaster Response Forces (SDRFs), civil defence, Non-Governmental Organisations (NGOs), volunteers, etc. The armed forces continue to be called for assistance during calamities. Presently, the response scenario, thus, represents a complex maze of stakeholders who bring overlapping capacities, diverging command and control structures and different philosophies of operating and information sharing. As can be seen from Fig 1, while all other stakeholders work on the basis, and within the framework, of the

DM Act 2005, the armed forces operate on the basis of the provisions of the ACA 1970.

Fig 1: Stakeholders’ Legal Basis for DM Pre and Post DM Act 2005



DOCTRINAL ISSUES WITHIN ARMED FORCES FOR DM EMPLOYMENT

Involvement of the armed forces is based on the principle of being the ‘last to enter and the first to leave’. However, in practice, in most post-disaster operations, the armed forces have been the first to enter and the last to leave. The enactment of the DM Act 2005 and the subsequent

specialised agencies like NDMA and NDRF has not, in any manner whatsoever, reduced or altered the engagement of the armed forces in DM operations, either in scale or frequency.¹² The DM Act which established specialised agencies, institutions and arrangements for a holistic approach to DM failed to enunciate the role- recognition, the definition of that role and the procedure of engagement of the armed forces in the new post-2005 DM framework. As a result, the armed forces have largely remained outside the capability and capacity enhancement initiatives undertaken under the new framework. They do not figure as stakeholders in the policy and plans evolution either.

Doctrines of Army, Air Force and Navy and DM in India: The three Services, viz. Indian Army (IA) Indian Air Force (IAF) and Indian Navy (IN) define HADR in differing terms and context. The Joint Doctrine for the Indian Armed Forces was published by HQ IDS in 2006. The IAF was the first to declassify its basic doctrine in 2012, followed by the army and navy. Internally, from a doctrinal standpoint, the DM aspects are not as well covered in the doctrines of the IA and the IAF as their war-fighting aspects are due to the lack of clarity, higher direction and role recognition. Disaster relief appears at various places in their respective doctrines and not as a specialised operational concept. This is especially critical with the growing frequency and ferocity of natural disasters and the increasing complexities of post-disaster response operations.

DM and Doctrine of the Indian Army: The Indian Army Doctrine¹³ refers to disaster related operations variously as disaster relief, humanitarian assistance, etc. The following are extracts from the doctrine:

- **Disaster Relief:**¹⁴ *The Indian subcontinent is vulnerable to floods, droughts, cyclones, earthquakes and accidents. Disasters include earthquakes, landslides, floods, cyclones, wildfires, and epidemics, on the one hand, and accidents and man-made disasters, on the other. The impact of these disasters is more predominant*

12. Lt Gen NS. Bawa, "Uttarakhand Disaster 2013: Lessons Learnt". National Workshop, New Delhi, NIDM 2013.

13. The Indian Army lists DR under 'Non-Combat Operations' while other nations like the USA list it under MTOOW.

14. Operations Other than War, Indian Army Doctrine, Chapter V, para 18.

in under-developed and remote areas, where facilities to handle such calamities do not exist.

- **Humanitarian Assistance**¹⁵: *These programmes consist of assistance provided in conjunction with military operations and training exercises. Humanitarian assistance should enhance national security interests and increase the operational readiness of units performing such missions. These may include provision of medical care, basic sanitation facilities, repair of public amenities and facilities, education, training and technical assistance.*

DM and Doctrine of the Indian Air Force: Unlike the army doctrine, the doctrine of the IAF makes no distinction between DM or humanitarian relief tasks and refers to disaster-related operations as one of the roles among its primary combat role operations¹⁶ in the following manner:

“Assisting the government in disaster management or humanitarian relief tasks.”

DM and Doctrine of the Indian Navy: The IN treats HADR and aid to civil authorities as two different objectives/missions. The four main roles envisaged for the IN are: military, diplomatic, constabulary and benign.¹⁷ The ‘benign’ role is so named because violence has no part to play in its execution, nor is the potential to apply force a necessary prerequisite for undertaking these operations. Examples of benign tasks include humanitarian aid, disaster relief, Search and Rescue (SAR), ordnance disposal, diving assistance, salvage operations, hydrographic surveys, etc. Table 2 illustrates the Indian Navy’s objectives, missions and tasks in the benign role of the IN.

15. *Ibid.*, para 19. Quoted as given in the Indian Army Doctrine.

16. The IAF lists Disaster Relief under ‘Structure of Air Strategy- Chapter-V/Roles of air power/p. 38’, and not under Chapter VI that deals with ‘Air Campaigns’. In contrast, the USAF lists HA/DR at serial no 16 among various other MOOTW.

17. The Indian Maritime Doctrine (NSP 1.1).

Table 2: Role of Indian Navy

Objectives	Missions	Tasks
Promote civil safety and security.	HADR.	Provision of relief material and supplies infiltration.
Project national soft power.	Aid to civil authorities.	Medical assistance.
	Hydrography.	Diving assistance.
	SAR.	Hydrography assistance.

The IN further defines its doctrinal separation of HADR and ACA, while the IA and IAF consider HADR as part of ACA (as provided by the ACA instructions of 1970)

- **HADR:** Humanitarian Assistance and Disaster Relief (HADR) are most required in the immediate aftermath of natural disasters and devastation. The essence of disaster management is to improve preparedness so as to provide the right item at the right place and at the right time.¹⁸
- **ACA:** Aid to Civil Authorities (ACA) is in addition to HADR assistance during floods, cyclones and other adversities; naval forces provide many other diverse forms of assistance to the civil authorities whenever called upon to do so.

The difference in the doctrinal approach of the IA, IAF and IN with regards to DM/HADR is summarised in the Table 3:

Table 3: Doctrinal Approach of IA, IAF and IN

	HADR		REMARKS
	HA	DR	
IA	Defined as separate functions.		The IA defines DR as the role that needs to be carried out in the immediate aftermath while HA comprises more of the mitigation and support role during non-disaster periods. HADR, however, is defined within the ambit of ACA.

18. The INBR 1920(A) on Disaster Management lays down the procedures in handling various types of disasters.

IAF	No separation	The IAF makes no distinction between DM or humanitarian relief tasks and equates DM with HADR. HADR, however, is defined within the ambit of the ACA.
IN	No separation within the HADR definition but unlike the other two Services, the IN defines HADR outside, and separate from, ACA	HADR is treated as one activity with no separation between HA and DR. However, HADR and ACA are defined as exclusive roles, with ACA representing non-disaster period assistance.

CIVIL-MILITARY RELATIONSHIP AND THE EVOLUTION OF DOCTRINE ON BOTH SIDES

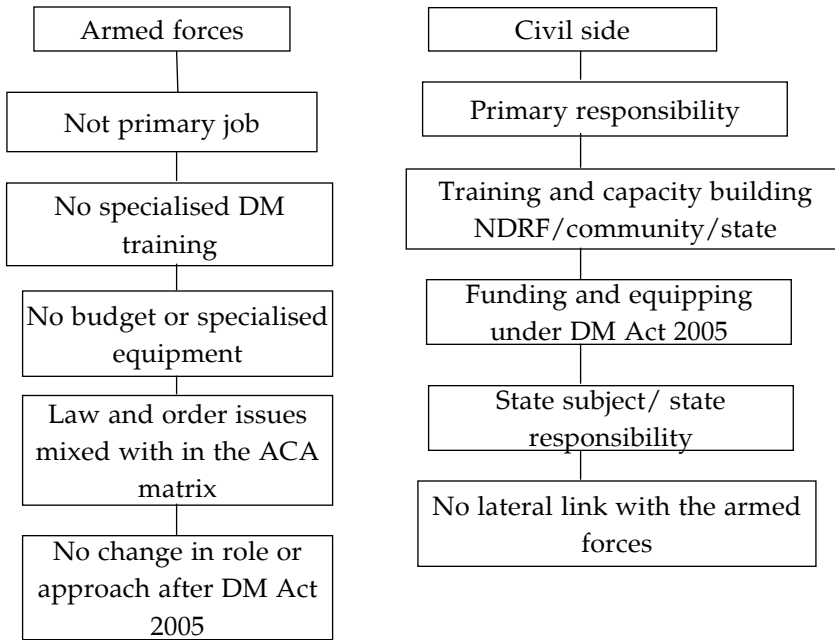
In India, the Latur earthquake (1993), Orissa super cyclone (1999) and tsunami (2004) exposed the gross inadequacies in terms of civil capacities to handle the challenges of mega-disasters. It also exposed the continued over-dependence on the armed forces whose primary role was securing the national borders. This prompted the Government of India to enact the DM Act of 2005 and create specialised structures to holistically address DM, moving away from being 'response-centric'. There are three distinct schools of thought that presently dominate the DM eco-system in India:

- **DM- Primacy of Civil Control:** The very dependence on the armed forces and the need to develop civil capacities led to the enactment of the DM Act 2005 and, hence, any clamour for role definition in terms of budgeting for, or equipping, the armed forces for participation in DM is at variance with the core objective of strengthening civil capacities. This has also been the global approach where NGOs and volunteer organisations have resisted military dominance and control of the DM space. They call it the 'increasing militarisation of DM' and have viewed with suspicion the neutrality and impartiality of the armed forces that are seen as extensions of government instruments—

especially those with a dubious human rights record. While in India, the armed forces enjoy a favourable public opinion and are viewed with trust and respect by the civilian population, the Srinagar floods of 2015 did add a new dimension of rescue and relief of a hostile and uncooperative population, highlighting the need for greater articulation of the engagement framework for the armed forces in such cases.

- **DM-Primacy of Armed Forces:** This school of thought supports primacy for the armed forces, with effective control of the DM space. This is especially common among states that have been plagued with internal and external insurgencies; e.g. the Sri Lankan model where the affected district is placed under the seniormost military commander for the period of relief and rescue. Within the Association of Southeast Asian Nations (ASEAN) framework too, the armed forces are given primacy for disaster relief.
- **DM-Primacy of Civilian Control in a Multi-Agency Framework:** This school of thought is a proponent of the 'balanced approach' which combines 'humanitarian principles' with the unique capabilities that the military possesses. It advocates the primacy of civilian control while providing for operational freedom for the military to execute its rescue and relief missions. While, theoretically, this model is the most 'balanced' as it combines the strengths of varied stakeholders, it is plagued with command and coordination issues due to the multiplicity of actors with differing operating philosophies and command structures.

The summary of the evolution of the doctrine on both the civilian and military sides is illustrated below:

Table 4: Evolution of Doctrine: Civil and Military

THE EVOLUTION OF DOCTRINES OF OTHER NATIONS: USA, CHINA, NATO FORCES AND CANADA

USA

After the initial struggle and doctrinal confusion on the role of the military in 'humanitarian tasks' and the plethora of command, communication and control (primacy) issues, the USA especially has been a trendsetter in terms of formalising the role of the armed forces in the DM space. It perhaps has the most robust legal framework that clearly lays down the process and the procedure for the involvement of the armed forces in DM, though it could not prevent the DM set-up of the USA from being overwhelmed during Hurricane Katrina in 2005. The USA, given the rich and varied expeditionary experience of its armed forces – in both armed intervention and HADR—is best placed to be the global gold standard; especially in the light of the fact that the Government of India has adopted the US model of Incident Response System (IRS) for its DM response. It, therefore, is absolutely essential and

imperative that the US' doctrinal evolution and approach be studied in detail. The USA lists HADR as one of its 16 Military Operations Other Than War (MOOTW)¹⁹ operations. What does this mean for the armed forces? The RoEs—Rules of Engagement—are organically defined and become intrinsic to all MOOTW operations and, hence, to HADR operations. This ensures self-protection for the armed forces which can decline to conduct a particular HADR operation on the grounds of either safety, non-feasibility or undignified labour. Also, clear entry and exit points are defined for the armed forces in HADR. The right to use of force is ingrained in the MOOTW doctrine in the case of an imminent threat to the military or its equipment. Essentially, an HADR operation by the military, when placed under the MOOTW umbrella, ensures that the HADR operation remains a MILITARY operation, albeit under civilian control. Some of the key features of the US framework for HADR are listed in Table 5:

Table 5: US Framework for HADR

1.	Executive Order No. 10427, dated January 16, 1953.
2.	Army responsibility and policy in disaster relief operations are prescribed in Army Regulations AR 500-60, "Emergency Employment of Army Resources, Disaster Relief," dated October 1, 1952.
3.	Department of Defence Directive No. 3025.1, "Responsibilities for Civil Defence and Other Domestic Emergencies," dated July 14, 1956.
4.	Federal Disaster Act of 1950, coordinated by the Federal Civil Defence Administration when the president declares a "major disaster"
5.	Defence Mobilisation Order No. VII-4, Supplement No. 1, Subject: "ODM Policy Guidance on Government-owned Production Equipment," dated August 25, 1955, and amendment thereto dated September 21, 1955.
6.	Defence Mobilisation Order No. VII-7, Supplement 1, Subject: "Emergency Action for Maintenance of the Mobilisation Base under Disaster Conditions," dated August 25, 1955.
7.	The Reserve Forces Act of 1955
8.	Defence Mobilisation Order No. VII-7, Supplement 1, Subject: "Emergency Action for Maintenance of the Mobilisation Base under Disaster Conditions," dated August 25, 1955.

19. MOOTW refer to operations undertaken by the military other than war usually in support of the civilian government and agencies. Operations in support of the UN like peace-keeping, election monitoring in strife-torn states, natural disasters, etc. are examples of MOOTW.

As can be seen from the above table, the US has an extensive legal framework for the US military's participation in HADR. There are many key benefits that accrue in terms of doctrinal clarity and operational focus due to this extensive framework. This clarity has resulted in an independent role for the US Army Engineering Task Forces (ETFs)²⁰ for flood relief directly between the affected states' civil authorities.²¹

NATO

The end of the Cold War brought an existential crisis for the NATO forces. The relevance of maintaining highly sophisticated armed forces in the absence of the reduced/changed 'Russian threat' was being increasingly questioned, especially in the light of budgetary constraints and the reduced salience of the USA in NATO affairs. Hitherto, NATO had never participated in international disaster relief operations. The changed 'role' led to a redefinition, and NATO forces, for the first time, participated in the 2005 Pakistan earthquake relief. Thus, there is now a change in the doctrinal approach that is oriented towards international relief as a core competency and role of the NATO forces.

China

China has a large military and did not regard international disaster relief with any particular interest until a decade ago. Backed by a booming economy and a growing desire for assertion as a global power, China has now doctrinally oriented towards defining a role for its military at both national and international levels in disaster relief. The first legislative document in China's history that defined the People's Liberation Army's (PLA's) participation in emergency rescue and disaster relief was drafted in 2005, the same year that India enacted the landmark DM Act. Since then, in over a decade, China has drafted nearly 100 laws and decrees that relate to disaster prevention and mitigation; these have been enacted from

20. The ETFs are army units that specialise in bridging operations and are commonly employed in flood relief.

21. The US Army's ETF has legislative sanction to be prepared, and participate, independent of whether the US military is involved or not in disaster relief.

1949 to 2010.²² These laws, decrees and the framework helped redefine the role of the Chinese military in disaster relief. It now sees HADR as a tool of international diplomacy. Key features of the framework for the participation of the Chinese military in disaster relief are:

- Article 29 of the Constitution of the People's Republic of China states that the tasks of the armed forces are "to strengthen national defense, resist aggression, defend the motherland, safeguard the people's peaceful labor, participate in national reconstruction, and do their best to serve the people", which provides the Chinese leadership with the constitutional basis for deploying the military for any internal task.
- In January 2009, the Central Military Commission (CMC) issued a document on PLA MOOTW capacity building and to drive the strategic guidance.
- In March 2009, China published *Opinions on Strengthening Political Work in Military Operations other than War*.
- China's MOOTW policy was a contributing factor to the announcement on April 20, 2010, that the PLA would establish state-level, domestically focussed emergency rescue troop units, each specialising in one of eight different types of disasters. The categories include engineering, medicine, transportation, Nuclear Biological and Chemical (NBC), emergency communication, maritime search and rescue, urban search and rescue.
- In November 2010, the CMC released the domestically focussed *Regulations on PLA's Emergency-Response Command in Dealing with Unexpected Events*. These provided regulations on issues, including organisation

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22. https://nidm.gov.in/easindia2014/err/pdf/country_profile/China.pdf. Accessed on March 19/2124H.

and command, force use, and military-civilian coordination relating to the PLA's participation in maintaining social stability and dealing with various unexpected events.²³

- In the 2010 White Paper, seven sets of diversified military missions were defined and the identification of both internal disaster response and HADR in them reflects their continual importance for the PLA. The missions identified vide the White Paper are:
 - Safeguarding border, coastal and territorial air security.
 - Maintaining social stability.
 - Participating in national construction, emergency rescue and disaster relief.
 - Participating in UN peace-keeping operations.
 - Conducting escort operations off the coast of Somalia/Gulf of Aden.
 - Holding joint military exercises and training with other countries.
 - Participating in international disaster relief operations.

Canada

The inclusion of HADR as one of the “eight new core missions” of Canada’s armed forces was, at least in part, a natural outgrowth of the policy document’s analyses of the changing security environment, the changing nature of conflict, and the challenge posed by climate change. The “increased frequency, severity and magnitude of extreme weather events all over the world—one of the most immediate and visible results of climate change—will likely continue to generate humanitarian crises. The effects of climate change can also aggravate existing vulnerabilities, such as weak governance, and increase resource scarcity, which, in turn, heightens tensions and forces migrations.” In the doctrinal evolution of the Canadian military, the traditional security role and the erstwhile sharp differences with other roles such as disaster relief are becoming less and less relevant in the new security environment. The 2010 policy document identified “eight new core missions” for Canada’s armed forces, including the provision

23. “Memorandum of PLA’s Military Operations Other than War,” *People’s Daily Online*, September 7, 2012, <http://english.people.com.cn/90786/7940049.html>. Accessed on December 17, 2012.

of “...assistance to civil authorities and non-governmental partners in responding to international and domestic disasters or major emergencies”. The document further amplifies that in the light of the increase in “frequency and severity” of natural disasters and weather-related emergencies, there is a growing need for the Canadian armed forces to support disaster relief. The Canadian armed forces have subsequently come up with the concept of ‘DART’ (Disaster Assistance Response Teams) towards this newly defined role. Ideologically, philosophically, or politically, there is a favourable consensus on military involvement in HADR. However, some academics and peace activists have, on occasion, expressed reservations over the potential ‘militarisation’ of humanitarian assistance and disaster relief. The Canadian military’s response to the Haitian earthquake of 2010 was criticised by some academics as ‘neo-colonial’. There is also growing concern that the military’s many ‘domestic’ roles, such as disaster relief, could contribute to the ‘militarisation’ of Canadian society. Others, including some emergency and disaster management practitioners like NGOs and Government Organisations (GOs), have more practical objections to the expansion of the military’s role in humanitarian assistance and disaster relief, which pertain to command and control issues during the relief operations.

THE CASE OF INDIA

The Indian military is guided by the ‘Aid to Civil Authority’ document of 1970, while all specialised stakeholders like the NDMA, NDRF, CD, SDRFs, etc. derive guidance from the DM Act 2005. Even the Tri-Service Response Plan adopted by the Indian military is a 2002 document and predates the DM Act 2005. With the increase in stakeholders and institutions—many of them with defined specialist roles—there is a need for the armed forces to reorient their participation in disaster rescue and relief, and align their core response and support functions in accordance with National Disaster Management Plan (NDMP 2016), National Policy on Disaster Management (NPDM 2009), etc.

- The guidelines issued to the Indian armed forces for disaster response are those contained in the document ‘Aid to Civil Authority’ 1970. It combines internal security and maintenance of essential services with the response

The guidelines issued to the Indian armed forces for disaster response are those contained in the document 'Aid to Civil Authority' 1970. It combines internal security and maintenance of essential services with the response to natural and man-made disasters. The response needed for each of these is distinctly different.

to natural and man-made disasters. The response needed for each of these is distinctly different and the underlying principles are so vastly varied.

- The National Disaster Management Policy approved by the Union Cabinet on October 22, 2009, acknowledges the role of the armed forces in disaster management and states that the armed forces are called only when the coping capability of the civil administration has been exhausted. It, however, admits that *"in practice (as has been in the past), the armed forces are deployed immediately and they have responded promptly"*.
- There is no new guidance from the Government of India (the last being 1970 ACA) for the armed forces. The Tri-Services response plan that is the latest guidance document issued by HQ IDS is also a pre-2005 document.
- Therefore, it can be seen that the armed forces, due to a lack of role definition in the DM Act 2005, have not either internally (doctrinally) or externally (by the Government of India—legally speaking) shown any change in the framework for their participation in the DM response.
- As can be seen, prior to the enactment of the DM Act of 2005, the armed forces undertook HADR missions under the ACA. They continue to do so, even after 2005, while all other institutions/agencies at the national, state and local levels function under the DM Act 2005.

SUMMARY

NATO and Canada are prime examples of sophisticated and well-budgeted militaries whose traditional war-fighting roles have seen growing 'irrelevance' in recent years; hence, these militaries have doctrinally moved towards a formal definition and institutionalisation of HADR as a key role. China's global aspirations lie at the core of its redefined approach to HADR. For nations like Australia, Japan and the US, the drivers for a military

role in disaster relief are reinforcing alliances and partnerships, advancing foreign policy agendas and providing knowledge of operational military capabilities.²⁴ India's armed forces are engaged in internal security issues in the insurgency affected states of Jammu and Kashmir (J&K), Jharkhand, the northeast, etc. and also face a continued threat of external aggression/short wars with its neighbours. Therefore, while there is no existential crisis of relevance as in the case of NATO, Canada, etc., the Indian armed forces remain at the core of government's response mechanism for the following reasons:

- Civil institutions created by the Act and institutional arrangements continue to be in a state of transition and development. Both the pre-2005 and post-2005 institutions are functional. An example is the case of the National Crisis Management Committee (NCMC) which is a pre-2005 arrangement that takes over the response management during major crises, even though the DM Act 2005 established the National Executive Committee (NEC) as the highest operational arrangement to manage disasters. The Government of India constituted a task force under Dr. PK Mishra in December 2011 for a review of (the performance of) the DM Act 2005. The task force submitted its report in 2013. It has recommended replacement of the NEC with the NCMC, a pre-2005 institution in the MHA that deals with disaster issues.²⁵

NATO and Canada are prime examples of sophisticated and well-budgeted militaries whose traditional war-fighting roles have seen growing 'irrelevance' in recent years; hence, these militaries have doctrinally moved towards a formal definition and institutionalisation of HADR as a key role. China's global aspirations lie at the core of its redefined approach to HADR.

24. Athol Yates and Anthony Bergin, *More than Good Deeds Disaster Risk Management and Australian, Japanese and US Defence Forces* (Canberra: Australian Strategic Policy Institute, 2011), 1.

25. REPORT OF THE TASK FORCE -A Review of the Disaster Management Act, 2005. Para 8.4.1 The National Executive Committee (NEC) [Para 4.6.3 to 4.6.3.3.3] 'The NEC may be discontinued. The NCMC may be included in the Disaster Management Act.

- The capacities and capabilities of the NDRF and SDRFs are limited. While the NDRF has acquitted itself well in the pre-disaster phase for evacuation and setting up of relief centres, the armed forces have invariably played a larger role during almost all natural disasters in the past decade, often alongside the NDRF and SDRFs.
- The airlift and induction of the NDRF is often by IAF aircraft and, hence, the IAF will always remain relevant whatever be the state of capability/capacity of the NDRF/SDRFs. Also, when normal lines of communication like roads and railways get affected, the IAF is often the first responder either for evacuating the affected people or for air-drop of relief supplies or induction of rescue personnel and medical teams.
- As was seen during Hurricane 'Katrina' in the USA, any disaster management system can get overwhelmed and in such situations, it is only the armed forces that retain the residual capacity to deliver relief. This is due to almost 24 x 7 x 365 days of readiness, disciplined manpower and a command and control structure that retains its integrity at both structural and functional levels.
- In terms of surge capacity to handle the enormity of the rescue effort—whether it is adding 'boots on the ground' or 'birds in the air'—only the armed forces possess the requisite capacity and capability to expeditiously upscale the rescue effort.
- Many parts of the country are remote and unconnected, and are very vulnerable to natural disasters. Often, the armed forces are the only credible government forces/capacities in such areas and automatically become the first responders.

CONCLUSION

The doctrinal reorientation of the Indian armed forces is an inescapable necessity in view of the increasing frequency and ferocity of natural disasters. They represent credible government capacity to handle the response to mega disasters. Given the constitutionally provided civilian supremacy over the military, a role definition that aims to provide greater articulation of their 'role' and 'terms of engagement' in disaster response is critically

warranted. At the same time, as an important and often the only critical instrument of response, the armed forces too need to evaluate, assess and adopt the following doctrinal issues:

- **Training and Capacity Building:** Currently, the armed forces do not have any disaster specific training and bring to the fore their combat training when responding to disasters. Given the complexities of disasters—especially urban flooding and cyclones—they will need a reorientation within the ambit of combat training to train for the challenges of disaster response.
- **Equipment:** While it is usual practice to keep Engineering Task Forces (ETFs)²⁶ ready during the monsoons, or the helicopters in a readiness state, it is more in the realm of ‘we will get in when called for’, than a defined or definitive clarity on when or where they are needed. Hence, there is a need to reevaluate force packaging and mission planning to be effective at the earliest and save as many lives as is possible in the 72-hour golden window.
- **Command and Control:** One of the unique capabilities of the military is its robust command and control structure that works effectively in crisis situations. While it is oriented towards war-fighting and war-management, reorientation to work alongside civilian command and control structures (district administration) and those of other response forces like the NDRF and SDRFs (IRS system) is critically required.
- **Joint Operations with Other Sister Services:** Given the differing operating philosophies and doctrinal approach between the IA, IAF and IN, there is as much a need for ‘jointness’ for disaster response as there is for war/combat scenarios.
- **Re-orienting for Effective Response Operations:** No combat operation would commence without the requisite intelligence and planning, whether it is a ground operation or an air operation. However, given the sudden onset and the coordination issues and lack of a clear trigger mechanism for rescue operations, the armed forces get inducted and have to almost immediately start these. The ensuing damage assessment

26. The Engineering Task Forces (ETFs) are teams of army engineers who comprise a self-contained units with flood relief equipment such as Bailey bridges, BAUTs, Gemini boats, etc.

then results in further accretion of forces and equipment and, often, the golden window is missed alongwith the opportunity to save many lives and property. There is, therefore, a need to holistically address disaster response operations from a doctrinal standpoint to be effective, not just efficient.

The armed forces have been an integral part of the national disaster response. The lack of role definition of the armed forces in the current institutional framework (both the pre- and post-2005 DM Act arrangements) has impacted the optimal utilisation, efficient deployment and effective harnessing of the unique capabilities of the armed forces and especially air power assets in the overall disaster response operations. A doctrinal re-orientation towards harnessing the unique capabilities of each arm of the military to achieve the desired effects of saving lives, reducing damage, etc. will enable the armed forces to be effective response providers and enhance their standing in the comity of stakeholders in the DM firmament.

IRAN AND AFGHANISTAN: A COMPLEX RELATIONSHIP

ANU SHARMA AND SWATI SINHA

Iran has been a predominant political factor and a noteworthy cultural force in the history of Afghanistan. From sharing a long border and an even longer history with Afghanistan, Iran emerges as the front-runner when compared with Afghanistan's other immediate neighbours in these aspects. In contrast to Pakistan, Iran has a well-defined border with Afghanistan; yet, like Pakistan, it is also host to a huge number of Afghan refugees. The role and contribution of Iran in the Afghan discord have been noticeably perplexing and multi-layered, induced by the regular ebb and flow of events in the region. Iran's deep-rooted civilisational legacy is the foundation for its easy connect with different countries in its neighbourhood. On the other hand, Iran's articulated Shi'a identity, with a confrontationist political inheritance of an Islamic upheaval, constrains its capacity in terms of redefining its connections, both regionally and internationally.

There is a wide array of reasons which makes Kabul important for Tehran, and the recent wheat shipment reaching Afghanistan from India via Chabahar port in Iran explains the importance of Iran for Afghanistan. These reasons range from the Sunni Taliban regime ruling Afghanistan territories to countering the drug menace which finds a way into Iran through Afghanistan. Another reason for Iran's increased engagement with Afghanistan has also been related to Tehran hiring Afghan Shi'a militias

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Economics also plays an important role in Iran-Afghanistan relations. Iran views Afghanistan as an upcoming market that will benefit Iran, and believes that the situation will change after the US' withdrawal from the region.

to fight in the Syrian war. All these factors prove that Iran has substantial political, economic, cultural and religious leverages in Afghanistan. From Kabul's perspective, the US and Iran have much common ground vis-à-vis Afghanistan and neither country wants Al Qaeda to reestablish a safe haven there. On the other hand, Afghanistan's relations with this important regional neighbour have been overshadowed by the regional proxy rivalry between Iran and Saudi Arabia, the Western sanctions on Iran, Tehran's ideologically

driven foreign policy, and some anti-Persian Afghan elite.

Geography plays an important role in the political and foreign policy calculations of the actors involved. Geographically, towards the east, Iran shares almost 900 km (536 miles) of porous borders with Afghanistan. Apart from sharing common historical linkages, Iran and Afghanistan at times share a common enemy: terrorism.

Economics also plays an important role in Iran-Afghanistan relations. Iran views Afghanistan as an upcoming market that will benefit Iran, and believes that the situation will change after the US' withdrawal from the region. Afghanistan, over the past decade, has been an importer of Iranian goods. In this context, Iran's exports to Afghanistan in the year 2016-17 were worth \$3 billion. This has shown an upward trend since 2006-07 when it was around \$497 million. Contrary to that, Afghanistan's exports to Iran have been as little as a dozen million dollars on an average over the years, which peaked at \$32 million in the fiscal year 2013-14.¹ However, this trade relationship is not without its barriers. Many government officials in Afghanistan believe that cutting the red tape and costs should certainly become a priority for the Iranian and Afghan authorities before they can

1. Ali Sherdelian, "Iran-Afghan Economies Tied by One-Way Trade", *Financial Tribune*, August 22, 2017, <https://financialtribune.com/articles/economy-business-and-markets/70824/iran-afghan-economies-tied-by-one-way-trade>. Accessed on December 18, 2017.

improve and ease bilateral trade. They also believe that Iran should not view Afghanistan only as a consumer market if the two countries' economic ties are to be strengthened.² It is also believed that one of the most effective ways for Iran to expand and sustain long-term economic ties with its eastern neighbour is to provide aid to Afghanistan for its development. There are chances that joint investment in Afghanistan will eventually lead to job creation, higher revenues, transfer of knowledge/technology and sustainable security, among others, which, in turn, will benefit Iran in the long term in creating effective footprints in Afghanistan. For a landlocked and multi-ethnic Afghanistan, Iran holds immense strategic value and is viewed, on the whole, as a key factor in the nation's security and economic development.

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RECENT HISTORY

The Iranian revolution led by Ayatollah Khomeini in 1979 coincided with the Soviet invasion of Afghanistan. This was the time when Iran was entangled in its own domestic problems (a nation witnessing regime change based on ideology), trouble with the US due to the hostage crisis, and the subsequent Iran-Iraq War (1980-88). Even if the Soviet invasion caused a conundrum for Iran's Supreme Leader Ayatollah Khomeini, the new regime—even though it criticised the Soviets for the invasion and demanded the withdrawal of their forces—was careful not to allow its policy to damage its otherwise amicable relations with Moscow. This made Iran maintain relations with the Soviet (puppet) regime in Afghanistan. Iran had refused to be the frontline nation opposing the Soviet occupation of Afghanistan as it wanted to counter balance the Soviet Union against the increasing US influence in the region. During this time, Iran supported the Persian-speaking Shi'a groups, mainly among the Hazaras. The Hazaras constituted 20 percent of

2. Ibid.

the population, and more than 1.5 million Afghan refugees who fled to Iran, comprised mainly Hazaras.³

After the pullout of the US and the Soviet troops from Afghanistan in 1989, the Afghan territory became the battleground for the proxy war among Saudi Arabia, Iran, and Pakistan. Saudi Arabia wanted to utilise Afghanistan as a springboard to Central Asia to increase its version of Islamic influence and to neutralise Iran's revolutionary message. Pakistan sought to install a Pashtun-dominated government and gain "strategic depth" against India, its nemesis.⁴ The consequent withdrawal of the Soviet Red Army by mid-1989 had prompted a quick abandonment of Afghanistan by both the US and the Soviet Union, pushing Afghanistan into chaos. The Russians and the Americans had little interest in Afghanistan by the time the Soviet Union collapsed in 1991. This led to a ten-year civil war in which the Islamist leaders became dominant and proved to be ruthless in every way. A long struggle followed against the Communist regime of President Najibullah soon after the Soviet withdrawal from Afghanistan in 1989. It continued until Najibullah was overthrown in 1992 by the Mujahideen who later set off to capture Kabul. An alliance of non-Pashtun Parchami officials with the Tajik leader Ahmad Shah Masoud ensured the demise of his regime, which was considerably weakened by the defection of Pashtun military officers after the Soviet Army withdrew in early 1989.

The subsequent civil wars in Afghanistan were based on the fact that Kabul fell under the control of the better organised and much more united Tajik forces of Burhanuddin Rabbani and his military commander Ahmad Shah Masoud, and to the Uzbek forces from the north under Gen Abdul Rashid Dostum.⁵ The fall of Najibullah was marked as a victory for Iran as non-Pashtuns became the dominating government in Afghanistan. The Iranian clerical leadership supported Burhanuddin Rabbani of the Jamaat-e-Islami against the Shi'a Hizb-e-Wahdat and provided Rabbani's government

3. Mohsen Milani, "Iran and Afghanistan", <http://iranprimer.usip.org/resource/iran-and-afghanistan>. Accessed on November 28, 2016.

4. Ibid.

5. ZalmayKhalilzad, "Afghanistan in 1995: Civil War and a Mini-Great Game", *Asian Survey*, vol 36, no. 2, February 1996, p. 194.

with food and resources. The reason for this can be that in order to consolidate his power base, Rabbani, an ethnic Tajik, resorted to pitting one ethnic group against the other, including the Shi'a political faction, Hizb-e-Wahdat, led by Abdul Ali Mazari.⁶ Tehran's apparent logic was that by supporting Rabbani, its strategic interests in the newly independent Central Asian states would be protected by a Tajik-dominated government in Kabul. The extent of the Iranian involvement is still unclear, but Ahmad Shah Masoud's victory would have been difficult without the Iranian support.⁷

With this, the Iranian involvement in Afghanistan increased. However, this victory was shortlived for Afghanistan because it plunged into a civil war. In this period, the Pashtuns lost influence and suffered perhaps the sharpest decline in their influence in Afghanistan. Apparently, this civil war was fuelled by the Afghan warlords who rose to prominence when they fought against the Soviets. At the same time, all the efforts by Iran to bring about a peaceful resolution to the civil unrest in Afghanistan were stalled by these warlords. This was also the time when Kabul conflicted with the Iranian policies and practices in order to appease Riyadh and Islamabad.⁸ The state of affairs in Afghanistan was devastating and the country was in a state of virtual disintegration. In the Afghan history of the last 300 years, it was for the first time that the Pashtuns had lost control of Kabul. This inflicted a severe psychological blow to the Pashtun ethnic group. As a result, an internal civil war was triggered as Gulbuddin Hekmatyar, at the same time, tried to bring together the Pashtuns in an attempt to take control of Kabul. The country was divided into warlord fiefdoms and the warlords switched sides and fought again in the bewildering array of alliances and bloodshed.⁹ This was also the period when those Mujahideen who had fought the Najibullah regime either returned to their homes or went to Quetta and Kandahar to continue their studies in *madrassas*. The nadir of this period gave

6. Sajjan M. Gohel, "Iran's Ambiguous Role in Afghanistan", *CTC Sentinel*, vol 3, issue 3, March 2010, <https://ctc.usma.edu/irans-ambiguous-role-in-afghanistan/>. Accessed on February 15, 2019.

7. Barry Bearek, "As the Taliban Finish Off Foes, Iran Is Looming", *New York Times*, October 3, 1998, <https://www.nytimes.com/1998/10/03/world/as-the-taliban-finish-off-foes-iran-is-looming.html>. Accessed on January 19, 2019.

8.. Milani, n. 3.

9. Ahmed Rashid, *Taliban: The Story of the Afghan Warlords* (London: I.B. Tauris, 2001), p. 21.

The Taliban regime in Afghanistan was highly antagonistic to Iran, and Tehran viewed it as a security threat. Iran, along with Russia, provided arms and ammunition to the Northern Alliance throughout the civil war, whereas Pakistan and Saudi Arabia supported the Taliban.

rise to the Taliban in the early 1990s. The factional contention for political supremacy kept on annihilating Afghanistan as the civil war entered another stage with the arrival of the hitherto unknown Taliban in the latter half of the 1990s.

By 1996-97, the Taliban had risen as another notable actor in the troubled political phase of Afghanistan. At first viewed as an answer for the faction-ridden Afghan politics—particularly in the south—they later transformed into outsiders for some; and were frequently regarded as a potentially destabilising factor by the neighbouring

nations, concerned about their radical belief system and factional strife inside Afghanistan impinging onto their territories.¹⁰

In 1996, the Taliban eventually overthrew the Rabbani government. This enabled the Taliban to gain a foothold within central Afghanistan, which they would not relinquish until the US-led invasion in 2001. The alienism of the Taliban identity further augmented other social groups to develop—the Tajik-led Northern Alliance and the Dostum-led Uzbek forces—to get back at the Taliban.¹¹ The Taliban regime in Afghanistan was highly antagonistic to Iran, and Tehran viewed it as a security threat. Iran, along with Russia, provided arms and ammunition to the Northern Alliance throughout the civil war, whereas Pakistan and Saudi Arabia supported the Taliban.¹² In 1998, the Taliban regime captured Mazar-e-Sharif in northern Afghanistan, launched new offensives and massacred 600 Uzbek troops in Faryab and later in the same year, the Taliban captured the headquarters of the warlord Dostum in Sheberghan. Subsequently, the Taliban slaughtered all the Hazara

10. Ahmed Rashid, *Taliban Militant Islam, Oil and Fundamentalism in Central Asia* (USA: Yale University Press, 2001), p.131.

11. *Ibid.*, p. 38.

12. Ahmed Rashid, "The Taliban: Exporting Extremism", *Foreign Affairs*, November/December 1999, <https://www.foreignaffairs.com/articles/afghanistan/1999-11-01/taliban-exporting-extremism>. Accessed on January 20, 2019.

Army troops except hundreds of Hazara civilians. Along with this dreadful massacre, the Taliban also killed nine Iranian diplomats. This led to an extended confrontation with Tehran.¹³

In the wake of the September 2001 attacks on the US, Iran provided extensive—indirect—political, intelligence and logistical cooperation to the US in an effort to oust the Taliban.¹⁴ The United States and allied forces were first deployed to Afghanistan as part of Operation Enduring

Freedom in October 2001, with Iran offering considerable assistance “to allow American transport aircraft to stage from airfields in eastern Iran [,] ... to perform search-and-rescue missions for downed American airmen ... [and to allow] an American freighter packed with humanitarian supplies to offload its cargo” at an Iranian port.¹⁵ Two months later, with the approval of the UN Security Council, additional foreign soldiers were deployed to support the establishment of the International Security Assistance Force (ISAF) in Kabul in order to ensure sufficient security to help jump-start post-civil war reconstruction.¹⁶ By the end of 2001, Iran had clearly shown its willingness to cooperate with the international community and its genuine interest in supporting durable peace in Afghanistan.

By the end of 2001, Iran had clearly shown its willingness to cooperate with the international community and its genuine interest in supporting durable peace in Afghanistan.

13. Douglas Jehl, “Iran Holds Taliban Responsible for 9 Diplomats’ Deaths”, *The New York Times*, September 11, 1998, <https://www.nytimes.com/1998/09/11/world/iran-holds-taliban-responsible-for-9-diplomats-deaths.html>. Accessed on January 24, 2019.

14. James Dobbins, “Negotiating with Iran: Reality, Options and Consequences,” Hearing before the Subcommittee on National Security and Foreign Affairs of the Committee on Oversight and Government Reform, US House of Representatives, November 7, 2007 (US Government Printing Office: Washington, DC, 2009); and Kayhan Barzegar, “Role at Odds: The Roots of Increased Iran–U.S. Tension in the Post-9/11 Middle East”, *Iranian Review of Foreign Affairs*, vol. 1, no. 3, 2010, pp. 85–114, https://www.belfercenter.org/sites/default/files/files/publication/5-Dr_Barzegar.pdf. Accessed on December 19, 2017.

15. K. M. Pollack, *The Persian Puzzle: The Conflict Between Iran and America* (New York: Random House, 2004), p. 346; D. Gerleman, Jennifer E. Stevens and Steven A. Hildreth, “Operation Enduring Freedom: Foreign Pledges of Military and Intelligence Support”, Congressional Research Service, Report to Congress RL31152, <http://www.iwar.org.uk/news-archive/crs/6207.pdf>. Accessed on December 19, 2017.

16. “Security Council Authorizes International Security Force for Afghanistan; Welcomes United Kingdom’s Offer to be Initial Lead Nation”, Security Council Resolution 1386, December 20, 2001, <https://www.un.org/press/en/2001/sc7248.doc.htm>. Accessed on December 19, 2017.

IRAN'S INTERESTS IN AFGHANISTAN

In the wake of political developments since the 2003 Iraq invasion by the US, Iran desired to define a new role for itself, aimed at integrating into the regional political-security system, building a coalition of friendly states to preempt future security challenges and establishing mutual economic cooperation with its neighbours commensurate with its sources of power and geopolitical posture. Tehran clearly recognised that a Taliban-ruled Afghanistan was not compatible with Iran's security interests. Ever since the collapse of the Taliban regime in 2001, Iran has followed a two-pronged policy in Afghanistan: firstly, to preserve and uphold stability in Afghanistan and support the Afghan central government; and, secondly, to oppose the presence of foreign forces in Afghanistan.

Iran, like any other state, has legitimate security concerns which are impacted by the situation in its neighbourhood, especially in the vicinity of its immediate border areas; enjoys a natural domain of cultural, political and economic influence in the region; pursues independent national security strategies to protect and preserve itself and tackle foreign threats; and advances in its own way of political and socio-economic development. In this context, Afghanistan plays a significant role in preserving stability in Iran's foreign policy vis-à-vis the neighbouring states. Following this principle, Iran has played an important role in the reconstruction and development efforts in fields such as financial aid, transportation and energy trade, and the refugee issue. Indeed, any instability in Afghanistan poses a direct threat to Iran and is related to the spread of extremism in the region. Various terrorist organisations like the Taliban, Al Qaeda and other Islamist factions have tried to increase the instability at the eastern border of Iran. Additionally, due to the ethnic and tribal connectivity within the borders of Iran and Afghanistan, any instability in Afghanistan may lead to the creation and continuation of ethnic conflicts. This can result in exacerbating the refugee situation by creating migration issues along Iran's eastern borders.¹⁷

Another important and concerning aspect of this relationship is related to the production of drugs and their transit into Iran. Due to this issue, it is

17. Sherdelian, n. 1, pp. 123-125.

an impending challenge for Iran to preserve its security along the borders with Afghanistan and Pakistan. The Taliban insurgency was largely funded by this narcotics trafficking, of which Iran is the most favoured destination.¹⁸ This illicit drug trade currently fuels the acute drug crisis that Iran is facing. At the same time, the revenues from this narcotics trade have financed much of the anti-American insurgency in Afghanistan. Iran also serves as the major corridor for shipping narcotics to the European and other Persian Gulf nations.¹⁹ Thus, addressing narco-trafficking in Afghanistan will serve as an effective point of collaboration among the US, Iran and Afghanistan.

Secondly, Iran takes a strong stand against the presence of foreign forces—especially of the US—in Afghanistan. This is because it sees the US as a direct threat to Iranian security and stability. However, it cannot be denied that the US forces have been responsible for the removal of Iran's two most dreaded enemies in the region—the Taliban and Saddam Hussein. However, Iran still remains sceptical of the challenges it is facing related to Sunni and Salafi extremism, ethnic geopolitical rivalry and instability and insecurity throughout the region.²⁰ Iran firmly believes that the presence of foreign forces in Afghanistan fosters extremism. This happened in retaliation to the foreign forces which considered that the Taliban and Al Qaeda were endangering their ideology and beliefs. The second reason why Iran opposes foreign troops in Afghanistan is to contain the US threat in the region. From Iran's perspective, the presence of US troops in the region is in line with the US policy to strengthen its position in the broader Central Asia and South Asia as well as in the Persian Gulf, at the expense of Iran's national and security interests.²¹ Thirdly, Iran is in disagreement with the fact that the neighbours form political security agreements with trans-regional actors in order to counter foreign forces. It believes that such a state of affairs will

18. Michael Kugelman, "The Iran Factor in Afghanistan", *Foreign Policy*, July 10, 2014, <http://foreignpolicy.com/2014/07/10/the-iran-factor-in-afghanistan>. Accessed on November 30, 2016.

19. Sarah Lohschelder and Amanda Zeidan, "Time for Convergence: Iran-Afghanistan Relations after the Nuclear Deal", *The Diplomat*, June 1, 2016, <http://thediplomat.com/2016/06/time-for-convergence-iran-afghanistan-relations-after-the-nuclear-deal/>. Accessed on December 1, 2016.

20. Sherdelian, n. 1, pp. 124-125.

21. *Ibid.*, p. 125.

Supporting Afghanistan's neutrality in the regional equations of South and Central Asia represents an important component of Iran's regional policy.

eventually lead to distrust among the regional states, consequently weakening regional political security and economic cooperation.²² Thus, supporting Afghanistan's neutrality in the regional equations of South and Central Asia represents an important component of Iran's regional policy.

CHALLENGES TO IRAN-AFGHANISTAN TIES

Politics of Water Security

The disagreements between Iran and Afghanistan over the sharing of the Helmand river have been brewing since the 19th century. However, at that time, the problem was two-fold: one, related to the demarcation, and the second to the respective sharing of the water of the Helmand river by the two nations. However, currently, this problem pertains to the trans-boundary²³ water management that rankles beneath the otherwise cordial relations between Iran and Afghanistan. The Helmand river is the longest running river in Afghanistan; it constitutes over 40 percent of Afghanistan's surface water. With 95 percent of the Helmand river located in Afghanistan, it is a critical source of livelihood for the country's southern and southwestern provinces. This has made the disagreement related to the Helmand river a national issue that seems to have become increasingly difficult for any Afghan government to resolve. For Iran, the Helmand's water is also becoming a national issue. In fact, all of Iran's post-1979 governments have maintained the same basic position on the dispute with Afghanistan over water.²⁴ Afghanistan is home to five river basins²⁵ that also sustain large

22. Ibid., p. 126.

23. A trans-boundary river is a river that crosses at least one political border, either a border within a nation or an international boundary. Bangladesh has the greatest number of these rivers in South Asia, almost all of which cross international boundaries.

24. Fatehmeh Aman, "Water Dispute Escalating Between Iran and Afghanistan", Issue Brief, Atlantic Council, August 2016, <https://www.ethz.ch/content/dam/ethz/special-interest/gess/cis/center-for-securities-studies/resources/docs/Atlantic%20Council-Water%20Dispute.pdf>. Accessed on December 5, 2016.

25. The five river basins of Afghanistan are Amu Darya, Harirud-Murghab, Hilmand, Kabul-Indus river basin and northern river basin.

populations in Iran, Pakistan and Central Asia, but the country lacks water-sharing agreements with its neighbours.

The dispute resulted in the Helmand river water treaty on March 13, 1973. In 1973, a document was signed based on which Iran would receive 26 cubic metres per second or 850 million cubic metres annually.²⁶ As against the normal cordial bilateral relations that have existed between Iran and Afghanistan, the former had accused Afghanistan of making the

Helmand river into a political tool. There had been a view in Afghanistan that Iran is using the issue of Afghan refugees in Iran as a counter-measure to put pressure on Afghanistan. The view suggests that Afghanistan could use the water issue as leverage to pressurise Iran to improve the conditions of the Afghan refugees. This issue has become the major focus of bilateral relations between the two nations. However, the ongoing discussions regarding this issue have not resulted in a breakthrough yet.²⁷ It is pertinent to mention here that water is a regional issue with international implications as it directly relates to regional security. An Iran-Afghanistan memorandum regarding this issue was signed in January 2016 which called for the complete implementation of the 1973 treaty and “regular meetings” of the Helmand water commissioners.²⁸

While improving water management in both countries is most important, the opportunities to do so in Afghanistan were lost during the peak of the flow of international funds into the country. Without outside assistance and greater local cooperation, the region will be faced with deeper and potentially irresolvable challenges that could have a significant negative impact on the economy and security situation in both countries. It should be kept in mind that Afghanistan is a nation with a predominantly rural and agricultural society which makes its dependence on its river very high. This makes the

Afghanistan is a nation with a predominantly rural and agricultural society which makes its dependence on its river very high. This makes the issue of water sharing a little tricky for Afghanistan with its neighbours.

26. n. 23.

27. Dobbins, n. 14.

28. Pollack, n. 15.

issue of water sharing a little tricky for Afghanistan with its neighbours. Coupled with this is the lack of technical and diplomatic expertise which might weaken Afghanistan's position at the negotiating table. It is certainly not in the interest of Kabul to have poor relations with Pakistan as well as Iran, the two countries that provide landlocked Afghanistan with access to the sea.²⁹

Iran's Alleged Communiqué with the Taliban

Iran's unequivocal association with the Taliban is a key factor of conflict with Kabul. Where, on the one hand, Tehran denies having any contact and discussion with the Taliban; on the other, there have been a few media reports³⁰ which reveal Iran's rising contacts with the Taliban. These reports indicate that Iran is facilitating, ensuring, preparing, and equipping the Taliban against the ruling government in Afghanistan. Despite the old disdain, exemplified in 1998 after the Taliban's massacre of Iranian diplomats in Mazar-e-Sharif, Iran appears to have associated with the Taliban. In fact, Iran had provided clandestine support to the Taliban as Tehran viewed it as an instrument for propelling the US forces out of the nation. Specifically, Kabul considers Tehran at fault for the ongoing conflicts in Afghanistan's western province of Farah, where Iran would have worked with the Taliban in order to take charge of the nearby assets, especially water.

Afghanistan's Farah province has been under steady danger of assault by the Taliban. In May 2018, the Taliban propelled a major offensive on the capital of Farah, which prompted the Afghan security forces to withdraw from the capital on a temporary basis.³¹ After the endeavour to take control of Kunduz in 2016, this was the second time that Taliban extremists endeavoured to capture a province. It is imperative to comprehend why the Taliban raised

29. Sudha Ramachandran, "Afghanistan Risks Water Conflict with Iran", July 30, 2016, <https://www.cacianalyst.org/publications/analytical-articles/item/13379-afghanistan-risks-water-conflict-with-iran.html>. Accessed on December 6, 2016.

30. Annalisa Perteghella, "Kabul and Tehran: A Complex Relationship", Italian Institute for International Political Studies, October 18, 2018, see: <https://www.ispionline.it/en/publicazione/kabul-and-tehran-complex-relationship-21461>

31. Jawad Sukhanyar and Rod Nordland, "Taliban Claim They've Taken Control of Western Afghan City, Farah", *New York Times*, May 15, 2018, see: <https://www.nytimes.com/2018/05/15/world/asia/afghanistan-taliban-farah.html>

their rebellions and assaults in Farah province in 2018. Farah comes under the southwestern part of Afghanistan that shares borders with Iran. The commencement of the construction of the trans-Afghanistan pipeline—a part of the Turkmenistan-Afghanistan-Pakistan-India (TAPI) pipeline—is also mapped to pass through Farah. This scheme enables the province to be counted among some of the more strategically important provinces of Afghanistan. However, if Farah falls into the hands of the Taliban, the results will have a direct impact on major regional economic projects, and at the same time, challenge the security of Kandahar, Helmand, and other adjacent provinces.³²

Cross-Cultural Problem

In view of sharing a porous border, Iran's interests in Afghanistan are more related to securing its eastern border; preserving the flow of water from Afghanistan; countering the narcotics trade; the large Afghan refugee population on its soil; and limiting the US' influence in the region. The Iranian-Afghan border crosses through several deserts and marshlands. The Afghan provinces of Herat, Farah and Nimrouz border Iran.³³ Iran has been the most influential regional actor in Afghanistan and was poised to play a significant role in Afghanistan after the 2015 nuclear deal between Iran and the Western powers and the US declaration of drawdown of troops in 2012. At the same time, the removal of sanctions from Iran had opened new avenues for Iran in Afghanistan. Afghanistan is located in the region referred to as "*Greater Ariana*", a wide area running north-south from Tajikistan to Maldives, and east-west from Myanmar to Iran. In this context, Afghanistan serves as an important gateway to this region and, thus, plays an important role in Iran's grand strategy of "Look to the East."³⁴ Afghanistan's

32. Aziz Amin Ahmadzai, "Iran's Support for the Taliban Brings it to a Crossroads with Afghanistan", *The Diplomat*, May 21, 2018, see: <https://thediplomat.com/2018/05/irans-support-for-the-taliban-brings-it-to-a-crossroads-with-afghanistan/>

33. Elena Ambrosetti et al., *Migration in the Mediterranean: Socio-Economic Perspectives* (London: Routledge, 2016).

34. Kayhan Barzegar, "Iran's Foreign Policy in post-Taliban Afghanistan", *The Washington Quarterly*, vol. 37, no. 2, 2014, pp. 119-137.

The presence of American troops near Iran's eastern borders has been quite alarming for Tehran; as such, the likely pullout of US troops from Afghanistan will lead Iran to fill the void in its neighbourhood.

landlocked geography has been compounded by its political isolation in the region.³⁵ Among Afghanistan's seven neighbours, only its borders with Tajikistan remain relatively free of political tension. Furthermore, living in an unstable neighbourhood has been costly for Iran. There persists a generalised condition of instability. There is also sectarian conflict on Iran's western borders (Iraq). In addition, there are failed and fragile states on Iran's eastern frontier (Afghanistan and Pakistan).

This makes Iran more insecure as far as its eastern borders are concerned, thereby leading it to invest heavily in its ground forces to protect its borders.

In a neighbouring country like Afghanistan, where Iran has a strategic interest, it had discarded its sphere of influence since 2002. However, the changing dynamics and President Trump's proposed slashing of US troops from Afghanistan will leverage Iran to further its influence—economic, political and sectarian.³⁶ The presence of American troops near Iran's eastern borders has been quite alarming for Tehran; as such, the likely pullout of US troops from Afghanistan will lead Iran to fill the void in its neighbourhood. As it is, there are existing cultural and religious differences between Iran and Afghanistan. Demographically, Iran and Afghanistan share several religious, linguistic, and ethnic groups that create cultural overlaps between the two countries. Out of the 34.9 million Afghan populace, up to 20 percent are Shi'a, mostly from the Hazara clan. They are predominantly settled in the western region of Afghanistan—Herat – alongside the Iran-Afghan border, known colloquially as Little Iran. Although Afghanistan is predominantly Sunni dominated (80 percent, roughly 27 million people), it does have a sizeable Shi'as minority. The Hazara, a Persian-speaking ethnic group which

35. Davood Moradian, "Iran Deal: A Possible Game-Changer for Afghanistan", *Al-Jazeera*, July 22, 2015, <https://www.aljazeera.com/indepth/opinion/2015/07/iran-deal-game-changer-afghanistan-150722075109925.html>. Accessed on December 18, 2017.

36. Dr. Mohammed Al-Sulami, "Nature May Abhor a Vacuum, but Iran Loves One", *Arab News*, December 24, 2018, at <http://www.arabnews.com/node/1425256>

is concentrated mainly in central Afghanistan, with major communities present in western Afghanistan, Iran, and Pakistan, constitute a large portion of Afghanistan's Shi'a community. Although the exact number is not available, the Hazaras make up roughly 9 percent of Afghanistan's population, or 2.9 million people.³⁷

Additionally, Iran and Afghanistan also share common languages. Half of all Afghans, or 16.3 million, speak one of the several dialects of Persian (Dari); 11 percent of Afghans, or 3.6 million, speak Turkic languages such as the Uzbek or Turkmen, as do 26 percent of Iranians or 21.06 million people. The Turkmen comprise an ethnic group that lives in Turkmenistan, Afghanistan, and Iran. The Baluch are another ethnic group that lives in Pakistan, Afghanistan and Iran. The Baluch constitute 2 percent of the Iranian population, or roughly 1.62 million people. In neighbouring Afghanistan, the Baluch account for 2 percent of the population.³⁸ Afghanistan's Baluch population lives mainly in the southwest of the country, along its borders with Iran and Pakistan. Both Afghanistan and Iran have a remarkably young population. Over 60 percent of Afghans are under the age of 25. In Iran, more than half of the population is under the age of 25.³⁹

Due to discrimination, targeted violence and displacement, the Hazara group has lost quite a bit of its social importance in Afghanistan. Conceivably as an outcome of this, the Hazaras have been moderately detached from other social impacts, and their ethnic identity has remained generally static. Consequently, the Hazaras are majorly concerned about the resurgence of the Taliban who have committed mass atrocities on the Hazara community.

37. "Iran and Afghanistan", <http://www.understandingwar.org/iran-and-afghanistan>. Accessed on December 18, 2017.

38. Alireza Nader et al., "Iran's Influence in Afghanistan: Implications for the US Drawdown", *RAND Report*, 2014, https://www.rand.org/content/dam/rand/pubs/research_reports/RR600/RR616/RAND_RR616.pdf. December 18, 2017; <http://worldpopulationreview.com/countries/afghanistan-population/>. Accessed on February 16, 2019.

39. n. 37.

IRAN-AFGHANISTAN: RECENT SITUATION

Specifically, there were chances that the Iran nuclear deal would have impacted Iran-Afghanistan bilateral relations in two key areas: economy and security. However, the Iranian interests in Afghanistan are more strategic than economic. Afghanistan stands to gain with the Chabahar port opening for business—the wheat shipment reaching Afghanistan through Chabahar is a success story. It has the prospects of developing into a transport hub for regional trade. Bilateral economic relations are already growing between the two nations, thriving on Iranian investments.

At the same time, this regional economic integration between Iran and Afghanistan can provide the latter with an opportunity to diversify trading partners and generate billions of dollars in trade revenue. To boost trade and economic ties, Afghanistan and Iran need to build on previous reconstruction projects to expand railway and road connectivity between the two countries and beyond. Iran's annual bilateral trade in Afghanistan was around \$3 billion in 2015.⁴⁰ In the security realm, Iran could prove to be a vital ally of Afghanistan in combating narco-trafficking originating in Afghanistan. The regional economic integration also provides an opportunity for the countries to come together and pursue security interests. As Iran seeks to improve its image on the international front, the only opportunity for it is to pursue joint security efforts in the region that benefit all the parties.

In 2013, Iran and Afghanistan signed a strategic cooperation agreement aimed to favour Iran by counterweighing the US influence there. The pact comprised important economic and security measures. These included boosting bilateral cooperation on transit, investment, commercial and educational exchanges, expanding tourism, fighting terrorism and cross-border drug trafficking, sharing intelligence, and conducting joint military exercises.⁴¹

Iran is a nation on the economic rebound and is reshaping the geopolitical context of its neighbours, particularly Afghanistan. With this renewed

40. Javid Ahmed, "The Enemy of Iran's Enemy in Afghanistan", *Foreign Affairs*, June 21, 2015, <https://www.foreignaffairs.com/articles/afghanistan/2015-06-21/enemy-irans-enemy-afghanistan>. Accessed on December 2, 2016.

41. *Ibid.*

engagement, there are possibilities of greater cooperation along the shared trade and security interests, which could have positive implications for the whole South Asian region. At the same time, Iran's rise in the region can be viewed as an opportunity to bolster regional security.⁴²

However, currently, multiple challenges face Iran-Afghanistan relations; chief among them are security and resource issues. Tehran seeks a stable government in Kabul, a government that doesn't rely on the US for its security and stability. Ironically, this led Tehran to make common cause with the Taliban so that it could deprive the US of the ability to negotiate a settlement between the Taliban and Kabul. However, Iran has no long-term desire to see the Taliban replace the Kabul government. Tehran does not want a hostile Sunni Islamist government on its border allied with Saudi Arabia and a recipient of Gulf Arab generosity that will endanger Iran and persecute the Shi'a communities inside Afghanistan.

In fact, one of the drivers of Tehran's difficult relations with Kabul in recent times is Tehran's own water policies which have created a resource crisis for Iran. Afghanistan has been in the process of constructing dams because dams help Afghan farmers to increase productivity that aids economic growth and reconstruction. However, this has received antagonistic reviews from Iran.

Most alarming of all may be what Iran intends to do with its Afghan Shi'a proxies in Syria once the fighting is over. Iran has sent a large number of Afghans to fight in its Fatemiyoun Division⁴³ for the Bashar al-Assad regime in Syria. However, there are chances that Iran may encourage large numbers to return to places like Herat province—which has a large Shi'a community—where they could serve as a militia providing leverage over the government in Kabul.⁴⁴

Iran is one of the neighbouring countries that has had favourable relations with Afghanistan. Iran has had lasting political, economic, religious, social, ethnic and cultural assets in Afghanistan since ancient times. In the present

42. Rashid, n. 9.

43. The Fatemiyoun Division is an Afghan Shi'a militia formed in 2014 to fight in Syria on the side of the government.

44. John Nixon, "What's Next for Afghanistan and Iran? Water Wars", *The Cipher Brief*, September 27, 2017, <https://www.thecipherbrief.com/whats-next-afghanistan-iran-water-wars>. Accessed on December 20, 2017.

Iran looks to Afghanistan as a gateway akin to the Silk Road, as a pathway toward Greater Central Asia. Stability in Afghanistan would bode well for Iran's interests in establishing future pipelines linking Iran to the Central Asian Republics.

age, Tehran has provided Afghanistan with millions in aid as assistance in development projects and for reconstruction. At the same time, Afghanistan holds strategic importance for Iran. However, there remain issues that the two countries need to resolve for increased economic cooperation between Kabul and Tehran. Iran's proximity gives Afghanistan advantage to increase the ongoing economic relationship. However, in order to boost trade and economic ties, Afghanistan and Iran need to build on previous reconstruction projects to expand the railway and road connectivity

between the two countries and beyond.⁴⁵

Iran looks to Afghanistan as a gateway akin to the Silk Road, as a pathway toward Greater Central Asia. Stability in Afghanistan would bode well for Iran's interests in establishing future pipelines linking Iran to the Central Asian Republics. In the near term, however, Iran's security and foreign policy dilemmas will continue to drive Tehran's policies vis-à-vis Afghanistan. In addition to the lingering Baluch insurgency, other transnational issues—such as the Afghan refugee question, water disputes and narcotics trafficking—will continue to play a major role in Iran's calculations vis-à-vis Afghanistan.

CONCLUSION

Against the backdrop of intensified Afghan peace talks, Iran is interested in being a part of the peace arrangements which are taking differing shapes in Afghanistan. The interest stems out of Iran's sensitive border that has a direct bearing on Iran's future security scenario. Iran has actively taken behind-the-scene responsibility in the form of carrying out bilateral talks by hosting the Afghan Taliban for the promotion of peace. Therefore, it is likely that the road to peace in Afghanistan shall consider Iranian interests

45. Abdul Ahad Bahrami, "Afghanistan-Iran Relations: The Needs and Challenges", April 26, 2015, <http://www.outlookafghanistan.net/topics>. Accessed on December 5, 2016.

as well. Among the primary Iranian concerns is the presence of the Islamic State of Iraq and Syria (ISIS) in Afghanistan and the threat of the resurgence of other activist groups.

Iran has long publicly supported the Afghan government. After the Taliban were ousted from power, Iran's trade with its neighbour expanded considerably. This happened despite its derision for American influence in the country and which becomes a stronger reason for Iranian support to the Afghan national government. At the same time, Iran has full faith that in its absence, the result of the mediation of its conspicuous adversaries—the US, Saudi Arabia, Pakistan and Turkey—will not fetch the desired results for the issues of cross-border terrorism and drug trade that surround Iran. This, additionally, forms the basis for Tehran to proceed with its strategy to support the Taliban against the Afghan government and Western powers working in Afghanistan, simultaneously portraying itself as a mediator between the Taliban and the Afghan administration.

Iran is also an important economic actor in Afghanistan and is one of Afghanistan's largest trading partners and investors. Iranian economic activity, which has included partnering with other powers such as India for development projects, has been largely positive for Afghan stability. Iran can also exercise significant political influence not just with the Tajik- and Hazara-dominated political groups but with the central government in Kabul as well. Iran wants stability next door. So, it is trying to primarily build influence by investing in proxies, ranging from Hazara Mujahideen politicians and warlords to the Northern Alliance groups. Cooperation with the Taliban may be part of this multi-pronged strategy. Pakistan is Iran's main competitor for influence in Afghanistan considering that Pakistan has invested largely in Sunni proxies, followed by the US.

Iran is also an important economic actor in Afghanistan and is one of Afghanistan's largest trading partners and investors. Iranian economic activity, which has included partnering with other powers such as India for development projects, has been largely positive for Afghan stability.

As Bruce Koepke clearly assesses, “Iran as an Islamic republic could play a key role in supporting the Afghan government’s reconciliation efforts with insurgents, working towards a regional security mechanism to support the stabilisation of Afghanistan and other countries in the region experiencing conflict, and strengthening Afghanistan’s transport corridor, thereby allowing the expansion of trade with Central Asia, China, Iran and South Asia.”⁴⁶ Many nations in the region, including Iran, believe that peace in Afghanistan is more likely to be realised through a regional approach. This has been the mainstay of the Iranian foreign policy vis-à-vis Afghanistan. However, with the extent of aid and reconstruction being done from the Iranian side in Afghanistan, it can be safely said that Iran will continue to be an influential player in Afghanistan. With the declined Western military presence in Afghanistan, it has become more tangible for Iran to have its say in Afghanistan’s internal political affairs. There are chances that in the future there could be a reduction of bilateral tensions between Iran and Afghanistan, as both countries seek to benefit from economic interdependence, and the completion of India’s Chabahar port project. These common economic objectives could eventually spill over to the security sphere as the Afghan government aims to bring the Taliban to the negotiating table. If Iran and Afghanistan capitalise on their common interests, there is a probability that the Tehran-Kabul relationship could improve significantly in the near future.

46. Bruce Koepke, “Iran’s Policy on Afghanistan: The Evolution of Strategic Pragmatism”, SIPRI, September 2013, <https://www.files.ethz.ch/isn/170144/SIPRI13WCABK.pdf>. Accessed on December 21, 2017.

ARCTIC SECURITY: COOPERATION OR COMPETITION BETWEEN RUSSIA AND USA

STUTI BANERJEE AND INDRANI TALUKDAR

INTRODUCTION

The Arctic has been the centre of the global climate change debate. The progressive melting of the Arctic ice has alarmed scientists, not only for the survival of the Arctic eco-system but also for the consequences it would have on weather patterns and ocean temperatures across the world. It needs to be understood that the near rapid melting of Arctic ice will have detrimental consequences for the socio-economic development of countries that are far from the region and have no understanding of the Arctic. According to report of the United Nations' Inter-governmental Panel on Climate Change on global warming, the effects of a temperature overshoot are reversible for the Arctic sea ice cover on decadal time scales.¹ The Arctic Council, in its report titled Arctic Resilience Report (2016), has pointed out that

the Arctic is now changing at an unprecedented pace, on multiple levels, in ways that fundamentally affect both people and ecosystems.... The changes

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1. UN IPCC, "Global Warming of 1.5 Degree Celsius," <https://www.ipcc.ch/sr15/>. Accessed on February 19, 2019.

The global scientific community as well as political and business leaders are coming together to cooperate on ways and means to stop or decrease the pace of Arctic ice melting. However, national interests and mistrust somewhere delude certain countries from genuine cooperation. This aspect can be seen between Russia and the United States.

happening in the Arctic today are driven primarily by external factors. Climate change is the most pervasive and powerful driver of change, but many other environmental changes are taking place as well, alongside rapid social and economic developments. In some contexts, factors such as resource demand, transportation needs, migration, geopolitical changes and globalization are making the greatest impact on the Arctic. Indeed, many Arctic social-ecological systems face multiple stressors at once.... The reality is that changes across the Arctic are closely interconnected. The drivers of change—many of them external to the Arctic—cascade across geophysical, ecological and human elements of social-ecological systems.²

The complexity of the Arctic environment makes it difficult to monitor it and, more importantly, make forecasts. Knowledge about the Arctic needs to be shared by, and between, nations and the indigenous populations that reside there. To preserve the environment of the Arctic, knowledge has to not only pursue problems but also find solutions for them through an interdisciplinary approach. The global scientific community as well as political and business leaders are coming together to cooperate on ways and means to stop or decrease the pace of Arctic ice melting. However, national interests and mistrust somewhere delude the scientific community and political leaders of certain countries from genuine cooperation. This aspect can be seen between Russia and the United States.

The ice melting of the Arctic is seen as a geo-political and geo-economic opportunity, albeit for a few nations at the moment. It would allow for

2. Arctic Council, "Arctic Resilience Report," [ARR_full_report_low-res_161114b.pdf](#). Accessed on February 19, 2019.

the passage of container ships along the Northern Sea Route (NSR). As the global economy undergoes a transformation with technologies that are increasing production, all nations are looking for new markets and sources of raw material as well as new routes to reach both. It needs to be noted that the NSR is yet to become fully functional due to financial viability, lack of specialised ships and manpower expertise needed to navigate in the Arctic waters and other safety concerns. The exploration of minerals from the Arctic sea-bed is the other aspect

It needs to be pointed out that the changing climate of the Arctic will lead to profound changes in the global climate, weather patterns and eco-systems. The disappearance of the older and thicker classes of sea ice is leaving an ice pack that is more vulnerable to melting in the summer, and liable to move unpredictably.

that countries that border the Arctic hope to exploit in the future, if and when it becomes economically viable. One has to also keep in mind the environmental fragility of the Arctic. It needs to be pointed out that the changing climate of the Arctic will lead to profound changes in the global climate, weather patterns and eco-systems. The disappearance of the older and thicker classes of sea ice is leaving an ice pack that is more vulnerable to melting in the summer, and liable to move unpredictably. This is a challenge not just for the exploration of minerals in the Arctic sea-bed but also for future navigation of ships in the region. The environmental impact is already being felt. The reduced sea ice coverage and early break-up of ice had a profound effect on primary ocean productivity in 2018, particularly in the Bering Sea region where productivity levels were sometimes 500 percent higher than normal levels. Warming Arctic Ocean conditions are also coinciding with an expansion of harmful algae species responsible for toxic algal blooms in the Arctic Ocean.³ All countries must share responsibility for the Arctic because activities pursued here have

3. Arctic Programme, US Department of Commerce, "Arctic Report 2018," <https://www.arctic.noaa.gov/Report-Card/Report-Card-2018/ArtMID/7878/ArticleID/772/Executive-Summary>. Accessed on February 19, 2019.

influence/consequences elsewhere. The Arctic can accommodate very diverse pursuits, but only to the extent that they are either compatible, or else separated by enough time and distance for the region to recoup.⁴

Apart from its economic and environmental importance, the Arctic also has played an important role in the strategic arena. During World War II, the Arctic constituted a supply route for the allied forces. Supplies between the United States and Soviet Union were shipped through the Arctic as it was the shortest route between the two nations. During the war, some battles were also fought in some portions of the Arctic, with the German Navy blocking the Arctic routes in order to block supplies by ships to the allied nations, especially the United Kingdom. The end of the war raised the strategic and military importance of the Arctic, with the Cold War becoming a reality.

During the Cold War, the Arctic remained transformed into a political and strategic region for both power blocs, the United States and the Soviet Union. One reason for the sudden importance of the region was the proximity, in geographical terms, between the two newly risen superpowers. The shortest distance between mainland Russia and mainland Alaska is approximately 55 miles. However, in the body of water between Alaska and Russia, known as the Bering Strait, there are two small islands known as Big Diomedes and Little Diomedes. Interestingly enough, Big Diomedes is owned by Russia while Little Diomedes is owned by the US. The stretch of water between these two islands is only about 2.5 miles wide and actually freezes over during the winter so that one can technically walk from the US to Russia on this seasonal sea ice.⁵ Thus, the two were not only neighbours across the Arctic region, the Soviet Union (and now Russia) also bordered American allies—Canada, Denmark, Greenland, Norway and Sweden. The routes that were used for anti-Axis cooperation were now used to influence the bi-polar international political order. As the Cold War progressed, the militarisation of the Arctic also became a reality. Through the Inter-Continental Ballistic Missile (ICBM) development and placement, production of nuclear powered attack submarines and the threat of cruise missiles carried by bomber planes,

4. Ibid.

5. Alaska Public Lands Information Centre, <https://www.alaskacenters.gov/faqs-people-often-ask/how-close-alaska-russia>. Accessed on January 23, 2019.

the two countries poured resources into building up their capabilities in the area vis-à-vis one another. More prominently, preventive radar systems were built and installed across the region by allies of both America and the Soviet Union.⁶ Apart from the overt military build-up, the region was also used for covert espionage activities and for undertaking some nuclear tests.

With the end of the Cold War, the militarisation of the Arctic region halted. Instead, the Arctic became the arena for a diverse range of cooperation mechanism between the two countries, with the most prominent being the founding of the Arctic Council in 1996. The Council is the leading inter-governmental forum promoting cooperation, coordination and interaction among the Arctic states, the Arctic indigenous communities and the other Arctic inhabitants on common Arctic issues. The countries that form the council are Canada, the Kingdom of Denmark, Finland, Iceland, Norway, the Russian Federation, Sweden and the United States.⁷ Apart from the eight Arctic countries, the council also has a number of observer members.⁸ It needs to be further stated that the Council does not look at military security issues. This may be intentional as five⁹ of the eight nations of the Council are also members of the North Atlantic Treaty Organisation (NATO), whose charter commits member states to collective self-defence. Finland and Sweden partner the United States on many international issues. It needs to be seen whether the Council will be able to avoid discussing military issues in the

6. Alexandre Piffero Spohr, Jessica da Silva Horing, Luiza Gimenez Cerioli, Bruna Lersch and Josua Gihad Alves Soares, "The Militarization of the Arctic: Political, Economic and Climate Change Challenges", *UFRGSMUN*, vol 1, 2013. <https://www.ufrgs.br/ufrgsmun/2013/wp-content/uploads/2013/10/The-Militarization-of-the-Arctic-Political-Economic-and-Climate-Changes.pdf>, pp. 16. Accessed on January 23, 2019.

7. Apart from states, six organisations representing the Arctic indigenous people have status as permanent participants. They are the Aleut International Association, Arctic Athabaskan Council, Gwich'in Council International, Inuit Circumpolar Council, Russian Association of Indigenous Peoples of the North and Saami Council.

8. Observer status is open to: non-Arctic states, inter-governmental and inter-parliamentary organisations, and global and regional non-governmental organisations. Observer states are: France, Germany, Italian Republic, Japan, The Netherlands, People's Republic of China, Poland, Republic of India, Republic of Korea, Republic of Singapore, Spain, Switzerland and United Kingdom. Thirteen Inter-governmental and Inter-Parliamentary Organisations and 13 Non-Governmental Organisations (NGOs) are approved observers in the Arctic Council. Details are available at <https://arctic-council.org/index.php/en/about-us/arctic-council/observers>

9. Canada, Denmark, Iceland, Norway, United Kingdom and United States are members of NATO.

The changing climate is also contributing to the debate on the territorial disputes between nations. There has been a trend of increased militarisation of the area to protect nations' interests in the region along exclusive economic zones and territorial waters.

future as complications would be inevitable because of the militarisation in the region, the delimitation of territorial claims as well as the growing interest of new stakeholders like China. Throughout the Cold War, the Arctic played a strategic role, but the current geo-economic importance of the region has once again highlighted the strategic importance of the Arctic to countries that border this region with its fragile environment. The Arctic is home to significant mineral wealth and has substantial oil and gas reserves.

While exploring these resources remains an expensive and technologically challenging proposition, the rapid change in the climate of the region may, in the near future, aid nations to find viable means of exploiting the resources of the region. The changing climate is also contributing to the debate on the territorial disputes between nations. There has been a trend of increased militarisation of the area to protect nations' interests in the region along exclusive economic zones and territorial waters. The environment of the Arctic is changing. With the accelerating melting of ice due to the rise in global temperatures caused by climate change, avenues have opened up for new shipping routes, exploration and exploitation of minerals, fishing and extraction of bio-proteins, etc. At the same time, it is also leading to more military presence and upgradation of defence systems in the region as states try to protect their interests. The militarisation in the region also impacts the regional climate which is an alarming situation as the region as well as its neighbouring countries will face floods, rise in temperature and droughts.

This paper is an attempt to understand the importance of the Arctic for Russia and the United States. It will try to study if the Arctic could be a pole of cooperation between the two states or the beginning of a new arena of confrontation.

RUSSIA AND THE ARCTIC

During the 2011 Arctic Forum, a conference meeting in the White Sea port of Arkhangelsk, Russian President Vladimir Putin had said, "I want to stress the importance of the Northern Sea Route (NSR)¹⁰ as an international artery that will rival traditional trade lanes (such as the Suez Canal¹¹). It will be the shortest route between Europe's largest markets and the Asia-Pacific region that lies across the Arctic."¹² The route is also important for Russia in the development plans for its Far East region. The proposed route will connect the remote region not just to Russia's western regions but also the larger international market.

Russia intended to transform the Northern Sea Route into a viable commercial route, an alternative to the Suez Canal. To develop the capabilities of this route, Russia decided to spend Roubles 38 billion (\$1.2 billion) in 2014 for further building its atomic ice-breaker fleet which would help in accessing the route. In December 2018, Russia's state-owned nuclear corporation Rosatom was able to use this route with the help of Russia's fleet of ice-breakers.¹³

The Arctic has become a geo-strategic and geo-economic priority for both Russia and the US. Insecurity is building within the two sides, which has intensified due to the belligerent relationship between the two. Like in other regions, the Arctic is also showing signs of the renewal of the Cold War minus its ideological differences.

10. The Northern Sea Route has been functional for international shipping since the Soviet times (1987).

11. The Northern Sea Route trims 7,400 km off the southern alternative via the Suez Canal. "Putin Says Arctic Trade Route to Rival Suez", *Arctic Transport*, September 23, 2011. <https://arctictransport.wordpress.com/>.

12. "Arctic Shipping Route Will Soon Rival Suez Canal, Putin Says", *Yale Environment Digest* 360, September 23, 2011. https://e360.yale.edu/digest/arctic_shipping_route_will_soon_rival_suez_canal_putin_says. Accessed on January 26, 2019.

13. Simon Osborne, "Russian Nuclear Icebreakers to Open Previously Impassable Trade Route Through Arctic", *Express.co.in*, December 14, 2018. <https://www.express.co.uk/news/world/1058925/russia-news-northern-sea-route-arctic-ocean-rosatom-nuclear-powered-icebreakers>. Accessed in January 29, 2019. Rosatom is now formally Russia's management authority for the Northern Sea Route from January 2019. Russian Arctic shipping is on a rapid increase. In 2018, about 18 million tons of goods were transported on the sea route, an increase of almost 70 percent from 2017. The Kremlin's priority is to achieve 80 million tons of goods to be transported by 2024. Atle Staalesen, "Rosatom will Manage Russia's Northern Sea Route", *Arctic Today*, January 2, 2019. <https://www.arctictoday.com/rosatom-will-manage-russias-northern-sea-route/>. Accessed on February 19, 2019.

Russia's activities in the Arctic, over the last decade and a half, have sparked responses from other regional states with a tilt towards an increase in military presence in the region. To understand the future of the geo-strategic dynamics in the Arctic region, one has to understand the prevailing dynamics between Russia and the West/NATO along the borders of Russia in Europe. The Arctic has become a geo-strategic and geo-economic priority for both Russia and the US. Insecurity is building within the two sides, which has intensified due to the belligerent relationship between the two. Like in other regions, the Arctic is also showing signs of the renewal of the Cold War minus its ideological differences.

The Arctic has always been important for the US as well as for Russia.¹⁴ During the Cold War, the Arctic provided the shortest flight path for Soviet and American ICBMs and strategic bombers armed with long-range cruise missiles to travel to each other's territories. It was also the most plausible area for the deployment of nuclear ballistic missile submarines (SSBNs) by the United States and the Soviet Union.¹⁵ The Soviet Union—and now Russia—has claimed that parts of the NSR, such as the Vilkitskii, Shokalskii, Dmitrii Laptev, Sannikon Straits and all the straits in the Karsky Sea as "internal waters". This claim has been contested by the United States since 1964. To ensure nuclear deterrence during the Cold War and to counter any claims by the United States, the Northern Fleet (NF) of the Soviet Union was stationed in the Arctic (Kola peninsula). The fleet included surface combat ships and strategic nuclear submarines. It was a '*naval fortress*' which was established in the Arctic to prevent possible intrusion and attack from the NATO fleets.¹⁶

Today, apart from its strategic importance for Russia, it has economic significance. The area generates about 20 percent of Russia's Gross Domestic Product (GDP) and 22 percent of Russian exports. In the words of former President Dmitry Medvedev, "...the region is home to major oil and gas

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14. Peter the Great in the 18th century was the first tsar who sent an expedition to map his Russian Empire's northern fringes. Murmansk has become a city of mining, military and scientific activity.
 15. Michael Lambert, "Russia's Arctic Ambitions Held Back by Economic Troubles", Centre for International Maritime Security, February 28, 2018. <http://cimsec.org/russias-arctic-ambitions-held-back-economic-troubles/35590>. Accessed on January 27, 2019.
 16. Barbora Padrtová, "Russian Military Build-up in the Arctic: Strategic Shift in the Balance of Power or Bellicose Rhetoric Only?" *Arctic Yearbook*, 2014, p. 2. https://arcticyearbook.com/images/yearbook/2014/Scholarly_Papers/22.Padrtova.pdf. Accessed on January 17, 2019.

producing areas such as in the West-Siberian, Timano-Pecherskaya and East-Siberian fields. It is also one of the most highly developed sectors in mining of rare and precious metals. Experts have estimated that the Arctic continental shelf could contain around a quarter of the world's hydrocarbon resources. Use of these energy resources is the guarantee for Russia's overall energy security."¹⁷ Since 2008, Russia has been developing its Arctic capabilities to exploit the Arctic resources for its economic benefit as well as to protect these interests through the deployment of effective security mechanisms. It was focussed on energy development and shipping in partnership with other foreign companies.¹⁸

Under the leadership of President Vladimir Putin, Russia, in 2001 submitted its proposed outer limits of the continental shelf of the Russian Federation beyond 200 nautical miles from the baselines to the United Nations Commission on the Limits of the Continental Shelf (CLCS).¹⁹ However, in 2002, the CLCS issued a recommendation that the application needed additional scientific evidence that the Arctic shelf is part of Russia's landmass. Since the CLCS published its recommendation, Russia has been trying to prove the country's rights to the Lomonosov and Mendeleev ridges as one of its top strategic priorities in the Arctic. It has conducted many scientific expeditions to collect information to strengthen its CLCS application, among them the Arktika 2007 polar expedition.²⁰ This led to a scramble from the other Arctic countries to not only protest Russia's claims but also to chalk out their own territorial claims in the Arctic and the Arctic sea-bed. The CLCS is yet to take a decision on Russia's claim. If the decision favours Russia, it will be able to have rights over the two ridges, Lomonosov and

17. "Speech at Meeting of the Russian Security Council on Protecting Russia's National Interests in the Arctic", President of Russia, September 17, 2008. <http://en.kremlin.ru/events/president/transcripts/48304>. Accessed on January 28, 2019.

18. Ekaterina Klimenko, "Russia's Arctic Security Policy Still Quiet in the High North?" *SIPRI Policy Paper*, No. 45, p.1. Accessed on January 28, 2019.

19. "Commission on the Limits of the Continental Shelf (CLCS) Outer Limits of the Continental Shelf beyond 200 Nautical Miles from the Baselines: Submissions to the Commission: Submission by the Russian Federation", United Nations Division for Ocean Affairs and the Law of the Sea, updated on June 30, 2009. http://www.un.org/depts/los/clcs_new/submissions_files/submission_rus.htm.

20. Klimenko, n. 18, pp. 11-12. The underwater Lomonosov ridge is important for Russia as it links Siberia to the Arctic. "Medvedev: Arctic Resources are Key to Russia's Future", *The Seattle Times*, September 18, 2008. <https://www.seattletimes.com/nation-world/medvedev-arctic-resources-are-key-to-russias-future/>.

Developments in the Arctic by the other Arctic nations – nearly all allies or partners of the United States – and their claims on the territories and resources, made the Kremlin rethink its Arctic policies.

Mendelev.²¹ It will help expand its strategic reach into the Arctic while expanding its economic policies for the region.

The political developments near Russia's borders such as the Colour Revolutions in Ukraine and Georgia and the ambiguity in the policies of the West, especially the United States, towards Russia, have pushed the latter to rethink and assert its policies in the Arctic. The discourse on the importance of the Arctic within the Russian academic and strategic community has also increased after these events. For instance, during the 2008 War with Georgia, Russia was put under restrictions by Ukraine over prior permission for the Russian Black Sea Fleet when crossing the Ukrainian border.²² The denial of access to the Black Sea made Russia realise the vulnerability of its position in the Black Sea. The Kremlin has never been at ease over Ukraine's pro-West leaning as it is indicative of the expansion of NATO in Russia's near border. Similarly, the developments in the Arctic by the other Arctic nations—nearly all allies or partners of the United States—and their claims on the territories and resources, made the Kremlin rethink its Arctic policies. In 2008, former President Medvedev stated that Russia's biggest task is to "turn the Arctic into Russia's resource base for the 21st century..." and to protect its national interests in the Arctic region.²³

21. Russia claims that Lomonosov ridge is an extension of its Serbian continental shelf whereas Denmark claims it as a part of Greenland. Similarly, Russia claims the Mendelev ridge to be a part of the Eurasian continent.

22. "Moscow Slams Kiev's 'Unfriendly' Stance", *France 24*, September 11, 2008. <https://www.france24.com/en/20080911-policies-russia-unfriendly-ukraine-georgia-sebastopol-lavrov>. Accessed on February 25, 2019. This happened despite the December 2003 Treaty Between the Russian Federation and Ukraine on Cooperation in the Use of the Sea of Azov and the Kerch Strait. The former Ukrainian President Viktor Yushchenko imposed restrictions on the Russian fleet, requiring ships to seek permission at least 72 hours prior to crossing the Ukrainian border. Ibid.

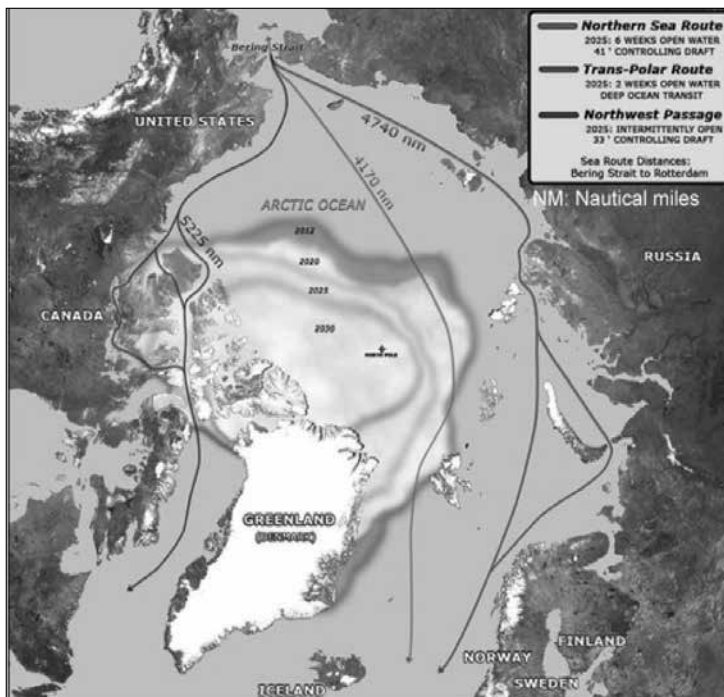
23. n. 11. Mr. Medvedev in his speech laid down the future task, including fixing of the border on the continental shelf, for Russia in the region. In the 2008 policy "The Foundations of Russian Federation Policy in the Arctic until 2020 and Beyond", the report also spoke about securing a mutually beneficial presence for Russia on the Spitsbergen peninsula. "The Foundations of Russian Federation Policy in the Arctic until 2020 and Beyond: Russia's New Arctic Strategy", American Foreign Policy Council (translated version), September 18, 2008, pp.98-99. http://www.arctic.or.kr/files/pdf/m4/rusia_eng.pdf. Accessed on January 28, 2019.

In its policy “The Foundations of Russian Federation Policy in the Arctic until 2020 and Beyond” released in 2008, Russia underlined its national interest in the Arctic. It states, “The basic national interests of the Russian Federation in the Arctic are: (a) use of the Arctic zone of the Russian Federation as a strategic resource base of the Russian Federation providing the solution of problems of social and economic development of the country; (b) maintenance of the Arctic as a zone of peace and cooperation; (c) preservation of the unique ecological systems of the Arctic; (d) use of the Northern Sea Route as a national single transport communication corridor of the Russian Federation in the Arctic . National interests determine basic objectives, primary goals and strategic priorities of the state policy of the Russian Federation in the Arctic. The realisation of national interests of the Russian Federation in the Arctic is to be done by the institutions of state power together with the institutions of civil society in strict conformity with the legislation of the Russian Federation and its international treaties.”²⁴ **Russia has laid stress on the importance of maintaining the necessary combat potential in the north in order to secure the country’s national interests in various military and political situations. It has also laid a lot of stress in the document on economic development of the area.** The opening of the NSR helps Russia to achieve its national interests as the route is the officially designated route of the country for its commercial traffic for Europe and beyond. Moscow is not putting any barriers in the shipping route for other countries currently. However, in the long run, there is a possibility that Russia might manipulate this route as it does in the Sea of Azov in the Black Sea. In 2018, a Bill was placed before the Duma to

24. The Arctic Database, “Russian Federation Policy for the Arctic to 2020,” <http://www.arctis-search.com/tiki-index.php?page=Russian%20Federation%20Policy%20for%20the%20Arctic%20to%202020>. Accessed on January 2, 2019.

restrict the use of the route.²⁵ There is a possibility that Russia may use a similar process to restrict the access to the use of the NSR in the future or limit the number of ships that use the route. While this may help limit the environmental damage that is caused by commercial ships to the pristine waters of the Arctic, it begs the question of whether the other nations of the Arctic will allow this and also the question of the commercial viability of the NSR if Russia restricts movement here.

Fig 1: Arctic Transit Routes and Their Projected Navigability, 2012-30²⁶



Source: U.S. Navy. | GAO-19-42

25. Russia was supposed to start with the regulation on foreign ships passing through the NSR route from January 1, 2019. It was deliberated that while the sailing route will not be consequently fully closed for foreign-built ships, Russia will issue passes to the foreign ships to pass through. "Russian Deputy Prime Minister Supports Restrictions on Northern Sea Route", *Safety for Sea*, September 21, 2018. <https://safety4sea.com/russian-deputy-prime-minister-supports-restrictions-on-northern-sea-route/>. Accessed on February 19, 2019.
26. US Government Accountability Office, "Navy Report to Congress Aligns with Current Assessments of Arctic Threat Levels and Capabilities Required to Execute DOD's Strategy," <https://www.gao.gov/products/GAO-19-42>. Accessed on February 21, 2019.

Militarisation of the Arctic

Geo-politics and Russia's present position have made it clear to Russia that the United States and the West are not yet ready to genuinely cooperate with it nor treat it as an equal partner. There is perpetual competition and clash of interests which has continued from the Tsarist period²⁷ through the Cold War, to the present. This competition can be seen in the Arctic very clearly.

The two reasons for the upgradation in Russia's militarisation in the Arctic are:

- The vast natural resources, including energy²⁸ and raw minerals in Russia's Exclusive Economic Zone (EEZ); and
- The everlasting threat from the United States and its allies in the West, strategically as well as security-wise.

Apart from the above two reasons, China's growing claims have further added to the Russian insecurity. A report by the European Parliament stated that China actually does not have territorial sovereignty and related sovereign rights to resource extraction and fishing in the Arctic.²⁹ Nonetheless, the shortest distance between China and the Arctic is 900 miles,³⁰ which has

27. There have been periods of rapprochement between Russia and the West on many occasions, but neither in a consistent manner, nor genuine.

28. Russia's oil and gas production accounts for 80 percent and 99 percent of the Arctic production respectively. Tang Guoqiang, "Arctic Issues and China's Policies", *CIIS*, February 6, 2013. http://www.ciis.org.cn/gyzz/2013-02/06/content_5727672.htm. Accessed on January 28, 2019. With the depletion of its matured oil and gas fields in the country, the Arctic's reservoirs are critical for Russia, domestically as well as strategically.

29. Gisela Grieger, "China's Arctic Policy: How China Aligns Rights and Interests", European Parliament, PE 620.231, May 2018. [http://www.europarl.europa.eu/RegData/etudes/BRIE/2018/620231/EPRS_BRI\(2018\)620231_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/BRIE/2018/620231/EPRS_BRI(2018)620231_EN.pdf). Accessed on January 28, 2019.

30. In fact, 900 miles which comes to approximately, 1,448.41 km is quite far. The Chinese claim of 'Near Arctic' despite the distance shows the assertiveness in their decisions. It is interesting to observe the basis of their claims. Under the UNCLOS, it seems difficult for China to have its claim. It is because under the convention, "the Coastal States have sovereign rights over the continental shelf (the national area of the seabed) for exploring and exploiting it; the shelf can extend at least 200 nautical miles from the shore, and more under specified circumstances". "United Nations Convention on the Law of the Sea of 10 December 1982: Overview and Full Text", *Division for Ocean Affairs and the Law of the Sea*, Last updated March 28, 2018. http://www.un.org/depts/los/convention_agreements/convention_overview_convention.htm. However, there is a change in rhetoric from the Chinese side. China, in the 2009-10 declaration was demanding the Arctic as the common heritage of mankind, however, since 2013 there is the narrative of 'Near Arctic' coming up.

led to subtle assertions by China of its claims in the region by referring to itself as a 'near Arctic' nation. Speaking to the Arctic Circle Assembly in late 2015, China's Vice Foreign Minister Ming declared his country "a major stakeholder in the Arctic."³¹

For China, apart from the energy and minerals, the rich reservoirs of fish³² and bio-protein are reasons enough for its interest. Its maritime Silk Road initiative to link China to Europe³³ also makes the Arctic region lucrative (Beijing is envisioning its strategy in the Arctic through the "Polar Silk Road"³⁴ which was declared in China's 2018 Arctic Policy³⁵). The Polar Silk Road as well as the declaration of an Arctic Policy helps China in its grand strategy of being the rising power. Having claims in the Arctic will also help China in asserting its claims in the South China Sea.³⁶ Till now, China's claims in the Arctic are not recognised internationally, hence, to mark its interest in the region, Beijing, in its 2018 Arctic Policy, talks about supporting "the peaceful settlement of disputes over territory and maritime rights and interests by all parties concerned in accordance with such treaties as the UN Charter and the UNCLOS and general international law". However, its actions in the South China Sea are the opposite, an indication of the double standards the country is pursuing. On the South China Sea dispute, China

31. The Munich Security Report 2017, "The Arctic: Tempers Rising?" <https://www.securityconference.de/publikationen/munich-security-report/munich-security-report-2017/places/the-arctic-tempers-rising/>. Accessed on January 29, 2019.

32. The Barents Sea and Beaufort Sea will become new important fishing grounds. Guoqiang, n. 28.

33. The 'Northwest Passage' and 'Northeast Passage' will help China to reduce the travel time to Europe from 15,000 miles to 8,000 miles. Gwynn Guilford, "What Is China's Arctic Game Plan?" *The Atlantic*, May 16, 2013. <https://www.theatlantic.com/china/archive/2013/05/what-is-chinas-arctic-game-plan/275894/>. Accessed on January 28, 2019

34. For China, the 'Polar Silk Road' is the third extension of the One Belt and One Road Initiative. Sherri Goodman and Marisol Maddox, "China's Growing Arctic Presence", Wilson Centre, November 19, 2018. <https://www.wilsoncenter.org/article/chinas-growing-arctic-presence>. Accessed on January 28, 2019.

35. "China Publishes Arctic Policy, Eyeing Vision of 'Polar Silk Road'", *Xinhua*, January 26, 2018. http://www.xinhuanet.com/english/2018-01/26/c_136926357.htm. Accessed on January 28, 2019.

36. In its 2018 Arctic Policy, China talks about supporting "the peaceful settlement of disputes over territory and maritime rights and interests by all parties concerned in accordance with such treaties as the UN Charter and the UNCLOS and general international law". "Full Text: China's Arctic Policy", *Xinhua*, January 26, 2018. http://www.xinhuanet.com/english/2018-01/26/c_136926498_4.htm. The South China Sea has been witnessing conflict for a long time, which grew since 2007 as there has been rising interest in exploiting the oil and gas deposits as well as the fishing reservoirs.

has not accepted nor acknowledged the Permanent Court of Arbitration (PCA) judgement which is based on the provisions of the United Nations Convention on the Law of the Seas (UNCLOS), while it seems to be seeking a piece of the Arctic pie under the very same provisions of the UNCLOS. An area of concern are the military assertions by Beijing in the region of the South China Sea. China believes that a country which can militarily lead the region can occupy the commanding heights of the world military.³⁷ The rejection of the international tribunal in The Hague over the South China Sea in 2016 shows the assertiveness and non-compliance of China over its claims. Based on the history of China's militarisation, it is being assumed that China will try to militarise the Arctic region as it asserts its claims and tries to access the region's vast potential.

Russia shares a cordial relationship with China³⁸ and cooperates with Beijing in countering the United States' dominance, including in the South China Sea.³⁹ However, Moscow is not willing to allow Beijing to dominate the Arctic or the discourse around it. The 2016 South China Sea military drill with China carried two messages from Russia:

- Firstly, the drill was a signal to the United States and its allies such as Japan, about Russia's naval power in the region and its non-compromising attitude towards the Kuril Islands. It was also to break the US hegemony in the region as well as in the international organisations such as the

37. Guoqiang, n. 28. During the Cold War, the Arctic became the front line for US-Soviet Union confrontation.

38. Due to the sanctions since 2014, Russia has not been able to acquire the sophisticated technology needed to develop the energy fields in the Arctic, leading to the partnership between Moscow and Asian countries, especially with China and, to an extent, with India. In the Yamal natural gas project, China has received a share of 39 percent, which is a large stake (Russia holds 50.1 percent and 20 percent is held by France's energy conglomerate, Total. Humphrey Hawksley, "China's Arctic Plan Spreads a Chill", *Nikkei Asian Review*, February 16, 2018. <https://asia.nikkei.com/Politics/International-Relations/China-s-Arctic-plan-spreads-a-chill>. Accessed on January 26, 2019.

39. The military exercise between Russia and China in 2016 was a signal to the US as well as America's allies and other powers about the growing alliance between Moscow and Beijing. The drill was a power projection from both the countries.

UNCLOS and International Tribunal in the Hague.⁴⁰

- Secondly, the exercise can also be interpreted as a message from Russia to China over Moscow's assertiveness and naval power, and its ambitions in the region and beyond.

Russia has developed at an accelerated pace its Anti-Access/Area Denial (A2/AD) capabilities (air and missile defences, surface-to-surface ballistic missiles, land, air and sea launched cruise missile batteries, layered anti-submarine warfare capabilities) in zones where the country could face external military pressure in the future. This has been the case in Crimea, Kaliningrad, and the Arctic.⁴¹ On the formation of the Joint Strategic Command in 2014, President Putin said that the formation of the Northern Fleet Joint Strategic Command has enhanced security in the Arctic. The command will also help in promoting the modernisation of military infrastructure in this region which is important for the Russian⁴² national interest. Russia has also built the Tor-M2DT anti-aircraft missile battalion, suitable for the Arctic region.⁴³ There has been ongoing construction and development of several permanent bases in the region. The constructions on the Alexandra Island (the Franz Josef Land archipelago), Kotelny⁴⁴ Island (this division will be rearmed with more precise and high-speed weapons⁴⁵), Sredny and Wrangel Islands, Novaya

40. Russia has always supported the United Nations and other international institutions, however, it has been against the domination of the US over these organisations. Likewise, China broke the decision of the International Tribunal in Hague over the South China Sea dispute with its neighbours.

41. "Russia's National Security Strategy and Military Doctrines and Their Implications for the EU", European Parliament, 2017, p. 15. http://www.europarl.europa.eu/RegData/etudes/IDAN/2017/578016/EXPO_IDA%282017%29578016_EN.pdf. Accessed on January 28, 2019.

42. "Russia's Military Infrastructure on Cape Schmidt, Wrangel Island to be Built by Late 2015", Russia Defence Forum, May 15, 2015. <http://www.russiadefence.net/t2746p105-arctic-rush>. Accessed on January 28, 2019.

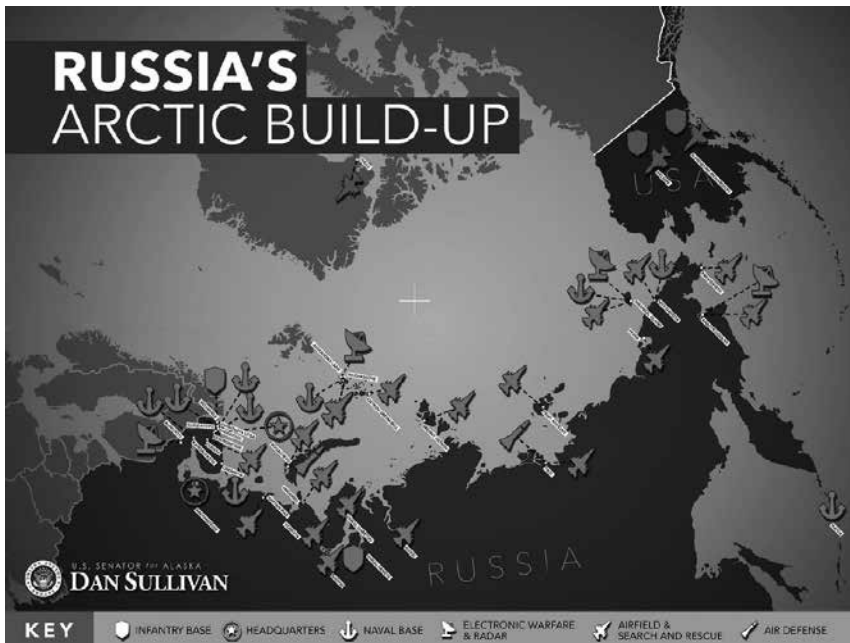
43. Li Zhixin, "The Arctic Sea Escalating Militarisation", China Military Online, December 7, 2018. http://eng.chinamil.com.cn/view/2018-12/07/content_9372164.htm Accessed on January 25, 2019.

44. This island, along with the base in Tiksi, will help Russia to protect the offshore oil and gas resources in the area. These bases will also support the country in keeping surveillance on the foreign ships sailing along the Northern Sea Route. Trude Pettersen, "Russia Re-Opens Arctic Cold War Era Air Base", *The Barents Observer*, October 30, 2013. <https://barentsobserver.com/en/security/2013/10/russia-re-opens-arctic-cold-war-era-air-base-30-10>. Accessed on January 27, 2019.

45. Atle Staalesen, "Russia Builds Another Military Base in East Arctic", *The Barents Observer*, September 3, 2018. <https://thebarentsobserver.com/en/2018/09/russia-builds-another-military-base-east-arctic>. Accessed on January 28, 2019.

Zemlya, the village of Alakurtti and Cape Schmidt reflect the broader pattern in Russia's Arctic activity. All these activities are helping Moscow to establish a monitoring outpost and stake a symbolic territorial claim.⁴⁶ The country is in accelerated pace in reopening and reconstructing the Soviet-era ports and airfields in the region.

Fig 2



Source: U.S. Senator for Alaska, *The Arctic Institute*, 2018.⁴⁷

In its military doctrines, including the Maritime Doctrine of 2015,⁴⁸ Russia has clearly mentioned the Arctic, apart from the Atlantic, as the

46. "Russia in the Arctic: A Different Kind of Military Presence", *Stratfor*, November 11, 2015. <https://worldview.stratfor.com/article/russia-arctic-different-kind-military-presence>. Accessed on January 28, 2019.

47. https://www.thearticinstitute.org/wp-content/uploads/2018/01/Russia_Arctic-military-build-up.jpg. Accessed on February 21, 2019.

48. This maritime doctrine was adopted in 2001 but was updated in 2015. President Putin made the changes in 2015. The reasons he gave for the amendments were the changing international scenarios and strengthening Russia's position as a sea power. "Russian Federation Marine Doctrine", President of Russia, July 26, 2015. <http://en.kremlin.ru/events/president/news/50060>. In the 2014 Military Doctrine, the employment of the armed forces for the protection of its national interests in the Arctic is clearly mentioned.

In November 2018, Russia passed a notification to all countries regarding prior notification to the Russian government on foreign military ships sailing through the Russian Arctic sea route. A possible rationale behind the notification may be the Kerch Strait incident in Ukraine in 2018.

country's main focus. The doctrine states the importance of the Arctic as it helps in the unhindered and free access to the Atlantic and Pacific Oceans.⁴⁹ It will help Russia to have its strategic presence as well as control over its claims. In November 2018, Russia passed a notification to all countries regarding prior notification to the Russian government on foreign military ships sailing through the Russian Arctic sea route. A possible rationale behind the notification may be the Kerch Strait incident in Ukraine in 2018.⁵⁰ The notification is being viewed as an approach by Russia to protect its strategic claims in the region as it will also allow it to monitor the movement of ships of other nations, including China.

Russia's Defence Minister Sergei Shoigu announced the Russian Defence Ministry's plans to hold the Strategic Command staff exercise codenamed Centre-2019 in September 2019,⁵¹ which will bring Russia's Northern Fleet, Pacific Fleet and Central Military District together. It will be held between the Novaya Zemlya and New Siberian Islands. The exercise is not only intended to check the range of new weaponry such as air defence missiles, armoured vehicles, all-terrain vehicles and support equipment but also test the impact of climate conditions on both the armed forces and weapon systems.⁵² If the exercise proves to be successful, then it will be a great boost for the Russian

49. Ibid.

50. On November 25, 2018, the Russian Federal Security Service's Border Service in Crimea said that three Ukrainian warships had violated the international maritime law by illegally crossing Russia's state border, entering its territorial waters of the Black Sea and the Sea of Azov and the Kerch Strait through the Kerch-Yenikale Canal, leading to the opening of gunfire from the Russian side. The incident had created a lot of tension in the West, given the belligerent relationship Russia and Ukraine have. "Three Ukrainian Warships Intrude into Russia's Territorial Waters – FSB", *TASS*, November 25, 2018. <http://tass.com/emergencies/1032402>. Accessed on January 29, 2019.

51. "Strategic Exercise Tsentr-2019 to be Held in September", *TASS*, December 4, 2018. <http://tass.com/defense/1034163>. Accessed on January 26, 2019.

52. James Seidel, "Russia Announced Large-Scale Arctic War-Games in 2019", *News Corp*, December 21, 2018. <https://www.news.com.au/technology/innovation/military/russia-announced-largescale-arctic-wargames-in-2019/news-story/148ebcce1fb414e812003a76e4f0156d>. Accessed on January 28, 2019.

government, given the competition the region is facing. It will also help Russia to export these tested weapons to other countries such as India, China⁵³, Japan, Singapore and South Korea which have also shown an interest in the Arctic.

The landscape of the Arctic is ever changing. It is an arena for both cooperation⁵⁴ as well as competition. Russia is working towards securing its national interests in the region, including by improving its military capabilities in the region. The refocus on the Soviet era military bases and their reequipping and rebuilding provides some indication of

Russia's strategy in the region. The Arctic, for Russia, is an extension of Eurasia. Policy-makers and scholars talk about it as the 'maritime Eurasia'. Hence, weakening its position or letting its guard down in the region is not foreseeable; rather, it would be the opposite.⁵⁵ More complications will arise in this region because of the non-ratification of the UNCLOS by the United States and China's claim of being a 'near Arctic state'. Nonetheless, the unpredictable and harsh climate of the Arctic and a strong United Nations might stop the region from becoming the next battleground of multipolarity.⁵⁶

Russia is working towards securing its national interests in the region, including by improving its military capabilities in the region. The refocus on the Soviet era military bases and their reequipping and rebuilding provides some indication of Russia's strategy in the region.

53. It is possible that China might be building its own indigenous weaponry for the Arctic. The launch of the recent indigenous nuclear-powered ice-breaker has raised eyebrows possibly within the Russian circle as well) as it can be further developed into a nuclear-powered aircraft carrier. This development can be in the direction of building its own armed forces in the Arctic. Secondly, China became a permanent observer in the Arctic Circle in 2013 and its claim in the 'Near Arctic' is yet to be recognised by UNCLOS. Given its strong interest in the region, it would be no surprise to know that Beijing has been clandestinely equipping itself militarily.

54. Till what extent there is genuine cooperation is questionable given the strategic interests of all the stakeholders as well as the non-stakeholders.

55. Last year, in the month of December, Russia announced an ambitious five-year plan of Roubles 5.5 trillion (approximately about €72 billion) for regional infrastructure and natural resource development in the region.

56. With the world moving towards a multipolar world order and China being a non-member claiming its stake in the region, it will not be surprising to see other countries aligning with the Arctic states (initially) and having their positions firmly grounded. In fact, if China is able to succeed, it will open a new path for other countries.

THE UNITED STATES AND THE ARCTIC

The United States identifies itself as an Arctic nation with broad and fundamental interests in the region since the purchase of Alaska from Russia on 1867. According to the US Department of State, national security and economic development were the key determinants of the United States' interests in the region then as they remain now.⁵⁷ With changing global politics, the policies of the United States to achieve the above stated goals have changed. The United States Arctic Policy is based on the following principal objectives: meeting US national security needs; protecting the Arctic environment and conserving its living resources; ensuring environmentally-sustainable natural resource management and economic development in the region; strengthening institutions for cooperation among the eight Arctic nations (the United States, Canada, Denmark, Finland, Iceland, Norway, the Russian Federation and Sweden); involving the Arctic's indigenous communities in decisions that affect them; and, enhancing scientific monitoring and research on local, regional, and global environmental issues.⁵⁸ During its two-year rotating chairmanship of the Arctic Council (April 2015 to May 2017), the United States worked with the council members on three areas: improving economic and living conditions; Arctic Ocean safety, security and stewardship; and addressing the impacts of climate change. The overarching theme, "One Arctic: Shared Opportunities, Challenges and Responsibilities," recognised and celebrated the region's long-term peace and stability.⁵⁹ Although there is significant international cooperation on Arctic issues, the region is increasingly being viewed by some observers as a potential emerging security issue. There is growing concern within the United States that it is not prepared for the changing geo-politics of the polar region. Security experts are of the opinion that the United States Coast Guard and the US Navy need to factor in the Arctic in future planning and operations if the United States wants to continue to play a role here. "Securing Our Arctic Interests Act

57. US Department of State, "Arctic", <https://www.state.gov/e/oes/ocns/opa/arc/>. Accessed on February 17, 2019.

58. Ibid.

59. n. 51.

of 2017",⁶⁰ a Bill introduced in the House of Representatives, authorises the Administration to procure six polar class ice-breakers. The Bill stated, "The strategic importance of the Arctic continues to increase as the United States and other countries recognise the military significance of the sea lanes and choke points within the region and understand the potential for power projection from the Arctic into multiple regions." It also stated that the economic significance of the Arctic has grown as nations understand the potential for maritime transportation. However, it did point out that this may lead to maritime accidents, oil spills and illegal fishing in the waters of the United States, leading to new challenges and mission requirements for the Department of Defence and Department of Homeland Security. While this Bill did not talk about the environmental concerns, Representative Jared Huffman (D-CA) and more than 100 members of Congress have introduced a bi-partisan legislation to restore protection to the pristine coastal plain of the Arctic National Wildlife Refuge (on February 11, 2019). The Arctic Cultural and Coastal Plain Protection Act would halt the Trump Administration in its rush to open the region to oil and gas drilling exploration, by repealing a controversial provision in the 2017 Republican Party's Tax Bill. However, it is clear that a lot more needs to be done to not only protect the Arctic environment but also to help the larger global eco-system.

Concentrating on the strategic/security aspect, one finds that based on the United States Arctic Doctrine [National Strategy for the Arctic Region 2013,⁶¹ Department of Defence (DoD) Arctic Strategy 2013⁶² and the updated DoD Arctic Strategy 2016⁶³], American interests in the region can be divided into several groups. First, it has military-strategic interests, including missile defence and early warning systems; deployment of sea and air systems for strategic sea-lift; strategic deterrence; maritime presence and maritime security operations; and

60. Text of the Bill is available at <https://www.congress.gov/bill/115th-congress/senate-bill/1442/all-actions?overview=closed#tabs>. As of June 26, 2017, it is with the Senate Subcommittee on Commerce, Science and transportation.

61. The National Strategy for the Arctic Region 2013 is available at https://obamawhitehouse.archives.gov/sites/default/files/docs/nat_arctic_strategy.pdf

62. The Department of Defence, "Arctic Strategy 2013" is available at https://www.defense.gov/Portals/1/Documents/pubs/2013_Arctic_Strategy.pdf

63. The Department of Defence, "Arctic Strategy 2016" is available at <https://www.defense.gov/Portals/1/Documents/pubs/2016-Arctic-Strategy-UNCLOS-cleared-for-release.pdf>

While remaining within the limits of its jurisdiction in the Arctic, the United States wants to protect its sovereign rights and exercise “appropriate control” over the contiguous waters; and maintain freedom of trans-Arctic over-flights and freedom of navigation throughout the Arctic.

ensuring freedom of navigation and over-flight. The Arctic is important for the United States to conduct its maritime security operations while ensuring the safety of its military bases in Alaska. It has also stated that it will be willing and prepared to “act unilaterally if necessary in defence of its interest in the region”. Second, the United States has a national security interest in preventing terrorist attacks or other criminal acts that increase its vulnerability in the Arctic region while bolstering its sea power. Third, the United States has political and economic interests. While remaining within the limits of its jurisdiction in the Arctic, the United

States wants to protect its sovereign rights and exercise “appropriate control” over the contiguous waters; and maintain freedom of trans-Arctic over-flights and freedom of navigation throughout the Arctic, including the Northern Sea Route, which is also one of the top national priorities. A key aspect that seems to be missing from the national discourse on the Arctic is the security of the environment of the Arctic. The Strategy for the Arctic Region 2013 does mention the need for the United States Defence Department to work with other agencies, departments and nations to support human and environment safety. Nonetheless, there is a greater focus on the traditional military security aspects. On January 12, 2017, former Secretary of Defence James Mattis stated that “[t]he Arctic is key strategic terrain...Russia is taking aggressive steps to increase its presence there.... I will prioritize the development of an integrated strategy for the Arctic. I believe that our interests and the security of the Arctic would benefit from increasing the focus of the Department of Defense on this region”.⁶⁴ On March 2, 2018, the US Navy, in collaboration with the US Coast Guard, under the polar ice-breaker integrated programme office, released a Request For Proposal (RFP) for the advance procurement and detail design for the coast guard’s heavy

64. Robbie Gramer, “Here’s What Russia’s Military Build-Up in the Arctic Looks Like,” <https://foreignpolicy.com/2017/01/25/heres-what-russias-military-build-up-in-the-arctic-looks-like-trump-oil-military-high-north-infographic-map/>. Accessed on January 29, 2019.

polar ice-breaker, with options for detail design and construction for up to three heavy polar ice-breakers.⁶⁵ A Department of Homeland Security (DHS) Mission Need Statement (MNS) approved in June 2013 states that the US Coast Guard will need to expand its ice-breaking capacity to meet future mission demands. Apart from the needs of the Coast Guard, the United States Navy is also focussing on the Arctic. In 2011, the US Navy shifted the responsibility of the Arctic from three commands to two – from the US Pacific Command (PACOM) to just the North Command (NORTHCOM) and European Command (EUCOM), with the NORTHCOM in

the lead. It has been understood by the US Navy that it would have to redefine its operations in the Arctic region as global warming is changing the way maritime warfare was planned. For example, the Arctic would no longer be available to conceal nuclear submarines in the future.

Within the North American Aerospace Defence Command (NORAD), Canada and the United States have begun planning a replacement for the North Warning System (likely to be finished by 2030)—the network of air defence radars across the top of the continent. Jointly funded and operated through NORAD—though located primarily in Canada—the system’s renewal comes in the context of a persistent Cold War revivalism that presages a preoccupation with national defence and geo-strategic competition.⁶⁶ The primary strategic role of the system, like in the past, would be to track long range Russian military aircraft. Apart from strategic stability, it was also felt

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65. Congressional Research Service, “Changes in the Arctic: Background and Issues for Congress”, Updated on 13 Dec. 2018, <https://fas.org/sgp/crs/misc/R41153.pdf>. Accessed on January 28, 2019.

66. Ernie Regehr, “Replacing the North Warning System: Strategic Competition or Arctic Confidence Building?”, *The Arctic Security Briefing Paper*, <http://www.thesimonsfoundation.ca/sites/default/files/Replacing%20the%20North%20Warning%20System-Strategic%20competition%20or%20Arctic%20confidence%20building%20-%20Arctic%20Security%20Briefing%20Paper%2C%20March%201%202018.pdf>. Accessed on January 29, 2019.

that such a system is needed to respond to the changes in the physical climate and to enhance domain awareness for security and safety reasons. With increasing access to, and movement in, the Arctic, the region needs support for protection of national defence, public safety as well as environmental safety.

Many experts have noted how Washington's motivation towards the north has changed. The United States did not identify itself—its national identity—with the Arctic. However, with the change in the Arctic environment and its importance in geo-politics, it has now become part of the American military and foreign policy. During the Cold War, the Arctic was predominantly an area of military and strategic confrontation with the Soviet Union; today, the security compulsions ensure that economic interests are not forgotten. The United States, unlike Russia, has not yet allocated the necessary resources to the Arctic security plans but it would likely change in the near future due to a trust deficit between the erstwhile superpowers and the growing importance of the region for commercial activity.

IMPACT OF THE UNITED STATES-RUSSIA RELATIONS IN THE ARCTIC

With its growing importance, the Arctic is becoming more susceptible to outside/geo-political influences while playing a very limited role in the events that affect it. For the United States and Russia, as the two important Arctic nations, the resources of the Arctic—both natural and human—along with its strategic location, demand attention in national and international policy-making. Bilateral relations between the United States and Russia have an impact on the various programmes that are in place to protect the Arctic and its environment as well as to ensure cooperation among the coast guards of the member-countries. The council is the primary organisation dealing with Arctic governance and provides the two nations with an opportunity to cooperate and collaborate at both the multilateral and bilateral levels. Nonetheless, it needs to be noted that while the council's other member-states have important stakes in the development of a peaceful, secure and sustainable Arctic, they all share a close relationship with the United States.

This means that the United States has the ability to influence the decisions of its partner nations and wean them away from Russia. It also means that, as the tensions with Russia increase, they are looking at the possibility of the military presence of NATO in the far north. This would increase the possibility of a militarised Arctic.

Other crises also have an impact on the Arctic. For example, as the conflict over Ukraine dragged on and escalated, Russian-US tensions in the international arena began to have an effect on the Arctic, too. Eventually, these dynamics started influencing the economics of the Arctic region and the development of mineral deposits' research, and search and rescue operations. The United States cancelled joint search and rescue training operations by the coast guard service. The updated list of the United States and European Union sanctions against Russia also mentions the economically significant energy sector. As the Western countries refused to transfer the technology for deep-water drilling to Russia, the latter's prospecting for oil and shale oil extraction in the Arctic got limited. The sanctions also put restrictions on the investment in, and financing of, oil and energy projects in Russia. This pushed some Western energy giants to withdraw from the projects to develop Russia's Arctic offshore zone. However, there are some reports of the sanctions having been circumvented subtly. For instance, Norway used to assist Russia with deep-water drilling technology. Due to the sanctions being imposed on Russia since 2014, the collaboration on technology had to be stopped. However, circumvention of these sanctions has been done. There are news reports that the Norwegian companies Boa Bison and Sea Spear and Sea Supraare are engaged in supporting drilling activities at both the Rusanovsky and Nyarmeysky areas which come under Russia.⁶⁷ In fact, instances like this add to the complications between Russia and the United States. It shows that the Western countries might ignore US' actions to protect their own interests. If this continues, it could accelerate geo-

67. Atle Staalesen,, "Norwegian Supply Ships Support Drilling Activities in Russian Arctic", *Eye on the Arctic*, August 16, 2018. <http://www.rcinet.ca/eye-on-the-arctic/2018/08/16/norway-ships-russia-drilling-oil-platforms-supply-arctic/>. Accessed on February 20, 2019.

While the opening of the NSR is likely to reduce the time taken for container shipment and, thus, cut costs, environmentalists are worried about the effects of the growing container traffic in an already fragile environment. The movement of ships and the waste they generate will further add to the warming of the Arctic waters.

strategic competition in the region, adding a new dimension to the neo-Cold War.⁶⁸ Already, the bellicose relationship between Russia and the United States has impacted the littoral states in the region.

Tensions in Russia-United States relations generate concerns about stability and security in the Arctic for the littoral states as well. These countries, while small in size and power, are important players in the region and the Arctic Council. As tensions between the two former superpowers mount, these smaller nations have started a process to review and revise their security and defence programmes. They are building plans to modernise and enhance their capabilities in the region. At the same time, they have called on both the United States and Russia to develop the Arctic together and to ensure that the Arctic remains a region of low political tension.

For Russia, the Arctic presents an opportunity to build/open new shipping routes from Asia to Europe and further on to North America. This not only provides Russia with economic opportunities to enhance its trade, it also allows it to deepen its relations with the other countries that would like to use this new sea route. While the opening of the NSR is likely to reduce the time taken for container shipment and, thus, cut costs, environmentalists are worried about the effects of the growing container traffic in an already fragile environment. The movement of ships and the waste they generate will further add to the warming of the Arctic waters. There is also the fear of an oil spill that would not only damage the environment but would be expensive to clean up due to the cold climate of the region. As the country with the largest coastline, it will be Russia's burden to be the first to respond to a crisis in the Arctic.

68. In 2017, US President Donald Trump lifted the ban on drilling in the Arctic, paving the way to competition in the region.

The NSR is not a viable option as yet with the sea ice posing a major hurdle to the movement of ships. The floating blocks of ice require not just specialised ships but well-trained captains and crew to navigate the Arctic.

Russia, as the country with the largest coastline, would, by default, need to be well prepared to handle the calls for search and rescue. It is the country that has the largest number of ice-breakers operational in the Arctic waters, and can provide assistance to a ship in need very quickly. It also has the expertise in terms of personnel to operate in the harsh climate of the Arctic. It is further enhancing its capabilities for modernisation and development of the infrastructure of the Arctic transport system and the fisheries complex in the Arctic zone of the Russian Federation.⁶⁹ However, Russia's growing military infrastructure in the region has caused concern to some of the other members of the Arctic Council. Russia has stated that it is strengthening its coast guard facilities; it has also clearly stated through its policy document for 2020, that the military should be able to provide security in various military-political situations.

For the United States, one hindrance is the fact that the US Congress has not ratified the UNCLOS, which excludes the United States from participating in one of the most important legal frameworks available for adjudication of sovereignty issues and the governance of the Arctic. The United States needs to reconsider its decision to not be part of the UNCLOS. The Department of Defence being the primary agency in securing American interests, would have to work with other departments, notably of commerce and the environment, to coordinate territorial, regulatory and environmental considerations in its missions. The Arctic has a number of tribes that call the region home and

The US Congress has not ratified the UNCLOS, which excludes the United States from participating in one of the most important legal frameworks available for adjudication of sovereignty issues and the governance of the Arctic.

69. The Arctic Database, "Russian Federation Policy for the Arctic to 2020," <http://www.arctis-search.com/tiki-index.php?page=Russian%20Federation%20Policy%20for%20the%20Arctic%20to%202020>. Accessed on January 27, 2019.

their interests require to be taken into consideration as the United States and Russia build their Arctic policies. Both countries need to take climate change and environmental degradation into serious consideration. Apart from the exploration and exploitation of natural resources such as oil and gas, minerals, fishing, bio-proteins, etc., tourism is also becoming a fast income source for the members of the council.

A matter of concern is that all these activities are hampering the fauna of the region. Russia is taking the initiative to protect the fauna such as the polar bear programme in Franz Josef Island. This island was included in the Arctic National Park that aimed at protecting the Arctic eco-system. However, at the same time, Aleksandra Island in Franz Josef Island has built a military infrastructure and upgraded an airport. These developments, along with tourism, disturb the eco-system. However, proper regulations on the inflow of tourists as well as eco-friendly infrastructure can help in the preservation of the region. To what extent Russia or the other members will be able to protect the environment in the region because of the military and non-military activities such as tourism is doubtful, though protection of the environment features in their Arctic policies. Nonetheless, cooperation amongst the stakeholders will be more rewarding than competition.

CONCLUSION: THE NEED FOR COOPERATION

The United States and Russia share similar interests in safeguarding national interests, protecting the environment, managing the Arctic resources in a sustainable manner, development of the community, strengthening scientific research and building international cooperation on matters of the Arctic. Both countries have stressed on the centrality of the Arctic Council for dialogue and cooperation, and, to their credit, have ensured that the council functions without a break. The Arctic Council has evolved to become the most prominent forum for Arctic cooperation on safety, environment and other areas of mutual concern (excluding defence) for the eight Arctic countries and six indigenous people's organisations, and the observer states. Enduring cooperation in the Arctic is best understood when considering the conditions

in which humans—whether indigenous communities, merchant navy crew or members of the military or homeland forces—operate there. The Arctic is a remote region that is difficult to access, dangerous to navigate and arduous to exploit. Cooperation is much cheaper than competition. The challenges to the relatively few present in the region make working together a necessity.⁷⁰ While military cooperation has ended, following the changed status of Crimea, low-level security cooperation remains vital to the regional interests of the Arctic states. There have also been cooperation agreements on search and rescue, oil-spill preparedness and response. In addition, an agreement on research cooperation was entered into in May 2017.

There is also a growing recognition that the Arctic Council provides the United States and its allies with a platform to hold a dialogue with Russia. Having a safe space to engage with Russia in the context of a relationship that is otherwise fraught with tension is a rare and valuable asset. It is difficult to fathom a country's intent when it is closed to the rest of the world. The sort of diplomatic and political interactions that have been maintained in the Arctic area provide an opportunity to explore a closed region. The Arctic nations are not in what may be called Russia's near abroad. Russia does not have to fear losing its influence in the Arctic region as it is exercising influence through its inclusion in Arctic governance institutions. So far, Russia has benefited from the existing legal order in the Arctic and the UNCLOS, and stands to gain little, at this point, from upsetting that order. A dramatic Arctic thaw may fundamentally change this situation in the medium to long-term; there might be a "race for resources" in the Arctic though countries will be challenged by nature itself. As waterways remain treacherous to navigate and hydrocarbon reserves still prove difficult and hazardous to exploit, the Arctic environment, at least in one regard, has not changed: all Arctic nations, including Russia, stand to gain more from cooperation than competition.⁷¹ At the same time, militarisation of the region is also becoming unquestionable.

70. Stephanie Pezard and Abbie Tingstad, "Will the Arctic Remain a Warm Spot in Chilly U.S.-Russia Relations?", <https://www.rand.org/blog/2016/04/will-the-arctic-remain-a-warm-spot-in-chilly-us-russia.html>. Accessed on January 27, 2019.

71. Ibid.

The entry of non-Arctic states such as China⁷² and its claim in the region will open a new dimension of complications for the Arctic, including for Russia and the United States.⁷³

It is safe to say that Arctic cooperation would need Russia's continued cooperation within the region, and to the extent to which its actions continue to be seen as benign by the other states. It would also require the two nations to continue to engage with each other. The Arctic is home to the only shared US-Russian border, and strengthening communication channels and operational protocols is necessary to enforce laws, avoid conflict, and protect sovereignty in this region. Cooperation allows the United States and Russia to work towards developing technologies for the future. With increased competition for the natural resources of the Arctic, it is important for both the United States and Russia to build a policy of cooperation with each other. Regional collaboration between the Arctic states is essential for them to pursue their regional goals and ensure the prosperity of their Arctic populations. Perhaps, the Arctic's harsh environment offers hope for cooperation. As the Law of the Sea scholar Caitlyn Antrim observes, "It is easy to be friends when the elements are your common enemy."

72. China is bidding for the tender to build airports in Greenland, which has not gone down well with Denmark. There is fear within Denmark that if Greenland becomes independent, then China will have more influence over it.

73. It will open an avenue for both cooperation and conflict between Moscow and America. It will be an extension of their clash of interests in the Arctic.

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