

AIR POWER

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• Group Captain Vivek Kapur • Wing Commander BS Nijjar
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CENTRE FOR AIR POWER STUDIES

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To be an independent **centre of excellence on national security** contributing informed and considered research and analyses on relevant issues.

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AIR POWER

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Kriti Singh



EDITOR'S NOTE

The year that has just ended witnessed many notable events. Terrorism and the wars against terrorism have continued unabated, Brexit continues to excite interest, and towards the end of the year, Mr Trump's victory in the US presidential election has spawned innumerable commentaries on what might happen. Most importantly, there are few areas in the world that are tension free. That has now become the norm. The New Year does not appear overly promising. The shape of problems facing the world may change but the tensions are unlikely to ease.

Closer home, our attempt for Nuclear Suppliers Group (NSG) membership was stymied by China, and Indo-China relations saw little improvement although they did not deteriorate. As for Pakistan, its indulgence in state sponsored terrorism against India saw no let-up. A major terrorist attack against a Brigade Headquarters (HQ) at Uri was carried out on September 20, 2016. Nineteen Indian soldiers were killed. Soon thereafter, India cancelled its participation in the South Asian Association for Regional Cooperation (SAARC) Summit to be held in Islamabad. A number of other members followed India's lead and the summit was indefinitely postponed. Our response to the terrorist attack was a very successful 'surgical strike' on the night of September 28/29, against terrorist camps in Pakistan Occupied Kashmir (PoK). The attack led to the inevitable political overtones but, more importantly, in spite of continued denials by Pakistan, our attempts to show Pakistan as the epicentre of terror got some traction. In early December, at the 'Heart of Asia' conference at Amritsar, many telling references to Pakistani support to terrorism were made. In the lead article in this issue of the journal,

Shalini Chawla examines the subject in some detail and opines that the covert war will continue, and recommends how India should respond.

The South China Sea represents troubled waters and the July 12, 2016, award of the Permanent Court of Arbitration in favour of the Philippines has not quelled the situation. The claims and counter claims are still being made. China continues with the creation and militarisation of islands in the area. Of growing interest is the militarisation of Scarborough Shoal that is only 150 miles from Subic Bay in the Philippines. Again, on December 15, 2016, China captured a US underwater drone some 100 miles from Subic Bay. This may be just an instance but it heralds growing tension in the area. There is also perceived reticence on the part of the recently elected president of Philippines to oppose China. The area has great relevance for India and its maritime trade. In a scholarly work, **Vice Adm Pradeep Chauhan** includes many interesting historical aspects and the norms as established by the United Nations Convention on the Law of the Seas (UNCLOS) in 1982. The article is the opinion of an expert and makes compelling reading.

India is very keen that the 'Make in India' programme gathers steam and our aerospace industry matures into a capable and well recognised entity worldwide. The road is difficult and it will be instructive if we could learn from the attempts made by other countries and the success achieved by them. Towards this end, **Gp Capt Vivek Kapur** looks at the development of the aerospace industry in China and Brazil. When we got our independence in 1947, the aerospace industry capabilities of all three countries were essentially comparable. Since then, we have been left way behind. The author argues that we did not have a clear plan, with specific milestones. Possibly, we should not have shied away from foreign help and collaboration with the clear intention to gain knowledge and expertise. Also, we should have invested in building a strong and large team of well-educated and trained professionals by collaboration and creation of indigenous facilities.

In part 2 of a series on the evolution of Indian Air Force (IAF) helicopters, **Wg Cdr Nijjar** discusses the consolidation of capability post 1971. To begin with, the need for more accurate supply drops in the northeast saw the acquisition of more helicopters. As we gained more experience and recognised the many varied uses of helicopters, the acquisition process gained momentum. Helicopters have been used in support of ONGC in the Bombay High area, in Antarctica, with UN missions, as part of the Indian Peace-Keeping Force (IPKF) in Sri Lanka and in support of our troops in Siachin. In all these areas, the crew have rendered great service that has been duly appreciated by all. Helicopters were also used extensively during the Kargil operations although their use in a combat role was discontinued very early. Since then, many accretions have been made and many more have been ordered. We will soon have a varied and extremely capable helicopter force.

The dangers of terrorists acquiring fissile material and using it as a Radiological Dispersal Device (RDD) are serious. Arms control got a fillip with President Obama's speech in Prague in 2009 where he also highlighted the need to "secure all vulnerable nuclear material". Since then, four Nuclear Security Summits have been held, with the last in 2016. **Sitakanta Mishra** explores what transpired at the summits and suggests a way forward. It is in everyone's interest to maintain the security of nuclear material but the issue is still work in progress.

Hina Pandey assesses how the US-Iran relations, particularly in the nuclear field, will play out in the coming years. The nuclear deal between Iran and the P5+1 was signed on July 14, 2015. It was assessed that the deal pushed back Iranian plans, if any, to produce a nuclear weapon, by at least ten years. There are some in the US who were against the deal and now want to abrogate it. Abrogation of the treaty will be a poor outcome that would probably please Israel but, if as a result, Iran felt that it was free to pursue the making of the bomb, a serious avoidable situation could result in the Middle East. Also, it is uncertain how the new dispensation in the White House will react to the situation.

In the last article in this issue, **Kriti Singh** looks at the role of the media in cultivating perceptions through a case study of US Psychological Operations (PSYOPs). Disinformation has been part of the military lexicon for a very long time but with technology, the impact of the media has become much stronger. The media is now a powerful tool to effect disinformation. Similarly, PSYOPs is a time-tested approach to war-fighting. The object is to confuse and adversely impact morale. Again, the media can play an important role. In an interesting and educative article, the author expounds the need for care and how to discern fact from fiction.

Finally, best wishes for the New Year to all our readers.

Happy reading

A handwritten signature in black ink, appearing to read 'Kriti Singh', with a small horizontal line underneath the final letter.

URI ATTACK, INDIA'S RESPONSE: WHAT NEXT?

SHALINI CHAWLA

Simmering tensions of varying intensity between India-Pakistan are not new to the South Asian region. Islamabad's rather widely acknowledged support to non-state actors against India is also not new. What is different today is India's diplomatic and military posture to counter Pakistan's strategy of pursuing proxy war, which it has followed for more than six decades. Islamabad seems to be confident of its approach of following a sub-conventional war against India and shielding it with a widely proclaimed 'first use' nuclear doctrine (unwritten!) and constant denial of its acts. India's reaction to the Uri terrorist attack is a distinct departure from the strategic position it had adopted in the past. India's restrained positioning as a responsible power has been misunderstood by the Pakistani leadership as lack of political will and military capability.

THE URI ATTACK AND INDIA'S RESPONSE

On September 20, in a major terrorist operation conducted by the Jaish-e-Mohammad terrorists, 19 Indian soldiers died near the Line of Control (LoC) in a highly guarded army camp in an Indian Army Brigade Headquarters in Uri. Once again, the repeat of a familiar sequence of events was witnessed – a terrorist act conceived in, and supported from, the Pakistani soil, with the Indian government finding proof of Pakistan's complicity but the Pakistan government denying its involvement in the attack. Pakistani Prime Minister

Dr **Shalini Chawla** is Senior Fellow at the Centre for Air Power Studies, New Delhi.

The global condemnation of the terrorist attack in Uri and the support for India rendered Pakistan's attempts to internationalise the current unrest in Kashmir ineffective.

Nawaz Sharif claimed that India was behaving in an "irresponsible manner" by blaming Pakistan without any evidence. The Uri attack generated tremendous anger within India and the much expected unanimous opinion in India was that New Delhi needs to respond to Pakistan's acts of terror.

The global condemnation of the terrorist attack in Uri and the support for India rendered Pakistan's attempts to internationalise the current unrest in Kashmir ineffective. Islamabad, till now, has managed to use 'denial' somewhat successfully over the past decades. It was rather 'surprising' for the Pakistani military leadership to receive widespread international criticism for Uri. Nawaz Sharif, in his attempt to balance the adverse international reaction to the attack, said that the incident in Uri was a reaction to the unrest in Kashmir.

New Delhi acted systematically in exposing Pakistan, and launched a diplomatic offensive against it at the national, regional and global levels. India was blunt in exposing Pakistan after the Uri attack. Exercising its right of reply during the General Debate of the 71st session of the UN General Assembly on September 21, the Indian representative said:

The terrorist attack is part of a trail of a continuous flow of terrorists trained and armed by our neighbour and tasked to carry out terrorist attacks in my country.What we see in Pakistan... is a terrorist state, which channelises billions of dollars, much of it diverted from international aid, to training, financing and supporting terrorist groups as militant proxies against its neighbours.¹

External Affairs Minister Sushma Swaraj, at the UN General Assembly on September 26, called for the global isolation of Pakistan and said, "Here

1. "India UN Secretary Eenam Gambhir's reply to Nawaz Sharif's UNGA Speech". See, <https://www.youtube.com/watch?v=Tbi5XPcr9dc>. Accessed on October 1, 2016.

are nations that still speak the language of terrorism, that nurture it, peddle it, and export it. To shelter terrorists has become the calling card of these nations. We must identify these nations and hold them to account. These nations, in which UN designated terrorists roam freely, lead processions and deliver their poisonous sermons of hate with impunity, are as culpable as the very terrorists they harbour. Such countries should have no place in the comity of nations.”²

Pakistan’s position is weakening as the major powers are seeking increasing engagement with India, which is not only a growing economy, but has also, over the decades, proved to be a responsible state, with strategic restraint.

Following the Uri attacks, India has been very actively talking about the global isolation of Pakistan. The Uri attack was globally condemned and India did get the support of the international community on this front. Pakistan holds a rather contradictory position where, on one side, it does not want to believe that global isolation against it is gaining momentum, and, on the other, it portrays its victimhood, calling this an Indian conspiracy to degrade the country. Pakistan’s position is weakening as the major powers are seeking increasing engagement with India, which is not only a growing economy, but has also, over the decades, proved to be a responsible state, with strategic restraint.

Pakistan has been recipient of lavish US military and economic assistance post 9/11. However, in the recent past, on multiple occasions, Washington had warned Pakistan to alter its strategy of supporting terrorism. One of the most noticeable warnings was issued ahead of President Obama’s visit to India in January 2015, when the US asked Pakistan to ensure that there was no cross-border terror incident during the trip.³ Following the Uri attack, US National Security Adviser Susan Rice called National Security Adviser Ajit Doval and reiterated that the US expects Pakistan to “take effective action to

2. Smt Sushma Swaraj’s speech at the 71st session of UNGA in New York: 26.09.2016. See https://www.youtube.com/watch?v=_JVlkSPW23M. Accessed on October 3, 2016.

3. “No Terror During Obama India Trip, US Warns Pak” *The Times of India*, January 19, 2015, <http://timesofindia.indiatimes.com/india/No-terror-during-Obama-India-trip-US-warns-Pak/articleshow/45935445.cms>. Accessed on January 20, 2015.

combat UN-designated terrorist entities, including LeT, JeM, and affiliates.”⁴

The statements by France, Russia, Germany and Japan condemning the attack also stood in support of India, opposing Pakistan's support to terrorism.

Russia said, “In view of the attack on the Indian air base in Pathankot in January this year, we note with concern the resurgence of terrorist attacks near the Line of Control. It is alarming and, according to New Delhi, the attack on the military unit near the town of Uri was committed from the territory of Pakistan”.⁵

France issued a statement, standing on India's side, “More than ever, we stand alongside India, France's strategic partner, to fight against this scourge.....We call for decisive actions to be taken within the respect of international law against terrorist groups targeting India and in particular, Lashkar-e-Tayebba, Jaish-e-Mohammad and Hizb-ul-Mujahideen”.⁶

Germany voiced its support for India's position on cross-border terrorism, “Germany stands firmly on the side of India in the fight against terrorism. Every country has the responsibility to take decisive action against terrorism, which emanates from its territory.”⁷

Adding to the discomfort of Pakistan was the condemnation from major players in the Organisation of Islamic Conference (OIC) grouping: Saudi Arabia, United Arab Emirates (UAE), Qatar and Bahrain. The OIC has been a critical group which has traditionally supported Pakistan on the Kashmir issue. The Indian media reported that all these countries issued statements in support of India, without directly naming Pakistan. Saudi Arabia, which has been Pakistan's critical partner, conveyed, “strong condemnation and denunciation of the terrorist attack”.⁸ The UAE also condemned the attack

4. “US Security Advisor Calls Ajit Doval, says ‘Expect Pakistan to Take Action Against Terror’,” *The Indian Express*, September 29, 2016, <http://indianexpress.com/article/india/india-news-india/uri-attack-susan-rice-ajit-doval-kashmir-3055437/>. Accessed on October 2, 2016.

5. Shyam Balasubramanian, “Condemning Uri Terror Attack, France, Russia Score Direct Hits Against Pakistan”, *The Times of India*, September 21, 2016.

6. Ibid.

7. Ibid.

8. Shubajit Roy, “OIC Members Join Chorus Against Uri Attack”, *The Indian Express*, September 21, 2016.

and expressed “solidarity and support to all actions it(India) may take to confront and eradicate terrorism”.⁹

The countries in the South Asia region stood in support of India’s position and the scheduled South Asian Association for Regional Cooperation (SAARC) Summit (2016), to be held in Islamabad, was cancelled due to the boycott by all the member nations because of the lack of a “conducive atmosphere”. Bangladesh government directly pointed at Pakistan in official communication to the SAARC chair, Nepal, and said, “The growing interference in the internal affairs of Bangladesh by one country has created an environment which is not conducive to the successful hosting of the 19th SAARC Summit in Islamabad in November 2016.”¹⁰

Afghanistan remains restive and unstable due to Pakistan’s desire to create, and sustain, strategic depth. Hitting out directly at Pakistan, the Afghan Ambassador to India, Shiada Mohd Abdali, said, “These terrorist groups, in my opinion, are all coming from the same sources but with different names, and thus, India-Afghanistan and the world community should come up with a joint strategy to fight terrorism out....It is a matter of great sadness, we condemn this strongly.”¹¹

INDIA’S MILITARY RESPONSE

On September 29, the Indian government announced that the Indian Army had conducted surgical strikes across the Line of Control (LoC) on the night of September 28/29, 2016, targeting terrorist launch pads. An official statement released by New Delhi confirmed that there were no aerial strikes and no helicopters were used during the surgical strikes. The details of the operation were not released by the Government of India due to security considerations. India’s robust response was also a cumulative build-up to

9. Ibid.

10. Smita Sharma, “SAARC Summit: Afghanistan, Bangladesh, Bhutan Join India in Boycott; Pakistan Isolated”, *India Today*, September 28, 2016, at <http://indiatoday.intoday.in/story/saarc-bangladesh-india-pulls-out-pakistan-terrorism-islamabad/1/774981.html>. Accessed on October 5, 2016.

11. “Uri Attack: Afghan Envoy Calls for a Joint Strategy to Fight Terrorist Groups”, *Asian News International*, September 20, 2016, <http://www.aninews.in/newsdetail-MTA/MjgwMzc0/uri-attack-afghan-envoy-calls-for-joint-strategy-to-fight-terrorist-groups.html>. Accessed on September 23, 2016.

the series of terrorists attacks which have been taking place across the LoC in the recent past.

Director General Military Operations (DGMO), Lt Gen Ranbir Singh, announced on September 29, 2016:

Despite our persistent urging that Pakistan respect its commitment made in January 2004 not to allow its soil or territory under its control to be used for terrorism against India, there has been no let-up in infiltration or terrorist actions inside our territory..... Based on very credible and specific information which we received yesterday that some terrorist teams had positioned themselves at launch pads along the Line of Control with an aim to carry out infiltration and terrorist strikes in Jammu & Kashmir and in various other metros in our country, the Indian Army conducted surgical strikes last night at these launch pads.....During these counter-terrorist operations, significant casualties have been caused to the terrorists and those who are trying to support them.¹²

Pakistan denied the surgical strikes and termed it as Indian propaganda. A military statement said, "The notion of a surgical strike linked to alleged terrorists bases is an illusion being deliberately generated by India to create false effects."¹³ It went on to say, "This quest by the Indian establishment to create media hype by rebranding cross-border fire as a surgical strike is fabrication of the truth. Pakistan has made it clear that if there is a surgical strike on Pakistani soil, the same will be strongly responded."¹⁴

Islamabad had little choice but to deny India's surgical strikes. The completely unexpected response from New Delhi actually challenged Pakistan's nuclear doctrine which has very often asserted 'first use' in case of any conventional move/response by India, projecting an extremely low threshold. The Pakistani

12. "Transcript of Joint Briefing by MEA and MoD (September 29, 2016), Ministry of External Affairs, September 29, 2016, http://www.mea.gov.in/media-briefings.htm?dtl/27446/Transcript_of_Joint_Briefing_by_MEA_and_MoD_September_29_2016, Accessed on September 30, 2016.

13. "Army Rubbishes Indian 'Surgical Strikes' Claim as Two Pakistani Soldiers Killed at LoC", *Dawn*, September 29, 2016, <http://www.dawn.com/news/1286881>. Accessed on October 1, 2016.

14. *Ibid.*

military leadership's acceptance of India's surgical strikes would have increased pressure on the military to take action against India. Pakistan military had suffered humiliation and loss of trust within the country after the killing of Osama bin Laden in 2012. The military regained its image and prestige in the last four years with Gen Raheel Sharif coming into power. Gen Raheel Sharif had a strong anti-India agenda, which was strengthened by the fact that his uncle and brother were killed in the 1965 and 1971 Wars respectively. Sharif had projected himself as a crusader against terrorism and corruption, and was extremely proud of the anti-terror Operation Zarb-e-Azb, launched on June 15, 2014, in North Waziristan against the Tehrik-e-Taliban Pakistan (TTP). He is popular in Pakistan, enjoyed a larger-than-life status but his inflated image received a setback with India's counter-terror strikes.

The Uri attack received widespread global condemnation and, much to Islamabad's surprise, world opinion seemed to be altered against Pakistan. Islamabad, at this point of time, would not have liked to escalate tensions when it was globally recognised as the centre of extremism. Recognition of the surgical strikes would also counter Pakistan's consistent denial of the presence of terrorist launch pads in Pakistan Occupied Kashmir (PoK). Therefore, the logical choice for the Pakistani leadership was to deny India's reaction.

India's reaction and successful surgical strikes have multiple connotations:

- For the first time, it raised the cost for Pakistan for pursuing terrorism as a foreign policy tool against India.
- It challenged a rather historic notion and belief (within Pakistan) that India lacks the political will to react to Pakistan's acts of terror.
- It was crucial in uplifting the morale and confidence of the people and armed forces in India.
- Pakistan has been in constant denial of the terror acts and has also maintained a stance that it has little control over the terror outfits. Hence, India was left with no choice but to act towards the anti-India groups based on the Pakistani soil.
- The Indian military response challenged Pakistan's repeated posturing of irrational and unpredictable behaviour, especially its nuclear positioning which projects a low threshold.

Pakistan has struggled with its insecurities from the time of its creation. Its deep identity crisis and the dominant military lobby never allowed the perceived threat perceptions to settle down and for it to function as a normal state.

PAKISTAN'S INDIA STRATEGY

Reaction to the Uri incident was unexpected for Pakistan, and India has managed to raise the cost for Pakistan's strategy of using terrorism as a policy tool. But the deeper question is: will India's reaction to the Uri attack alter Pakistan's grand strategy? Will Pakistan alter its strategic calculus which it has pursued for decades now? What would be Pakistan's behaviour in the near future? It would be useful to analyse Pakistan's strategy against India to be able to understand Pakistan's future behaviour.

Pakistan has struggled with its insecurities from the time of its creation. Its deep identity crisis and the dominant military lobby never allowed the perceived threat perceptions to settle down and for it to function as a normal state. The threat of Indian domination was propounded and maintained from the very beginning. Pakistan's prime objective as a state has been to achieve parity with India. Since it has been unable to do so, 'undermining' India's growth became the focus of Pakistan's national strategy.

For a comprehensive understanding of the Pakistani strategy against India, it would be useful to look into all three dimensions of the strategy which have a direct correlation.

Pakistan has opted for a three-dimensional approach in its strategy towards India:

- **Conventional Level:** Pakistan has tried hard to attain parity with India in terms of its military build-up. The military leadership in Pakistan has focussed primarily on defence build-up and modernisation, highlighting the strategic threats in the region. *Kashmir* has eventually become more an excuse than the real cause, and the military in Pakistan has boosted the issue within the country, adding to the insecurity of the nation and building a legitimate basis for weapons modernisation. Pakistan has maintained a high defence budget, at an average rate of 5.5 per cent of

the Gross Domestic Product (GDP), which, according to a retired Air Marshal of the Pakistan Air Force (PAF), did not include major weapon systems.¹⁵

This insecurity has been further deepened by the fragmentation of the Pakistani society as the frequently changing regimes in Pakistan and fragile democratic structure have failed to generate a sense of nationalism in the country. Islamic extremism and *jihadi* terrorism have continued to prosper in the country, creating a deep armament culture in the country.

The basic objectives shaping the arms acquisitions of Pakistan are as follows:

- From the time of its creation, Pakistan has been highly suspicious of India and the adversarial relationship with India has played a major role in the formation of its threat perceptions. The commonly accepted notion is that India, with its hegemonic ambitions, would dominate the South Asian region. The dominant military lobby in Pakistan has aggressively propagated the Indian threat within Pakistan to legitimise the country's high defence spending, and, on the international front, to support the acquisition of high technology weaponry. This also interacts with, and promotes, the military's special and dominant role in Pakistan's power structure.
- Pakistan has been constantly engaged in the battle of matching Indian conventional military superiority. The strategic aims, as brought out in the Pakistani writings, are: "to strengthen national power; to prevent open aggression by India; to induce India to modify its goals, strategies, tactics and operations; to attain a position of security or, if possible, dominance,

The dominant military lobby in Pakistan has aggressively propagated the Indian threat within Pakistan to legitimise the country's high defence spending, and, on the international front, to support the acquisition of high technology weaponry.

15. Air Mshl A. Rashid Shaikh, PAF (Retd) "Security and Development: Hobson's Choice", *Defence Journal*, vol. XXI, May-June 1996, p.13, as cited in Jasjit Singh, "Trends in Defence Expenditure", *Asian Strategic Review 1998-99* (New Delhi, Knowledge World, 1999). p. 75.

which would enhance the role of other (non-military) means of conflict; to promote and capitalise on advances in technology in order to reach parity or superiority in military power;”¹⁶

- Pakistan has relied more on high technology weapons to seek competitive military advantage. The desire to acquire high technology weapons has been very strong in the Pakistan military and the alliance with the United States has provided it with opportunities to acquire high technology weapons.
- Pakistan has believed in offensive aggressive strategies and has had a deep-rooted belief that by going on the offensive, smaller size forces in history have won wars against bigger enemies. All the four wars which Pakistan has fought with India (in 1947-48, 1965, 1971 and 1999), have been initiated by Pakistan. The war in 1971 was caused by Pakistan's internal instability. But the actual war was initiated by Pakistan with a preemptive air strike against Indian Air Force (IAF) bases on December 3. In addition, it adopted the offensive route for its covert war through terrorism in Jammu and Kashmir (J&K) since 1988 (besides that in Punjab in 1983-93).

The Military Build-up in Pakistan

The defence build-up in Pakistan has been facilitated by mainly three factors:

- Its military's alliance with the United States
- Pakistan's consistently growing relationship with China
- Financial autonomy of the military within Pakistan

American Alliance and Pakistan's Military Modernisation

During the early decades, Pakistan acquired arms mainly from the United States of America (for high-technology systems) and China (for low cost but efficient systems), although a certain proportion was contributed by France. In fact, the massive US arms aid to Pakistan in the late 1950s provided it with both the incentive to initiate the 1965 War as well as

16. Ross Masood Husain, "Threat Perception and Military Planning in Pakistan; The Impact of Technology, Doctrine and Arms Control", in Eric Arnett, ed., *Threat Perception in Pakistan* (SIPRI Publications), p.130.

demonstrated the philosophy of high-technology weapons providing a competitive advantage against India which, in any case, was saddled at that time with obsolete systems being employed after the war in 1962. The classic case was the shooting down of the first four Vampire vintage aircraft by a combination of F-104 Starfighters and F-86 Sabres on the opening day of the war, forcing India to withdraw these and older fighters from combat, thus, reducing the numerical advantage that India was supposed to enjoy.

A mutual defence assistance agreement signed on May 19, 1954, between the US and Pakistan was the first formal bilateral security commitment between the two countries which also provided a legal basis to the US military assistance.¹⁷

American sanctions after the 1965 War suspended the US arms supply, but the Soviet invasion in Afghanistan in December 1979 led the Americans to review their South Asian policy and, consequently, Pakistan entered into a new engagement with the US. Pakistan was declared as a “frontline state” and, in return, received massive military aid.¹⁸ Gen Zia-ul-Haq managed to negotiate an elaborate military and security-related aid package of \$3.2 billion. The US military assistance programme included the sale of 40 F-16 Falcon multi-role combat aircraft, one of the most advanced military aircraft in the world at that time. Pakistan also received the Harpoon anti-ship missiles, upgraded M-48 tanks, tank recovery vehicles, towed and self-propelled field artillery, attack helicopters, and second-hand destroyers.¹⁹ The second US package worth \$4.02 billion commenced in 1987 but was suspended after the US arms embargo imposed in 1990 due to Pakistan crossing the “red line” to acquire nuclear weapons capability.

17. Dennis Kux, *The United States and Pakistan, 1947-2000* (Oxford: Oxford University Press, 2001), p. 67.

18. Immediately after this development, President Carter unveiled his doctrine, which included, “assembly of a Rapid Deployment Force (RDF), increase of naval presence on Indian Ocean, a collective security framework in the region and a commitment to the defence of Pakistan by transfer of significant amount of weapons and dollars.” *The New York Times*, January 25, 1980, as cited by Hamid Hussain, “Tale of a Love Affair That Never Was: United States-Pakistan Defence Relations”, at <http://www.defencejournal.com/2002/june/loveaffair.htm>

19. Rodney W. Jones, “The Military and Security in Pakistan”, in Craig Baxter ed., *Zia’s Pakistan, Politics and Stability in a Frontline State*, (Lahore: Vanguard, 1985), p.83.

After the September 11, 2001, terrorist attacks on the United States, Pakistan came under strong pressure to cooperate with the United States in its war against the Taliban and Al Qaeda in neighbouring Afghanistan. Pakistan's alliance with America post 9/11 lifted its economy out of the doldrums, provided the opportunity to grow, and again opened the long desired supplies of defence equipment from the United States. The US designated Pakistan as a "major non-NATO ally" in March 2004, giving Pakistan a distinct advantage in terms of obtaining greater military and security assistance. Pakistan received approximately \$ 33 billion from Washington post 9/11, with a significant portion of the aid dedicated to fulfilling Pakistan's security requirements.²⁰

Chinese Assistance in the Military Build-up of Pakistan

The China-Pakistan alliance is said to be higher than the mountains and deeper than the seas. Pakistan's relationship with China, which formalised with a major step by the two countries in 1963 with the signing of the Shaksgam Valley agreement, has continued to grow consistently, given Beijing's strategic interests in the region and its strong desire to neutralise India's growth. For Pakistan, Beijing served the purpose of not only fulfilling its defence requirements but also providing Islamabad diplomatic support against India and the United States on various occasions.

Pakistan and China share a strong strategic partnership and friendship. There is a growing consensus within Pakistan, not only amongst the ruling elite but also the masses, that their relationship with China is indispensable because of sustained Chinese military, strategic and economic assistance and also their belief that Pakistan and China share common strategic interests. Over the years, China has provided Pakistan a wide range of conventional weapon systems, and Pakistan's nuclear and missile build-up has primarily been with Chinese assistance. Pakistan turned towards Beijing as a trusted 'all weather friend' in dealing with India; China, on the other hand, found a feasible option in Pakistan to contain India and also the expansion of the US'

20. For details, see "Direct Overt U.S Aid Appropriations for the Military Reimbursements to Pakistan", FY2002-FY2017, Prepared by the Congressional Research Service, February 24, 2016, <https://www.fas.org/sgp/crs/row/pakaid.pdf>. Accessed on March 30, 2016.

dominance in the region. The two nations have served each other's strategic interests well, and over the past six decades, the alliance has grown in multiple dimensions.

Chinese Nuclear and Missile Assistance to Pakistan

Chinese support to Pakistan has been on three critical fronts: one of the most important outcomes of the China-Pakistan strategic nexus is China's extensive support to Pakistan in building up its nuclear capabilities. Nuclear proliferation analyst Gary Milhollin, was not wrong when he argued, "If you subtract Chinese help, there wouldn't be a Pakistani program."²¹

China, allegedly, provided direct assistance to Pakistan's nuclear weapon programme in the past, which included the supply of warhead designs, Highly Enriched Uranium (HEU) and a variety of nuclear products and services. Pakistan's missile development programme has been carried out with Chinese assistance and, to some extent, help from North Korea, after the United States imposed sanctions on China. The Chinese missile assistance to Pakistan ranges from providing equipment and training to transferring the complete missiles. The Chinese M series of Short Range Ballistic Missiles (SRBMs) commenced development in the early 1980s and the three versions are known as the M-9, M-11 and M-18. Pakistan acquired a series of missiles – the Hatf-I, Hatf-II, Hatf-III, Hatf-IV, Hatf-V and Hatf-VI – which are reportedly variants of the Chinese M-11 and M-18.

Chinese Supply of Conventional Weapons to Pakistan

China began arms aid to Pakistan in 1965 after the US embargo on it, when the leadership in Islamabad felt the need of diversifying the sources of

China is today Pakistan's largest defence supplier. Pakistan has not only imported the maximum types and numbers of defence equipment from China but managed to build up significant indigenous defence capability with the Chinese assistance.

21. Gordon Corera interview with Gary Malhollin, Washington, D.C., December 14, 2005, as cited in Gordon Corera, *Shopping for Bombs* (New Delhi: Foundation Books, 2006), p. 45.

The CPEC carries immense potential to upgrade and revive Pakistan's infrastructure and also cater to Islamabad's energy crisis. The corridor which involves building of highways, railway lines and oil and gas pipelines, will connect Pakistan's Gwadar port to China's autonomous region of Xinjiang.

weapon supply. Undoubtedly, China is today Pakistan's largest defence supplier. Pakistan has not only imported the maximum types and numbers of defence equipment from China but managed to build up significant indigenous defence capability with the Chinese assistance. Chinese equipment turned out to be much cheaper compared to equipment from the West, and the Chinese sales were further facilitated by availability of credit from China on relaxed repayment terms. In the 1960s, and later in the 1970s, Pakistan received interest free economic aid and also a significant amount of free weapons

from China, and became the only non-Communist Third World country to receive generous assistance from it. Chinese military assistance came in not only in the form of arms but also development of infrastructure for repair and overhaul. The Chinese supplies included: F-6s, T-59 Main Battle Tanks (MBTs), T-60 light tanks and T-63 light tanks and Type 531 Armoured Personnel Carriers (APCs).

Sino-Pakistan defence collaboration further flourished under the shadow of the US sanctions in the 1990s and, in the process, the two nations entered into deals for the co-development of a fourth generation fighter aircraft, the JF-17 (earlier called the FC-1); the K-8 jet trainer had earlier been jointly produced. Pakistan also signed the deal for the purchase of two squadrons of the Chinese J-10. Pakistan will be the first buyer for the J-10 which was initially set to be sold to Iran. Pakistan's former Chief of the Air Staff, Mahmood Ahmed, in an interview to *Jane's Defence Weekly*, said that the J-10, along with the JF 17, would form the backbone of the PAF.²² Pakistan has also managed to acquire the Chinese Airborne Warning and Control System

22. Interview, Air Chief Mahmood Ahmed, Pakistan's Chief of the Air Staff, *Janes's Defence Weekly*, April 4, 2007, p.34.

(AWACS) (ZDK-03). On the naval front, the significant acquisitions include the C-802/CSS-N-8 anti-ship missiles and 4 Jiangwei II class frigates.

China's Support to Pakistan's Arms Industry

The 1980s and 1990s saw a wide expansion of defence production activities within Pakistan and a large number of varied projects were undertaken in this period. China has been the main support in the establishment of defence production units in Pakistan, often provided free of cost. Some of the major defence production units established with the Chinese assistance are: Heavy Industries Taxila (HIT), F-6 Rebuild Factory (F-6 RF) and Heavy Mechanical Complex (HMC) Ltd.

Gwadar port has been developed with Chinese assistance and the primary project has been the construction of a deep sea port, expanding its maritime role, to allow trade to and from the landlocked Central Asia. Gwadar offers the geoeconomic and geostrategic pivot to China and Pakistan. It is strategically located on the southwestern coast of Pakistan between three increasingly important regions of the world: South Asia, Central Asia and oil-rich Middle East. Gwadar, which overlooks the Gulf of Oman and the entrance to the Persian Gulf region, is just 180 nautical miles (nm) from the Strait of Hormuz. Thus, Gwadar would eventually emerge as the key shipping hub, providing mass trade to the Central Asian Republics (CARs) through Pakistan and China, and an important naval base.

The China-Pakistan Economic Corridor (CPEC) which involves an investment of over \$45 billion, was inaugurated in August 2013, and is viewed as a game-changer which will substantively benefit both Pakistan and China. The CPEC carries immense potential to upgrade and revive Pakistan's infrastructure and also cater to Islamabad's energy crisis. The corridor which involves building of highways, railway lines and oil and gas pipelines, will connect Pakistan's Gwadar port to China's autonomous region of Xinjiang.

Military's Financial Autonomy

The military has managed to maintain a financially autonomous structure for itself and has complete control over the national policies relating to defence

spending. This has certainly facilitated Pakistan's defence modernisation over other national objectives. Pakistan had maintained defence spending at the rate of 6 per cent of the GDP till the late 1990s, even when the GDP growth was extremely low and Pakistan was being termed a "failing state". Defence requirements and allocations got precedence in the national spending of Pakistan from the beginning by every successive regime, regardless of it being civilian or military. The defence planners in Pakistan have constantly justified the high defence allocation by highlighting the perception of threat from India. Since the inception of Pakistan, 'fear of India' has been generated in the minds of the masses which has helped to justify the maximum share for defence allocations from the national income. Successive regimes in Pakistan, whether political or military, have focussed on issues like Kashmir to gain public support in order to further their respective political goals. Not only on the national front, but also at the international level, the perception of threat has always been used as an argument to convince foreign aid donors for financial and military assistance and also to prevent any cut in the defence expenditure.

Sub-Conventional Level: Pakistan began its covert war operations as early as 1947, by launching its first aggression in the name of a tribal revolt. It exercised the covert option in the 1965 War and also during Kargil in 1999. It has relied on the strategy of terrorism for more than six decades. Pakistan military has pursued a covert war strategy with remarkable persistence over the last six decades, although the tactics of the covert war have been modified and evolved.

Pakistan opted for covert war in 1947 when the Pakistan Army, with the approval of the political leadership, decided to exploit a local uprising which had broken out in the *jagir* of Poonch, taking the initial step of covert warfare. It then accelerated its infiltration activities and in order to carry out guerrilla warfare operations, sent a large number of Pathan tribesmen, Punjabis and other Pakistani nationals to defeat the State Forces.

The aggression of 1947-48, formed the basic guideline for Pakistan's future military strategy against India. The war established the pattern of Pakistan's

covert war strategy as an important component of its grand strategy.²³ The salient aspects of this strategy in the 1947-48 War may be summed up as follows:

- Employment of irregular armed fighters composed of army personnel on leave, demobilised/retired soldiers/local and tribal individuals/groups.
- Weapons and logistics support provided by the Pakistan government under the overall guidance of the Pakistan Army.
- The irregular fighters were reinforced with regular Pakistan Army units and formations to avoid their defeat by the Indian military forces defending their territory.
- Pursuit of a covert war, including with regular military forces, with plausible deniability of direct involvement.
- Political ideological formulations to provide justification for the war as an indigenous uprising, freedom struggle, etc. to which Pakistan provided “political and moral support”.

The Pakistan Army leadership learnt many lessons to improve its strategy. While the Pakistani covert operations in the 1950s and then the early 1960s became far more organised, they actually yielded fewer results because the people did not support them.

The lack of success in the covert operations in Kashmir Valley were adding to frustration and impatience in Pakistan. In 1964, Pakistan developed a strategy around Operation Gibraltar as the covert component and Grand Slam as the overt armoured and artillery thrust into J&K. The tactical aims of Operation Gibraltar differed from the war in 1947. The Indian Army responded robustly and was soon able to cut off the militants’ infiltration routes and supply lines. The irregular fighters had to face the Indian troops, and those who survived, were tracked down with the help of the local political activists.²⁴ Operation Gibraltar was followed by Operation Grand Slam, as planned, in which the Pakistan Army launched a major armour-cum-

23. For details on Pakistan’s covert war, see Shalini Chawla, *Pakistan’s Military and its Strategy* (New Delhi: Knowledge World, 2009).

24. Praveen Swami, *India, Pakistan and the Secret Jihad; The Covert War in Kashmir: 1947-2004*, (London: Routledge, 2007), p.62.

artillery offensive in the Chhamb sector to capture Akhnur. On September 23, the fighting stopped, with both India and Pakistan claiming victory. India actually had reason to celebrate as it managed to achieve the objective of defending Kashmir against the Pakistani invasions, both covert and overt.

In the 1970s, Pakistan moved towards increasing Islamisation and the religious ideology, initially promoted by Zulfikar Ali Bhutto, was followed by the aggressive fundamentalist policies of Gen Zia-ul-Haq. The loss of East Pakistan and the rise of insurgency in Baluchistan led the military and political leadership in Pakistan to intensify the religious ideology to counter any further division of Pakistan and also to motivate the nation for an aggressive posture against India.

In the 1980s, religious resurgence, coupled with the increasing alienation of the youth for diverse reasons started to grow in Kashmir, and Pakistan's strategy began to concretise. What was happening in Afghanistan and also simultaneously in the Khalistan movement obviously had a direct impact in the Valley. Thus, in the mid-1980s, disturbances in Kashmir were growing with an unusual amount of Jamaat activity, processions and resentment against the Hindus, and the communal divide had started to be a major disturbing factor. In the late 1980s and 1990s, Pakistan became much more active in sponsoring terrorism in J&K. The Inter-Services Intelligence (ISI) initially trained the secular groups in Kashmir and eventually shifted to training of the groups linked to Pakistan's own Islamic parties.²⁵ These Kashmiris drew inspiration from the Muslim brotherhood, regarded the struggle in Kashmir as an Islamic war on national liberation and were extreme in their hatred for India.²⁶ The period after 1988 witnessed shifts in the nature of the covert war in terms of the weapons and strategy used by the Pakistani policy-makers.

In the late 1980s and 1990s, the targets in Kashmir were the security forces, specifically the Indian Army and the Border Security Force (BSF), with Rocket Propelled Grenade-7 (RPG-7) rockets. The terrorists in Kashmir seem to be imitating the Mujahideen tactics in attacking the security forces. The weapons used by the terrorist had undergone a change as Pakistan

25. Ahmed Rashid, *Descent into Chaos* (London: Penguin Group, 2008), p. 111.

26. *Ibid.*

had acquired modern arms in the 1980s to equip the covert fighters in Afghanistan. Although the Central Intelligence Agency (CIA) supplied arms for the Afghan fighters, around 60 per cent were retained by the Pakistan Army. But the most important factor for escalating the covert war in Punjab and J&K was the acquisition of nuclear weapon capability by Pakistan which it perceived as a security guarantee against a robust Indian military response. In the 1990s, the terrorists were much better equipped owing to the following factors:²⁷

- There was significant expansion in the smuggling of high technology weapons from Pakistan into Kashmir and a corresponding change in the tactics used by the terrorists.
- The terrorists in the 1990s were using sophisticated communications systems, including small radios and collapsible solar-panels for reload systems, as well as frequency scanning devices to track the communications systems used by the Indian security forces in the Valley. The modern communication system used by the terrorists is of US/NATO (North Atlantic Treaty Organisation) origin which was initially being used by the Mujahideen in Afghanistan.
- Massive expansion of small arms was experienced, including all types of specialised equipment which was used for the assassination projects.

Thus, the weapons and technology transferred by the United States during the Afghan War in the 1980s became a major asset for the Islamic militants in Kashmir who were also trained in the use of these weapons.

The insurgency in Kashmir became much more organised after 1988. The militants gained experience in Afghanistan and were more professional in carrying out covert warfare. Highly trained Mujahideen, many of them professional Special Forces, and terrorists, joined the fighting in Kashmir. Acts of sabotage increased not only in number but also intensity. The militant acts were responded to violently by the Indian security forces and, consequently, innocent civilians in the Valley suffered.

27. Congressional Record, "Pakistan Supports Terrorist Rebels in Kashmir" by Youssed Bodansky and V Aughn S. Forrest, Extension of Remarks June 1994), at http://www.fas.org/irp/congress/1994_cr/h940622-terror-pak.htm

The Afghan *jihad* strengthened the belief in Pakistan that fighting through irregulars “defeated” the Soviet Union, a superpower. Hence, India could be defeated in Kashmir.

As Ayaz Amir has very rightly said, “Whether any or most of these fighters acquired their combat skills in Afghanistan is a matter of detail. What is important is that their spiritual outlook has been shaped by the Afghan experience which they, and a goodly part of the religious and military establishment in Pakistan, consider to have been a true *jihad*. It was the spirit of *jihad* which drove the Soviet Army from Afghanistan. It is the spirit of *jihad* which can drive the Indian Army from Kashmir. The various schools who subscribe to this thinking consider it an article of faith that the seeds of the break-up of the Soviet Union were sown in Afghanistan. Might not the same happen in Kashmir with similar consequences for India?”²⁸

The Afghan *jihad* strengthened the belief in Pakistan that fighting through irregulars “defeated” the Soviet Union, a superpower. Hence, India could be defeated in Kashmir. Pakistan had been following the strategy of covert war earlier also, but the Afghan War further enhanced the army/ISI capability to wage it.

The Pakistan military has continued to follow the sub-conventional approach through terrorism with consistency. The state has nurtured anti-India groups like the Lashkar-e-Tayyeba (LeT) and Jaish-e-Mohammad (JeM) and continues to support them for its strategic objectives. Post 9/11, when the military was compelled to crack down on the terror groups within Pakistan, the anti-India organisations remained unaffected due to the military’s selective approach in targeting the militants. Despite international condemnation and pressure to ban these organisations, these militant groups continue to flourish on the Pakistani soil. Hafiz Saeed, the founder of the LeT, with a \$10 million bounty on his head, not only continues to operate in Pakistan but is also looked upon as a hero by the society. Although there have been some signs of the state losing its tolerance with Hafiz Saeed, Pakistan continues to fund

28. Ayaz Amir, *Dawn*, June 11, 1999, at <http://www.dawn.com/weekly/ayaz/990611.htm>. Accessed on January 15, 2008.

and train these outfits to operate in the Indian territory. Pakistan's capability to support these outfits has been strengthened with continued support from China which has never questioned Pakistan's strategy of terrorism against India. On the contrary, China has opposed any Indian move that demands action against Pakistan on account of terrorism.

Nuclear Level: Pakistan has been an overt nuclear state for 18 years now and its arsenal has grown considerably in size. Pakistan's expansion of its nuclear arsenal, development of the delivery systems, and adoption of "full spectrum deterrence" does indicate its rather *excessive reliance* on nuclear weapons for its security. Pakistan's nuclear arsenal is on its way to becoming the third largest after that of the US and Russia. Pakistan's induction of Tactical Nuclear Weapons (TNWs) (Hatf-9) signals a dangerous strategy. TNWs not only inject complexities into the existing instability in South Asia, but also, by their nature, these weapons exacerbate enormous command and control challenges. The weapons are vulnerable to falling into the hands of non-state actors after they are deployed, or even, while they are being transported to the battlefield. Pakistan has been very proud of making 'tiny bombs', not realising that these weapons could actually backfire on Pakistan given the nature of the volatility of the state and the rising extremism in the Pakistani society. There have been numerous attacks in the past on the nuclear installations/air bases in Pakistan. The leadership in Pakistan very proudly announces the progress of TNWs with great confidence. TNWs, according to the Pakistani leadership, comprise the biggest deterrent they have against the Indian military forces. Talking about Pakistan's sense of accomplishments in the nuclear programme, Gen Khalid Kidwai said:

It's a comprehensive satisfaction of having taken the Pakistani capability which has been proven by scientists, at a scientific level,and having taken these devices, which were scientific experiments, into an area of

China has never questioned Pakistan's strategy of terrorism against India. On the contrary, China has opposed any Indian move that demands action against Pakistan on account of terrorism.

complete operationalisation, into a vision which has consolidated Pakistan's nuclear capability in a manner that it today possesses a variety of nuclear weapons. In different categories. At the strategic level, at the operational level, and the tactical level.²⁹

The central assumption on which Pakistan has progressed and built up its nuclear arsenal is that a credible nuclear deterrent would compensate for the inferiority of its defence forces. The basic rationale for Pakistan acquiring nuclear weapons has been to neutralise India's perceived conventional military superiority and the way it was employed by it in the 1971 War.

In this respect, Pakistan adopted a doctrine and strategy not very different from that pursued by NATO against the former USSR. Pakistan visualised nuclear weapons as the sole guarantor of its national pride and national survival, and, thus, started to seek Chinese assistance for its nuclear weapon programme in the late 1960s in the aftermath of the US sanctions. Nuclear weapons for Pakistan were seen as a means to neutralise the Indian conventional military superiority, and also a projection of its scientific and technological capabilities.

Pakistan has subsequently endeavoured to use nuclear weapons to carry on, and intensify, its proxy war in Kashmir, claiming the Valley to be the "nuclear flashpoint". Pakistan has managed to pursue its grand strategy to "bleed India through a thousand cuts" under the nuclear umbrella.

Pakistan has tried to project its nuclear assets as an instrument of blackmail. The acquisition of the nuclear capability enhanced Pakistan's capability to wage and escalate the covert war in Kashmir. Pakistan's non-adherence to no first use was believed to serve the objective to deter India from responding with conventional military retaliation. Policy-makers in Pakistan seem to be convinced that they will be able to carry on, or rather accelerate, their activities in Kashmir under the broader threat of using nuclear weapons, if required, and this would constrain India's strategic moves. Although, this

29. Peter Lavoy, "A Conversation with Gen Khalid Kidwai," Pakistan's Command Authority Monitor 360, Carnegie International Nuclear Policy Conference 2015, March 23, 2015, p.6. Accessed on January 1, 2016.

has been the Pakistani thinking for long, it has strengthened tremendously with Pakistan's acquisition of nuclear weapons and announcement of the first use policy.

Pakistan does not have an officially announced doctrine, but statements made by responsible policy-makers in Pakistan have clearly outlined basic elements in its nuclear doctrine. There is an unofficial code adopted by the Pakistani leadership, based on *Indo-centricity*, *credible minimum deterrence* (now *full spectrum deterrence*), *strategic restraint* and *first use*. Very interestingly, and rather ironically, the code asserts on the principles of a peaceful programme revolving more around maintaining a balance against the Indian force build-up, but it includes making a first strike in response to not only a conventional attack by India but also to a threat posed by India. Pakistan has been talking rather often about TNWs which it is confident would deter India from a conventional military response.

IS PAKISTAN READY TO ALTER ITS STRATEGIC CALCULUS?

Pakistan has been most confident of the 'sub-conventional approach' which, in its thinking, is shielded by its nuclear weapons and its excessive reliance on the 'first use' doctrine. Although, Pakistan has been very confident of its nuclear card, it is aware that a covert war could rapidly escalate to an overt war. Thus, the covert war strategy seems to have been constrained below a level that could provoke an Indian military response. India refrained from military action after the Mumbai attacks in 2008 which reaffirmed the popular Pakistani perception of 'lack of will and capability' on India's part. For more than two decades, covert war has been calibrated by the *bleeding through a thousand cuts* philosophy, so as not to excite a major military response and punitive action. Support from the US and China also strengthened Pakistan's psychological capability to conduct proxy war against India.

Six decades of Pakistan's reliance on the centrality of the covert war strategy is unlikely to change in the coming years, although the tactics, intensity and areas of operations may undergo changes. The support to the resurgence of the Taliban in Afghanistan and continuing terrorist violence in J&K and

Pakistan has relied on nuclear weapons and terrorism as a state policy tool and is likely to continue to do so as it has failed to build other strengths or overcome its fundamental challenges.

selected places in India, along with support to Islamic fundamentalism in Bangladesh, which impacts the northeast states of India, are obvious examples of Pakistan's continuance of the covert war strategy.

Pakistan has relied on nuclear weapons and terrorism as a state policy tool and is likely to continue to do so as it has failed to build other strengths or overcome its fundamental challenges. Being crippled with the inherent problems of extremism, unemployment and low growth, Pakistan significantly lags behind India on most of the parameters of national security. Its reliance on terrorism (and nuclear weapons) to wield its power emerges from its internal weaknesses. The youth in Pakistan seem to be trapped in the culture of violence, terrorism, unemployment and, very importantly, an identity crisis.

Despite the inherent weaknesses of the state, the policy-makers in Islamabad seem to be convinced that they can continue their acts of terrorism without fear of Indian retaliation. This notion has been challenged post Uri. The critical question is: what is the strategy Pakistan is likely to adopt now? Will it alter its strategic calculus and rethink its India strategy?

Given the past experience and current scenario in Pakistan, some inferences could be drawn regarding Islamabad's likely behaviour:

- Pakistan will try to escalate covert operations through terrorism with varying intensity. It will to maintain its posture of deniability and continue to support anti-India groups.
- Islamabad's reliance on nuclear weapons is likely to go up with the increasing tensions between India and Pakistan. Projection of irrationality, with a low nuclear threshold, would continue, with 'excessive' reliance on tactical nuclear weapons.
- Pakistan's conventional military capability has gone up significantly in the last two decades and its focus on military modernisation is likely to continue, with consistent Chinese support.

- Although Pakistan would not opt to fight a conventional war with India, given the global scenario, build-up of its conventional capability would boost its psychological will to conduct covert operations.

New Delhi is far ahead of Pakistan in terms of its resources, growth, capability and, more importantly, credibility as a responsible state at the global level.

INDIA'S OPTIONS

India's strategy option would be to exploit the strategic space above terrorism but below the nuclear threshold. India's profile has grown significantly on the global platform and it has the support of major states. New Delhi is far ahead of Pakistan in terms of its resources, growth, capability and, more importantly, credibility as a responsible state at the global level. India, with more than 7 percent growth, is on its way to become an economic giant and certainly does not desire to engage in a conventional war with Pakistan. But this does not in any way signal India's inability to respond militarily. New Delhi has far more at stake as compared to Pakistan, which relies on undermining India's achievements to uplift its image amongst its own people and on the global platform. Pakistan has tried hard to internationalise the Kashmir issue, accusing India of human rights violations, while it has been engaged in a full-fledged insurgency in Baluchistan and the Federally Administered Tribal Areas since the 1940s. The suppression of minorities within the Pakistani state did not change even after the dismemberment of the nation in 1971. Pakistan surely is not ready for any change and is not likely to alter its strategic calculus towards New Delhi.

Sustained actions to strengthen India's response to Pakistan's acts of terror could be the following:

- Any form of India's engagement with Pakistan has to be strictly conditional. The message has to be loud and clear to Pakistan that any economic or diplomatic engagement is not possible as long as the cross-border terrorism sponsored by Pakistan continues.

- Islamabad's posture of deniability cannot be accepted by India and the international community. Pakistan needs to take the responsibility for the terror acts conducted from its soil.
- A diplomatic *blitzkrieg* needs to be maintained against Pakistan to isolate it at both regional and global levels.
- India needs to raise the cost of Pakistan's acts of terror through its diplomatic and military responses.
- Pakistan's all weather friend and ally, China, needs to be persuaded to convince Pakistan to alter its strategic calculus. Beijing has so far maintained silence on Pakistan's acts of terror and has, in fact, opposed any Indian move that demands action against Pakistan on account of terrorism. Last year, in 2015, Beijing blocked India's move at the UN to seek action against Pakistan for releasing Zaki-ur-Rahman Lakhvi, the mastermind of the 26/11 Mumbai attacks. China also blocked India's attempt at the UN to ban Jaish-e-Mohammad chief Masood Azhar. China's all-out support to Pakistan has strengthened Pakistan's will to conduct terrorism against India.
- India's conventional military capability build-up and modernisation has to be kept up to deter Pakistan.

THE SOUTH CHINA SEA: TROUBLED AND TURBULENT WATERS

PRADEEP CHAUHAN

The South China Sea (SCS) is a semi-enclosed sea in the western Pacific Ocean, spanning an area of almost 3.5 million sq km. As shown in Fig 1, it lies to the south of China; to the west of the Philippines; to the east of Vietnam; and to the north of Malaysia, Brunei, Singapore, and Indonesia.

The SCS has been much in the news recently, especially in the immediate aftermath of the judgement delivered by the Permanent Court of Arbitration (PCA) in The Hague on July 12, 2016, on a 15-point case initiated by the Republic of the Philippines, challenging China's claim to what it says are its historic waters, as enclosed by the 'Nine-Dash Line' (depicted in Fig 2). The arbitration award by the PCA, announced on July 12, 2016, was overwhelmingly in favour of the Philippines. In ruling that China's Nine-Dash Line is devoid of legal merit, the PCA scathingly removed the fig-leaf of 'historical' control that had been so brazenly worn by China. Beijing, for its part, has consistently maintained that the PCA has no *locus standi* in this matter and, as such, China would neither take part in the deliberations nor take cognisance of any award arrived at by the PCA.

Vice Adm **Pradeep Chauhan** retired in December 2013 after a distinguished four-decade- long career in the Executive Branch of the Indian Navy, during which he held numerous command and staff appointments, including that of the aircraft carrier, INS *Viraat*. He has since been an active member of the strategic community.

Fig 1: South China Sea



Source: "Limits of Oceans and Seas"; International Hydrographic Organisation Special Publication 23, 1953; available at url: <https://epic.awi.de/29772/1/IHO1953a.pdf>

Fig 2: Nine-Dash Line

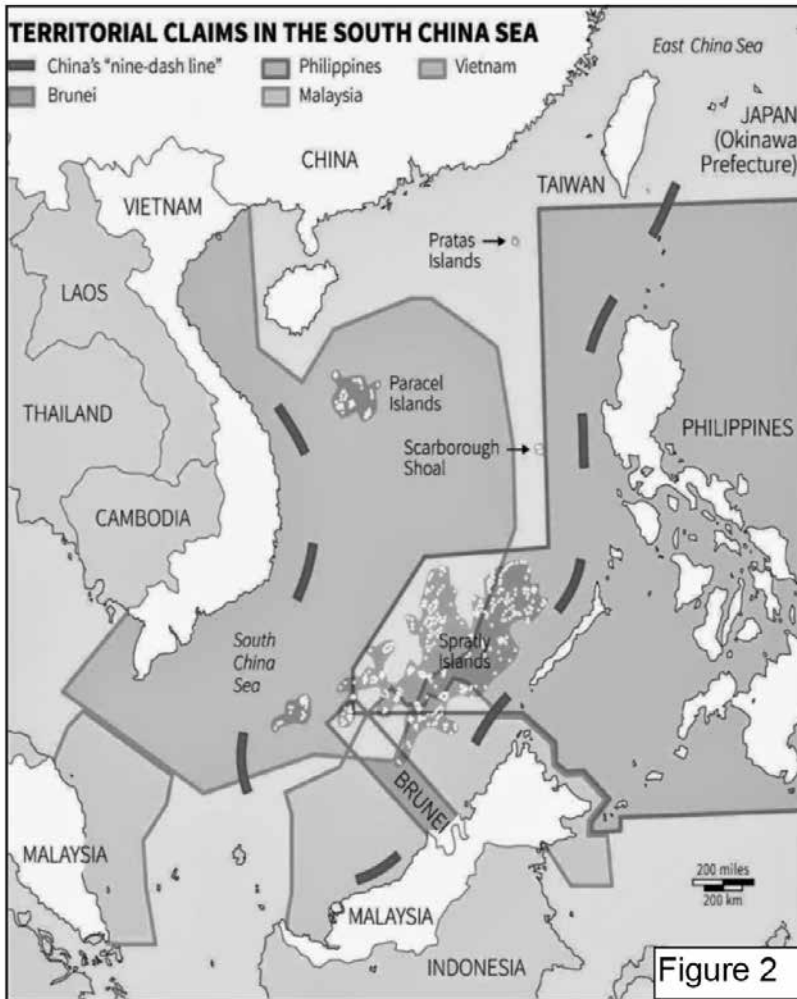


Image Credits: Stephen Green; "The New Containment", November 4, 2013; available at url: <http://pjmedia.com/vodkapundit/2013/11/04/the-new-containment/>

Although the various claimants to sovereign territory in the South China Sea have almost uniformly buttressed their claims by their respective versions of the sub-region's ancient and medieval history — if not its historiography — the history of 'sovereignty' disputes in the South China Sea actually begins only in the 19th century, with the peculiarly European practice of dividing all

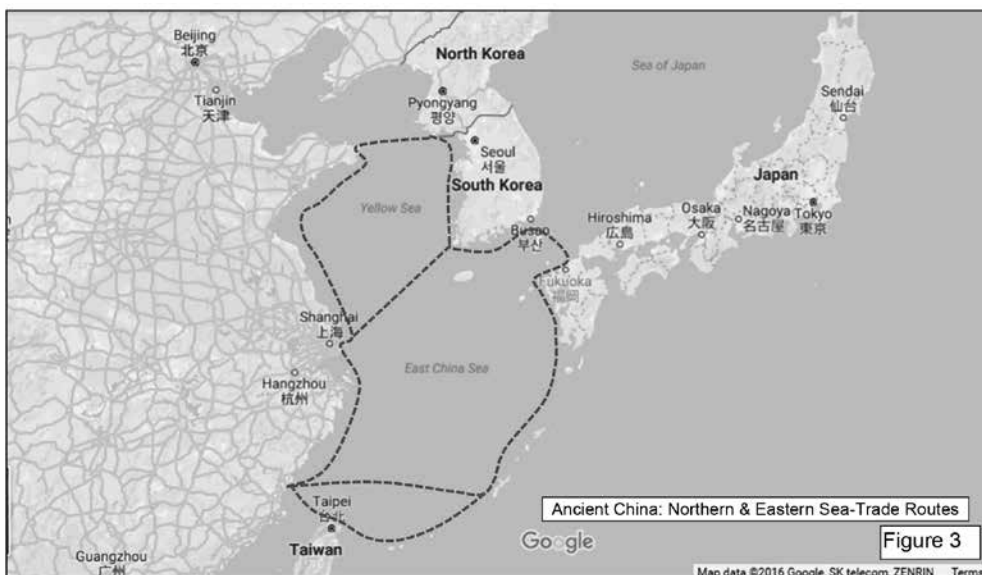
The history of 'sovereignty' disputes in the South China Sea actually begins only in the 19th century, with the peculiarly European practice of dividing all land masses found above sea level between nation-states that thereafter (at least after the 1648 'Peace of Westphalia') claimed to enjoy full sovereignty over them.

land masses found above sea level between nation-states that thereafter (at least after the 1648 'Peace of Westphalia') claimed to enjoy full sovereignty over them. This may be contrasted with the much longer pre-European period, in which the SCS principally served not as an area enclosing segments of sovereign territory, but rather as a means of communication — i.e., seaborne transportation and trade. The islands of this sea were of consequence only as hazards to navigation that were to be avoided. In common with the global practice of those times, much of the SCS' seaborne trade involved close-coast sailing. Information on these sea routes and their relevant

coastlines was compiled into 'rutters'¹ — written mariner's handbooks or 'Sailing Directions' — comprising route maps, star charts, and 'magnetic-compass manuals' that were the primary sources of geographic information for maritime navigation, and remain invaluable even in contemporary times. There were several important maritime trading routes:² the 'Northern Routes' (Fig 3) from Fujian, Zhejiang, Jiangsu and Shandong, to the eastern and southern coasts of Korea and further to Japan (Hakata, Nagasaki), as also from Shandong along the Bohai and Dalian Bay to the mouth of the Yalu river and from Jiangsu or Zhejiang via Huksan to the west coast of Korea. Likewise, there was the 'Eastern Route' (Fig 3) from Fujian or Zhejiang via the Ryūkyūs to southern Japan and from Fujian via the northern tip of Taiwan to Naha on the Ryūkyūs, and from Fujian to Luzon and the Sulu region.

1. The term is derived from the French *routier*, meaning a roadmap.
 2. Angela Schottenhammer, *The "China Seas" in World History: A General Outline of the Role of Chinese and East Asian Maritime Space from its Origins to c. 1800* (Ghent, Belgium: Ghent University, Blandijnberg 2, 9000), January 16, 2013, available at url: <http://www.sciencedirect.com/science/article/pii/S2212682112000261>

Fig 3: Ancient China: Northern & Eastern Sea Trade Routes



Source: Google Maps. Routes drawn by me. Citation for description of routes already indicated at note 2 of the article

However, the main artery of maritime trade was the ‘Southern Route’ (Fig 4) from ports such as Shanghai in Jiangsu province, via Zhejiang, Fujian, Guangdong to the South China Sea via Hainan, Vietnam and the area of modern Singapore, and thence into the Indian Ocean (this route had many branches within Southeast Asia).

Insofar as the littoral powers (and sometimes hinterland ones as well) were concerned, the economic importance of this route lay in the levying of port dues, taxes to be paid by the vessels engaged in maritime trade, and also included sundry amounts of money that might assure safe-passage of the crew and cargo. These ships and their cargoes came from a variety of kingdoms, principalities and port-cities, and the levies to be paid were enforced by a messy mix of state-owned craft and hired privateers — one man’s privateer was often another’s pirate. This complex — albeit untidy — maritime trade network had one common and binding interest: economic profit. If the economic profit of a given portion of territory was deemed great enough and the power holding the territory

The major island and reef formations in the South China Sea that are at the centre of so much of the present-day turbulence afflicting the South China Sea — the Spratly Islands, Paracel Islands, Pratas Islands, Natuna Islands and Scarborough Reef — were utterly insignificant economic factors in the period preceding the advent of the European naval powers in the area.

was deemed weak enough, a kingdom might risk war with another in order to acquire the concerned territory, but if not, the economics of the market prevailed — a situation not terribly different from the one that governs contemporary international relations. Hence, the avoidance of risk — whether generated by predation or navigational hazards — was an important feature of maritime trade. The major island and reef formations in the South China Sea that are at the centre of so much of the present-day turbulence afflicting the South China Sea — the Spratly Islands, Paracel Islands, Pratas Islands, Natuna

Islands and Scarborough Reef — were utterly insignificant economic factors in the period preceding the advent of the European naval powers in the area, except as broad areas to be avoided for the navigational hazard that they represented. This was the case even during the Ming dynasty's impressive maritime outreach exemplified by the seven trans-oceanic voyages of Adm Zheng He (1405-33). Perhaps this could be termed 'active maritime-disinterest'. As such, there was no real question of any territorial dispute over these islands, islets, rocks and reefs. This 'active maritime-disinterest' remained largely unchanged even well after the advent of the European powers into the SCS.

Fig 4: Ancient China: Southern Sea Trade Routes



Source: Google Maps. Routes drawn by author. Citation for description of routes indicated at note 2 of the article.

EUROPEAN CONTRIBUTION TO THE SCS IMBROGLIO

With the launch of Europe’s ‘Age of Discovery’ in the 15th century by Prince Henry of Portugal, the Portuguese were the first to venture into the SCS, arriving in the early 16th century, in pursuit of the wealth that would accrue were they to acquire a controlling interest in (and preferably a monopoly over) the spice routes into Europe. Aware that the land-based trade routes of Asia-Minor were under the firm control of the Egyptian Mamluk dynasty (whose principal trade partner was Venice), the Portuguese sought to exploit, instead, the medium of the sea. They were followed by the Spaniards and the Dutch, but neither of them showed any interest in establishing or maintaining sovereign claims over the SCS islands. This changed only in the 19th century — China’s ‘Century of Humiliation’ — by which time Portugal had lost its empire to the Dutch. However, it was Britain and France that were the overwhelmingly dominant powers within the SCS. Between them, they created a number of new colonial states that were based upon the principle of national

sovereignty — Britain constructed Singapore, wrested Malacca (Melaka) from the Dutch, acquired Hong Kong, and established protectorates in Malaya and northern Borneo. Not to be left behind, France colonised Indo-China [Vietnam, Cambodia, Laos, and leased part of the Liaozhou peninsula (north of Hainan)].³ The by-now-lesser European powers (such as the Netherlands and Spain) were still in the sovereignty/colonisation game, with the Netherlands consolidating its many possessions (much of Java, parts of Sumatra, Makassar, Manado, and Kupang) into the ‘Dutch East Indies’ and Spain seeking to tighten its hold over the Philippines. Chinese power had been severely eroded by the Opium Wars (1839-42). Although systematic surveys of the Spratly and the Paracel groups were progressed from the 1830s onwards, resulting in more accurate charts and maps, nobody was particularly interested in the islands and islets of the SCS, much less so in its reefs and rocky outcrops, except as places where they and their ships would rather **not** go.

It was only in 1877 that the European concept of national sovereignty began to be force-fitted onto the SCS islands and islets. Consequent upon the commencement of private commercial exploitation of the *guano*⁴ on Spratly and Amboyna Cay, these two islands of the Spratly group were formally claimed by the British crown as sovereign British territory.⁵ From 1891 to 1933, these two islands “were mentioned specifically in the annual editions of the British Colonial Office list, but little was done to exploit them or exercise British sovereignty.”⁶ Significantly, China did not protest the British claim.⁷ In fact, both Britain and France considered the

3. Timo Kivimäki, *War or Peace in the South China Sea?* (NIAS Press, 2002), p. 8, available as an e-book at url: https://books.google.co.in/books?id=CNVf9R_L5FAC&pg

4. *Guano* is bird-dung, used for fertiliser and in the making of soap.

5. Bill Hayton, *The South China Sea: The Struggle for Power in Asia* (Yale University Press, 2014), available as an e-book at url: <https://books.google.co.in/books?id=01FmBAAAQBAJ&dq>

6. Stein Tønnesson, “An International History of the Dispute in the South China Sea”, EAI Working Paper 71, March 2001; available at url: www.cliostein.com/documents/2001/01%20rep%20eai.pdf

7. James D Fry and Melissa H Loja, “The Roots of Historic Title: Non-Western Pre-Colonial Normative Systems and Legal Resolution of Territorial Disputes”, *Leiden Journal of International Law*, 27, 2014, pp. 727–754; available at url: https://seasresearch.files.wordpress.com/2014/09/historictitle_territorial-disputes.pdf

Spratly Islands to be *terra nullius*.⁸ In any case, in the 1870s, Great Britain — in a staggering manifestation of imperial arrogance — “did not regard China at that period as fully a member of the family of nations”.⁹ France, too, was suffused with a palpable sense of imperium and simply ignored both Chinese and Vietnamese territorial claims (the latter were fairly strongly articulated by Vietnam’s *Nguyen* kings between 1802 and 1847). Towards the end of the turbulent 19th century, two non-European powers established themselves — both through conquest in war — as major factors in the subsequent South China Sea equation. The main newcomer was Japan, which had won the Sino-Japanese War in 1895 and acquired Taiwan as part of the ensuing peace settlement. The other was the USA which, having won the Spanish-American War of 1898, took over the Philippines from Spain. Thus, as the 19th century rolled over into the 20th, there was a condominium of five naval powers in the SCS — Britain, France, the Netherlands, Japan and the USA.

Much of the present geopolitical entanglements in the SCS can be traced to the complex geopolitical interaction among these five powers and the two main resident ones — China and Vietnam. Of particular note is that through the opening decade of the 20th century, the USA, like the Europeans, showed little or no interest in the Spratly or Paracel group or in any of the other islets, rocks and reefs that would be so central in a hundred years from then.

THE JAPANESE IMPACT

Japan, however, was another matter. Having defeated Qing China (1894-95), Japan annexed Korea and Taiwan and, amongst other (and less palatable) activities, also began to exploit the *guano* on the Paracel and Spratly Islands — the second country to do so, after Britain.¹⁰

8. *Terra nullius*: a Latin expression meaning “nobody’s land” and used in international law to describe territory which has never been subject to the sovereignty of any state, or over which any prior sovereign has expressly or implicitly relinquished sovereignty.

9. R. Haller-Trost, “The Spratly Islands: A Study on the Limitations of International Law”, Occasional Paper No. 14, (Canterbury: Centre of Southeast Asian Studies, University of Kent), p. 41.

10. Hung Yu Chen; “Territorial Disputes in the South China Sea under the San Francisco Peace Treaty”, *Issues & Studies* 50, no. 3, September 2014, pp. 169-196, available at url: <http://tkuir.lib.tku.edu.tw:8080/dspace/bitstream/987654321/100230/2/>

As a direct consequence of its self-assessed humiliations and acutely sensitive to internal accusations that it was incapable of defending China's territory, Beijing decided — for the first time — to turn the question of sovereignty of the SCS islands into a question of national pride and the regaining of face.

The dawn of the 20th century saw multinational forces (comprising six European powers, Japan and the USA) intervene militarily in Beijing to suppress the 1901 Boxer Rebellion, causing significant loss of face to China's Qing court. By 1907, reports were freely circulating in Beijing recounting Japanese commercial activities on the *guano*-covered reef known as Pratas Island (400 km southwest of Taiwan — now under Japanese control). As a direct consequence of its self-assessed humiliations and acutely sensitive to internal accusations that it was incapable

of defending China's territory, Beijing decided — for the first time — to turn the question of sovereignty of the SCS islands into a question of national pride and the regaining of face. Thus, in 1909, it sent a mission to map and formally claim the Paracel Islands. However, within two years (in 1911) the Qing dynasty succumbed to the Chinese Revolution and China was wracked by protracted warlordism and civil war. As such, China was in no position to uphold its claim either through effective occupation or utilisation,¹¹ leaving Japan in *de facto* control.

The unhappily simmering SCS brew next bubbled over in 1930. France, apprehending a further and imminent Japanese southerly naval expansion by using the Spratlys, occupied and claimed sovereignty over Spratly Island. Britain, by not opposing the French claim, relinquished its own 1877 one. Two years later, in 1932, France formally claimed both the Spratly and Paracel Island groups and in July 1933, annexed and occupied nine islands of the Spratly group, placing them under the administrative control of Cochinchina (which later became a part of Vietnam, thereby enabling independent Vietnam's subsequent claim).¹²

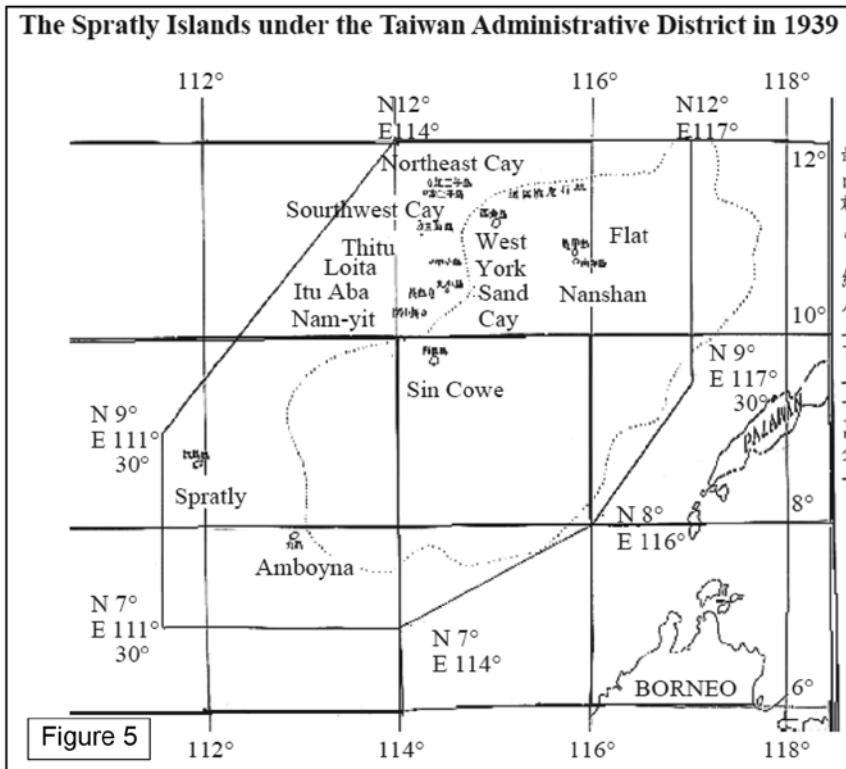
11. Hayton, n. 5.

12. Yu Chen, n. 10.

Both China and Japan protested. While Japan's protest was a formal one, China's was largely through expressions of confused outrage — the government being unsure where exactly these islands were and whether they were merely names of islands in the Paracel group that had been changed by the French to confuse Beijing!¹³ China's reaction was limited to an affirmation that the Spratly and Paracel Islands belonged to China, and the publication of a formal map. The Japanese reaction, however, was far more robust and involved the establishment of Japanese military presence in both the Paracels and the Spratlys. In January of 1939, Tokyo, flush with Japan's victories in Manchuria (1931) and China (1937), dispatched military troops to occupy the Spratly Islands and rejected the French demand for the dispute to be submitted to the Permanent Court of Arbitration (PCA). Two aspects merit note: to Britain's dismay, France did not militarily resist the Japanese occupation and the USA limited itself to a formal protest in Manila. This resulted in Japan formally claiming sovereignty, in 1941, over the islands of both groups (Fig 5). Tokyo placed the Paracel Islands under the administrative control of Hainan and the Spratly Islands under Taiwan (both of which were held by Japan). In World War II, Japan, which had entered into a treaty of cooperation with the Vichy France regime, used Itu Aba (in the Spratly Islands) as a submarine base and a vantage point for its 1942 invasion of the Philippines. However, Japan lost World War II, and in 1945, in accordance with the Cairo and Potsdam Declarations and with American help, the armed forces of the Republic of China (ROC) government at Nanjing accepted the surrender of the Japanese garrisons in Taiwan, including the Paracel and Spratly Islands.

13. Ibid.

Fig 5: The Spratly Islands Under Taiwan Administrative District, 1939



Source: Hurng Yu Chen; "Territorial Disputes in the South China Sea under the San Francisco Peace Treaty", *Issues & Studies* 50, no. 3, September 2014, Map 1, p. 178; available at url: <http://tkuir.lib.tku.edu.tw:8080/dspace/bitstream/987654321/100230/2/>

THE SCS IMBROGLIO POST-WORLD WAR II

With the defeat of Japan and its renunciation of its erstwhile territories in China and the SCS, Nanjing (the ROC's capital) claimed both archipelagos and declared them part of Guangdong province. In 1946, it established garrisons on both Woody Island in the Paracels and Taiping Island in the Spratlys. France protested and tried, but failed to dislodge the Chinese nationalist troops from Woody Island (then the only habitable island in the Paracels), but was able to establish a small camp on Pattle Island in the southwestern part of the Paracel archipelago.

What of the USA? By the end of World War II, the USA was the dominant naval power in the region and Japan had abandoned Itu Aba, Woody Island, and its other holdings within the SCS islands. However, in marked contrast to its present stand, it showed little interest in them except as targets to test the use of napalm.¹⁴

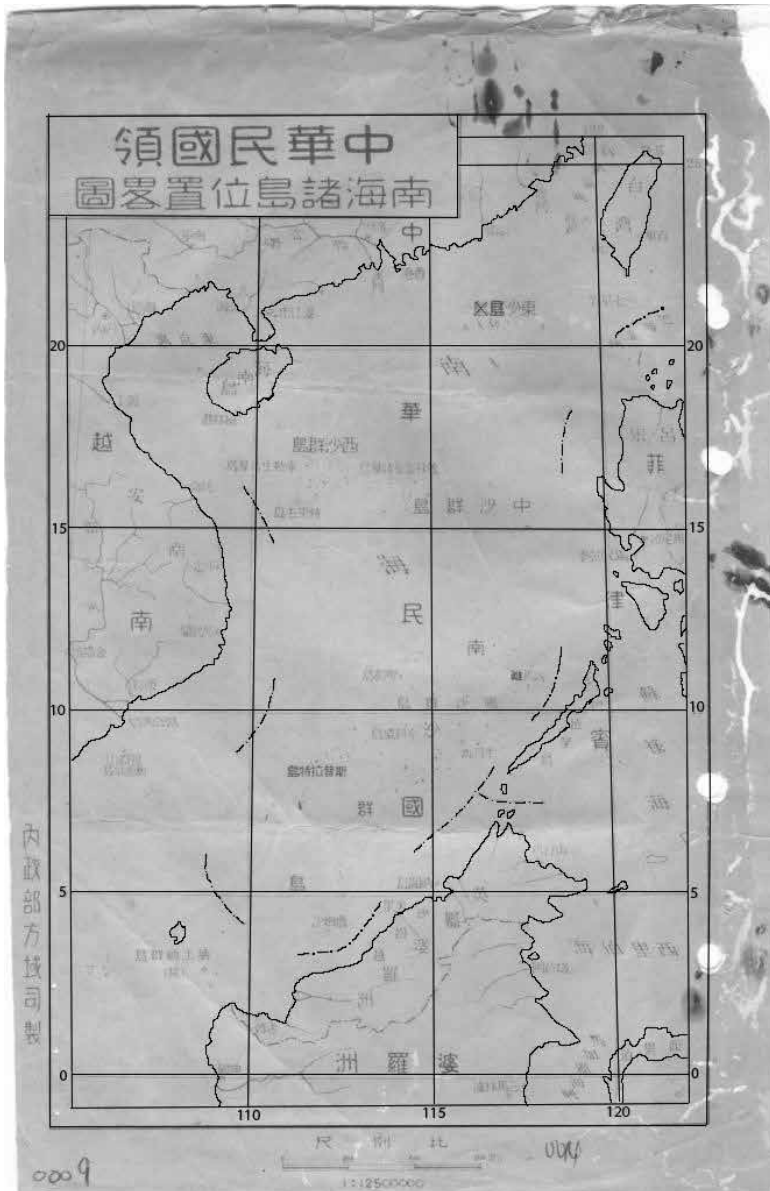
THE PHILIPPINES ENTERS THE FRAY

Around this point in time, a new regional claimant emerged — the Philippines. On July 4, 1946, the Philippines became formally independent from the USA. Just a few days later (July 23, 1946), Manila issued a declaration claiming the Spratly Islands — once again on the principle that they were *terra nullius*! In an immediate response, the ROC government in Nanjing began to take practical steps to reassert its own claim. Later that very year, the ROC Ministry of the Interior commissioned a ‘Location Sketch Map of the South China Sea Islands’. This depicted, for the first time, the now-infamous Nine-Dash Line (then comprising only eight dashes) stretching as far south as the James Shoal, just off the coast of Borneo. It has been speculated that this southerly stretch of the line (which is what gives it the sobriquet “Cow’s Tongue”) is due to the ROC’s mistaken belief that the James Shoal was an island, and that the line is a legacy of a series of ‘maps of national humiliation’ drawn by Chinese nationalists in the first half of the 20th century. As such, it owes more to misunderstandings amongst those nationalists about Southeast Asian history and the actual geography of the SCS than it does to any real assertion of historic Chinese sovereignty. Nevertheless, it is a mistake that has been forced upon the region with ideological rigour.¹⁵

14. Bill Hayton, “Calm and Storm: The South China Sea after the Second World War”, Asia Maritime Transparency Initiative (AMTI), August 2015, available at url: <https://amti.csis.org/calm-and-storm-the-south-china-sea-after-the-second-world-war/>

15. Ibid.

Fig 6: Location Sketch Map of the South China Sea Islands



Source: Bill Hayton; "Calm and Storm: The South China Sea after the Second World War", *Asia Maritime Transparency Initiative* (AMTI), August 2015; available at url: <https://amti.csis.org/calm-and-storm-the-south-china-sea-after-the-second-world-war/>

VIETNAM'S POST-UNIFICATION IMPRINT

In 1950, Vietnam became independent as two geopolitical entities. North Vietnam was supported and recognised by the People's Republic of China (PRC), the erstwhile USSR and several East European states, while South Vietnam was supported and recognised by Britain, the USA, France and most of Western Europe.

In 1954, France accepted the independence of both South and North Vietnam and withdrew from Indochina, thereby ceasing to be an involved factor. However, which Vietnam (North or South?) inherited its erstwhile holdings remained a matter of doubt. North Vietnam's dilemma was that it was in no position to oppose its major benefactor — the PRC — and yet, the PRC claimed the Paracel and the Spratly Island groups as its own. South Vietnam, on the other hand, claimed both, the Spratlys and the Paracels. There was also the question of which 'China' was the counter claimant? The PRC re-established a Chinese garrison on Woody Island in the Paracels, while the Republic of China (Taipei) put troops back on Taiping Island in the Spratlys.

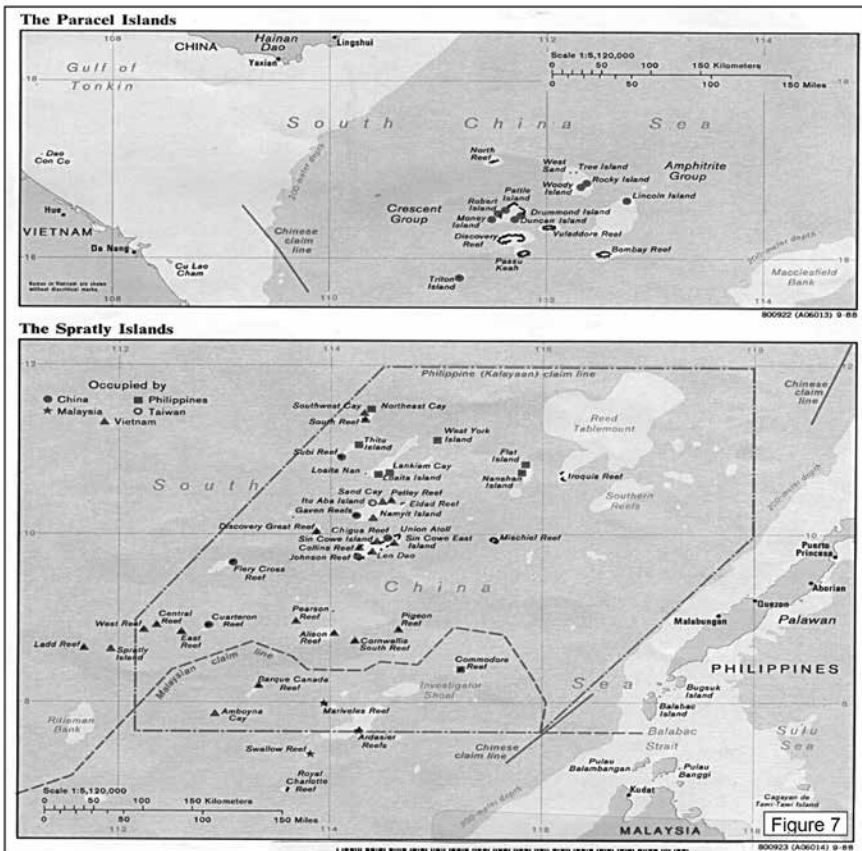
In 1974, South Vietnam attempted to enforce its claims to sovereignty by placing settlers in the Spratlys and expelling Chinese fishermen from the southwestern Paracels. In the ensuing naval battle at Pattle (a.k.a. *Shanhu*) Island, China defeated the Vietnamese forces. This enabled Beijing to extend its control to the entire Paracel archipelago, where it has not been effectively challenged since. In 1975, however, North Vietnam defeated the South and the country was reunited, with Hanoi as its capital. Five years later, Hanoi repudiated its earlier deference to China's claims, adopted the erstwhile South Vietnam's position, and claimed sovereignty over all the islands in the South China Sea. In the early 1980s, even as Beijing, Kuala Lumpur, Manila, and Taipei protested, Vietnam resumed vigorous settlement and garrisoning of the Spratlys.

THE IMPACT OF UNCLOS

The effect of the 1982 United Nations Convention on the Law of the Sea (UNCLOS) upon the SCS imbroglio has been profound and mostly negative.

Even before the 1982 UNCLOS could be brought into force, but most especially after, the SCS dispute split into two separate but related disputes: the older one, with its complex history, is about the islets themselves and involves China, Taiwan, the Philippines, Malaysia, Brunei, Vietnam and, to a limited extent, Indonesia. The other is about the spaces in between the islets — which is really about the rules of the international system, particularly the Law of the Sea. It is the overlap between the two disputes that makes them so potentially dangerous.

Fig 7: Spratly & Parcel Islands



Source: US CIA Maps, University of Texas Libraries; available at url: http://www.lib.utexas.edu/maps/middle_east_and_asia/parcel_spratly_88.jpg

In the long run-up to the 1982 UNCLOS, several countries unilaterally promulgated enhanced maritime zones such as a 200 nm(nautical miles) Exclusive Economic Zone (EEZ). Within the SCS, these included the Philippines and Malaysia (Fig 7). In 1978 and 1979, respectively, Manila and Kuala Lumpur had unilaterally proclaimed such EEZs off their coasts. Once the UNCLOS was signed, the resolution of claims and counter-claims in the SCS became even more problematic, particularly because contemporary international law is premised upon the land dominating the sea. Thus, ownership of 'islands' (as defined by UNCLOS) generated varying degrees of jurisdiction and exclusive rights over substantial sea areas ranging from territorial seas, contiguous zones and exclusive economic zones — the latter additionally incorporating continental shelves in certain cases. The Philippines' claim has already been alluded to. Malaysia, too, entered the list of claimants and, in 1983, occupied Swallow Reef and established a military presence there. Malaysia, the Philippines, Vietnam, and China have all correctly understood that the key to sovereignty is not legal arguments but physical possession and control — a continuous human presence. Whether an island generates an EEZ or simply a twelve-mile territorial sea is determined by whether or not it is able naturally to support human life. Hence, the rush to seize and settle any and all land features in the South China Sea and to demonstrate that people can live on them. Thus, in March 1988, after a bloody skirmish with Vietnamese forces at Johnson South Reef, the PRC seized seven land features and began frenetically building fortresses atop these reefs and rocks. Where the Spratly Islands are concerned, some 44 features in the group are currently settled, occupied, or garrisoned: 25 by Hanoi, eight by Manila, seven by Beijing, three by Kuala Lumpur, and one by Taiwan. The political difficulty for the claimants of accepting this outcome can hardly be overstated. All sides feel cheated by it. None is without passion on the subject.¹⁶

16. Chas W. Freeman, Jr., erstwhile US ambassador, "Diplomacy on the Rocks: China and Other Claimants in the South China Sea", remarks at a seminar of the Watson Institute for International Studies, Brown University, available at url: <http://www.mepc.org/articles-commentary/speeches/china-and-other-claimants-south-china-sea?print>

In 2002, during the 8th Association of Southeast Asian Nations (ASEAN) Summit, a declaration was signed between China and the ASEAN member-states (which included all the other claimants except Taiwan), whereby all the parties committed themselves to exercising self-restraint.

THE CONTEMPORARY SCENARIO AND INDIA

Standing out starkly against the foregoing historical backdrop is the contemporary situation. The advent of the 21st century was one of great hopes that most, if not all, of the many Asian colonial traumas of the preceding centuries would be put firmly in the unhappy past. The start of the new millennium seemed to herald a happier future. The condition of the South China Sea appeared to be characterised by a relatively benign set of geopolitical swell-waves rather than the fierce and choppy sea waves of the

preceding epoch. Matters appeared to be well in hand and in 2002, during the 8th Association of Southeast Asian Nations (ASEAN) Summit, a declaration was signed between China and the ASEAN member-states (which included all the other claimants except Taiwan), whereby all the parties committed themselves to exercising self-restraint and resolving their territorial and jurisdictional disputes without resorting to the threat or use of force.

Then, having lulled ASEAN into complacency with a protracted and most seductive siren song of a peaceful rise, China — responding to the submissions to the UN by Malaysia and Vietnam in respect of their continental shelves — suddenly precipitated matters by a formal submission to the UN on May 7, 2009, claiming some 90 percent of the South China Sea as its own, through the now famous Nine-Dash Line.¹⁷ Although, as indicated earlier in this article, a map depicting this Nine-Dash Line (then comprising eight dashes) — the result of a set of historical, geographical and cartographic mistakes by the ROC authorities in Nanjing¹⁸ — had been in existence since 1946, the audacity with which it was dusted off and used to proffer a ‘historical claim’ by Beijing put the Chinese cat firmly amongst the ASEAN pigeons.

17. China’s Submission CML/17/2009; available at url: http://www.un.org/depts/los/clcs_new/submissions_files/mysvnm33_09/chn_2009re_mys_vnm_e.pdf.

18. Hayton, n. 14.

While several ASEAN states chose to either acquiesce or remain extremely circumspect, the Philippines and Vietnam have consistently adopted robust positions in opposing China's moves of creeping jurisdiction within the SCS.

In 2010, China declared that, like Tibet and Xinjiang, the South China Sea was a "core national interest". It is important to understand that the term 'core interest', as used by the Chinese leadership, does not have direct correspondence with the same term used by India — or, for that matter, by almost all the other nation-states. The People's Republic of China uses the term geopolitically "*to lay down a marker, or type of warning.*"¹⁹ — in other words, to specify "*issues it considers important enough to go to war over.*" Geopolitics is, after all, largely the sum of geoeconomics and geostrategy.²⁰ Consequently, as China's geoeconomic power impacted and dwarfed other regional and state economies, Beijing's asserted geostrategy has been incorporating an incremental increase of geographically-specific regions as its "core interests".

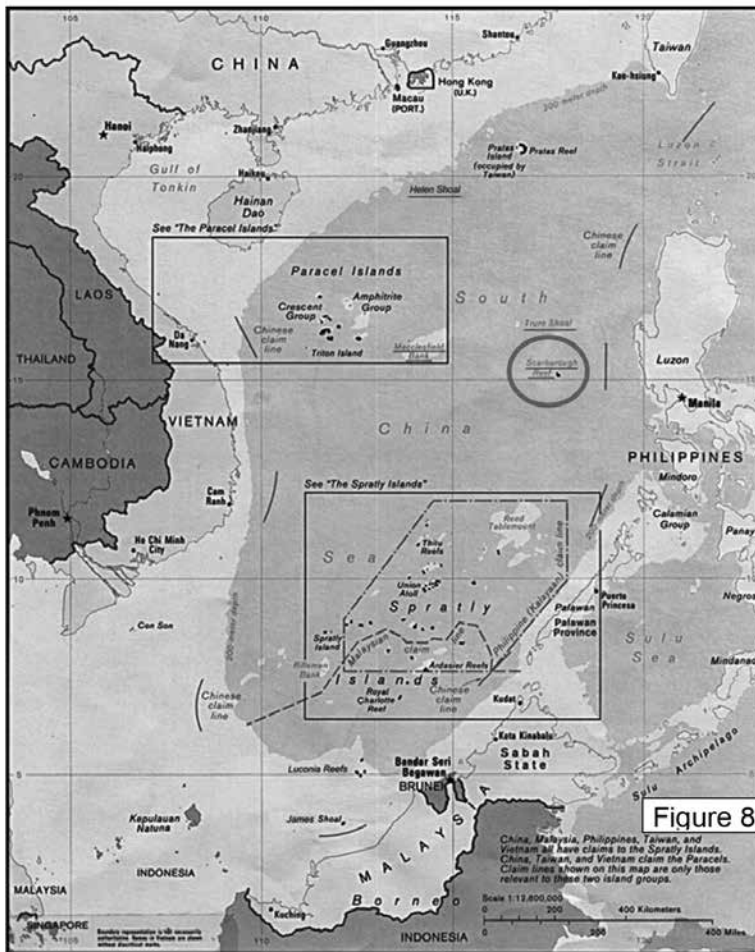
Since 2010, China has been undertaking frenetic offshore construction to convert uninhabited islets and shoals within the South China Sea into artificial islands so as to cloak itself in the garb of the UNCLOS-based International Maritime Law. Notable examples of such transformative construction include Gaven Reef, Johnson South Reef and Fiery Cross Reef. Of course, it is true that other claimants, too, have built upon existing natural structures (Itu Aba by Taiwan, Southwest Cay by Vietnam, Swallow Reef by Malaysia, and Thitu Island by Philippines) but what sets China's activities apart, is that while other claimants have built upon, or modified, *existing* land masses, Beijing has been dramatically changing the size and structure of the physical land features themselves. Moreover, in both, the Paracel and Spratly groups, the PRC has now weaponised islands [Chinese Surface-to-Air Missiles (SAMs) are already deployed on Woody Island] and created

19. Michael D. Swaine; "China's Assertive Behavior — Part One: On Core Interests", Carnegie Endowment Lectures (CLM-34); available at url: http://carnegieendowment.org/files/CLM34MS_FINAL.pdf

20. Editorial Board of *The New York Times*, "China's Evolving Core Interests", May 11, 2013, available at url: <http://www.nytimes.com/2013/05/12/opinion/sunday/chinas-evolving-core-interests.html>

airstrips capable of operating medium and large military aircraft, thereby altogether abandoning its earlier pretences of developing these rocks, shoals and islets for the advancement of tourism!

Fig 8: South China Sea Islands



Source: US CIA Maps, University of Texas

While contemporary geopolitical tensions between the Philippines and China have been high over ownership of the Johnson South Reef (also claimed by Brunei, Taiwan, and Vietnam) in the Spratly Islands, the most recent

point of confrontation with China has involved the ring-shaped coral reef called Scarborough Shoal, which Philippines calls *Bajo de Masinloc*. Located 124 nm west of Luzon Island but as much as 472 nm from China, it lies well within the 200 nm EEZ of the Philippines Island of Luzon (Fig 8). The Philippine position is that Scarborough Shoal is an integral part of Philippine territory. China, on the other hand, which wrested physical control over the reef in 2012, asserts that it has a historical claim over the shoal, claiming that it was discovered by the Yuan Dynasty and that it is, moreover, part of its traditional fishing waters. There is real concern that this might well be the eighth reef subjected to Chinese 'terraforming'. In January 2013, the Philippines, holding that China's Nine-Dash Line was completely illegal, took the issue to the Permanent Court of Arbitration (PCA) in The Hague. China strenuously opposed the move, opining that the court did not have jurisdiction to rule on the case since the issues raised in the Philippines could not be considered without determining sovereignty, which the tribunal was not empowered to do. It categorically stated that it would not participate and would not accept any ruling of the court. However, eight months later, having considered all the relevant arguments, the PCA ruled that it did, indeed, have jurisdiction over the matter. This ruling notwithstanding, China remained obdurate, stating, "By unilaterally initiating the arbitration, the Philippine side is imposing its own will on others..... It is only natural for China not to participate in such arbitration that has become tainted and gone astray. And China will not accept or recognize the award of the arbitration, whatever it might be." On July 12, 2016, in an anxiously awaited but widely expected verdict, the PCA not only ruled overwhelmingly in favour of the Philippines, but far more damagingly for China, it scathingly removed the fig-leaf of 'historical' control that had been so brazenly worn by China. The PCA has categorically ruled that China's Nine-Dash Line is devoid of legal merit.

Where does all this leave the People's Republic? On the one hand, China has remained consistent in its rejection of the jurisdictional competence of the PCA on this subject, insisting that the only solution to the imbroglio lies in bilateral negotiations between the Philippines and the People's Republic.

There has been much by way of angry (if not vituperative) polemics within official circles as well as within the media, but all that is largely along expected lines, as are the calls for restraint and sobriety. In the wake of this verdict, whether or not accepted by China, any move by Beijing to set up an Air Defence Identification Zone (ADIZ) in the SCS will be very hard to sustain outside of outright military belligerence, since an ADIZ is essentially a measure to prevent transgressions into one's *territorial* air space and China's view that the Nine Dash Line defines the limits of its national waters within the SCS has been roundly debunked. We may certainly expect a high level of browbeating by Beijing and there is a good possibility of China extending its 'terraforming' activity to the Scarborough Shoal. However, with the USA and the Philippines having concluded a new Enhanced Defence Cooperation Agreement (EDCA) on March 18, 2016, which envisages US personnel and assets being integrated into (and rotated through) five *existing* bases of the Philippines, any future Freedom-of-Navigation (FON) operation by the US Navy to challenge such moves by China will be backed by extremely proximate US forces. On the other hand, the very recent apparent *volte-face* by President Rodrigo Duterte of the Philippines and his strong overtures to the PRC have introduced even more complexity into the SCS tangle. Despite President Duterte's pro-China rhetoric, the significance of the USA's sharp recovery from its 1992 loss of Subic Bay can hardly be lost upon Beijing. This is not something that can be countered by coast guard forces or paramilitary militias, nor by the eminently newsworthy but militarily insignificant positioning of a few HQ-9 or equivalent SAMs, as had been done on Woody Island in the Paracel group.

Of particular concern is that China, with its continuing militarisation of the SCS islands, is rapidly increasing its ability to control who can go where in the South China Sea — including along the trade routes. This creeping Chinese ability to control international trade routes through the South China Sea greatly worries the USA, Japan, Australia, South Korea, Vietnam and others. It ought to be deeply troubling to New Delhi too.

It is common knowledge that 90 percent by volume and some 77 percent by value of India's external merchandise trade moves by sea. But how much

does this external merchandise trade impact India's Gross Domestic Product (GDP)? This is indicated by the country's 'Openness Index', i.e., its Trade-to-GDP Ratio. In the 1980s, this averaged a mere 11.25 percent. So whatever happened (or didn't happen) to our external trade, did not matter very much to our GDP. One unfortunate consequence of this was that many Indians — including many Indian naval officers — pretty much forgot the symbiotic relationship between 'flag' and 'trade' and paid little more than lip-service to the navy's need to promote, pursue and protect India's external merchandise trade. However, the India of today is very different from the somnolent one that lumbered along between 1947 (Independence) and the economic reforms of 1990.

Today, India is a dynamic and resurgent power and its merchandise trade²¹, as a percentage of its GDP, has skyrocketed to its present average decadal value of 40 percent!²² Today, therefore, any adverse impact upon India's maritime trade has a huge impact upon its GDP, and geopolitical disruptions and infirmities — particularly maritime ones — have very great significance. Since "*money is a coward*"²³ and abjures areas of high instability and geoeconomic risk, geopolitical maritime instability nearly always has an adverse impact upon trade. Space, time and cost disruptions of external trade, in turn, affect both domestic manufacture and local consumption, and, hence, money flows and market dynamism.

However, a caveat is in order at this point. Contrary to several reports and analyses²⁴ appearing in the Indian media, the Malacca Strait does **not** lie within the South China Sea. It is, of course, true that almost all of India's maritime trade to, and from, the East Asian and Southeast Asian countries — such as Thailand, Indonesia, Malaysia, Brunei, Philippines, Vietnam,

21. 'Merchandise Trade' only includes trade in goods, not in services nor capital transfers and foreign investments.

22. World Bank, "Data: Merchandise Trade (% of GDP)", available at url: <http://data.worldbank.org/indicator/TG.VAL.TOTL.GD.ZS/countries/IN-CN?page=2&display=default> .

23. Zoltan Merszei; speech at the Empire Club of Canada on February 16, 1978, available at url: <http://speeches.empireclub.org/61635/data?n=2>

24. As only one example of this erroneous view, see: Palakh Dutta; "What the South China Sea Dispute is all About", *Hindustan Times* epaper (New Delhi Edition), February 18, 2016, available at url: <http://www.hindustantimes.com/world/explained-what-the-south-china-sea-dispute-is-all-about/story-1MORDfwv5sRfgXsjYXEj9J.html>

Some 25 percent of all India's external (maritime) trade — i.e., approximately \$190 billion worth — does, indeed, pass through the SCS [bound to, and from, Vietnam, Cambodia, Laos, the two Koreas, China (including Hong Kong), Japan, Pacific Russia, and, the western seaboard of the USA] and is certainly susceptible to geopolitical infirmities/ disruptions in the SCS.

the western seaboard of the USA] and is certainly susceptible to geopolitical infirmities/ disruptions in the South China Sea.

This notwithstanding, India's burgeoning interest and occasional naval presence in the South China Sea are derisively dismissed by some as a case of maritime overreach if not hubris. Their view is that by meddling in maritime expanses that do not directly concern India, the country and its navy will be distracted from activities that lie squarely within what ought to remain India's (and its navy's) principal area of focus, namely the Indian Ocean in general and the Arabian Sea and Bay of Bengal in particular. They believe that venturing into the South China Sea will serve only to mar a much-needed strengthening of relations with the People's Republic of China, debar India from enjoying the economic benefits of Chinese cooperative constructs such as the 'One Belt One Road' (OBOR) initiative, and, contribute to regional insecurity at precisely a time when nation-states of the Indo-Pacific need to

Cambodia, Laos, China (including Hong Kong), North and South Korea, Japan, and the western seaboard of the USA — passes into, or emerges from, the Strait of Malacca. However, trade to, and from, the Malacca Strait littorals (Malaysia, Indonesia, Thailand and Singapore) — which is quite substantive, by the way — does not transit the South China Sea at all! This notwithstanding, some 25 percent of all India's external (maritime) trade — i.e., approximately \$190 billion worth²⁵ — does, indeed, pass through the South China Sea [bound to, and from, Vietnam, Cambodia, Laos, the two Koreas, China (including Hong Kong), Japan, Pacific Russia, and,

25. EXIM Bank figures for FY 2015 are Merchandise Exports: US \$309.6 billion and Merchandise Imports: US \$447.5. See: "Catalysing India's Trade and Investment", July 2015, available at url: <http://www.eximbankindia.in/sites/default/files/indias-international-trade-and-investment.pdf>

maximise mutual amity so as to face the menace of malevolent violent non-state entities such as the IS/ISIL/ISIS/Daesh.²⁶ These are frequently the opinions of those whose life's experience, either 'in' or 'about' the Indian Navy, is drawn from a time when this force had very limited 'capacity', while its 'capability' was still in the process of being established.

At the other end of the spectrum are those who feel that India has come into its own as a maritime power in the Indo-Pacific and that the time is now ripe for India to deal with China in its own coin. They hold that it is essential for India to establish and sustain geopolitical signalling that explicitly conveys its refusal to be cowed down by China's aggressiveness and to convey India's firm intent to proactively protect its trade. Towards this end, they believe that although India should continue to abjure alliances, it should visibly and overtly strengthen its alignment with like-minded powers such as the USA, Japan and Australia and should, indeed, be unafraid to undertake India-US-Japan-Australia combined 'Freedom-of-Navigation' (FON) patrols in the South China Sea. These are frequently the opinions of those whose life's experience, either in or about the Indian Navy, is from relatively contemporary times when the Service has adequate 'capacity' to look at geographical spaces other than those immediately proximate to it, while its 'capability' is globally recognised as being sufficient for India to assert at its apex political (prime ministerial) level that it would be "... a net provider of maritime security in our immediate neighbourhood and beyond."

India can assert at its apex political (prime ministerial) level that it would be "... a net provider of maritime security in our immediate neighbourhood and beyond."

26. IS: Self-styled Islamic State = ISIL: Islamic State of Syria in the Levant = ISIS: Islamic State of Iraq and Syria (also sometimes expanded to Islamic State of Syria and al-Sham) = Daesh (an Arabic acronym formed from the initial letters of the group's previous name in Arabic: "*al-Dawla al-Islamiya fil Iraq wa al-Sham*"), where 'al-Sham' was commonly used during the rule of the Muslim Caliphs from the 7th century to describe the area between the Mediterranean and the Euphrates, Anatolia (in present day Turkey and Egypt). See: Faisal Irshaid, "ISIS, ISIL, IS or Daesh? One Group, Many Names", BBC Monitoring, December 2, 2015, available at url: <http://www.bbc.com/news/world-middle-east-27994277>

security in our immediate neighbourhood and beyond."²⁷

In determining which end of this spectrum of opinion to tend towards (or whether, indeed, to embrace one or the other end), it might be best to be guided by Lord Palmerston's (seldom accurately quoted) comment²⁸ on the permanence of India's core national interest and the persistence of the maritime interests that flow from, and feed into, it. India's core national interest, as derived from the Constitution of India, is *to assure the economic, material and societal well-being of the people of India.*

Flowing from, and simultaneously feeding, into this core national interest, are India's *maritime* interests. These are:

- (1) Protection from sea-based threats to our territorial integrity.
- (2) Ensuring stability in our maritime neighbourhood.
- (3) Obtaining and retaining a regionally favourable geostrategic maritime position.
- (4) Provision of holistic maritime security ('human' security) — that is, freedom from threats arising 'in' or 'from' the sea.
- (5) Creation, development, and sustenance of a '*blue*' ocean-economy, incorporating:
 - Preservation, promotion, pursuit and protection of offshore infrastructure and maritime resources within and beyond the Maritime Zones of India.

27. Press Information Bureau, Government of India (Prime Minister's Office); "PM's Speech at the Foundation Stone Laying Ceremony for the Indian National Defence University at Gurgaon", May 23, 2013, available at url: <http://pib.nic.in/newsite/mbErel.aspx?relid=96146> (accessed on August 7, 2015).

28. "I hold, with respect to alliances, that England is a Power sufficiently strong, sufficiently powerful, to steer her own course, and not to tie herself as an unnecessary appendage to the policy of any other Government. I hold that the real policy of England—apart from questions which involve her own particular interests, political or commercial—is to be the champion of justice and right; pursuing that course with moderation and prudence, not becoming the Quixote of the world, but giving the weight of her moral sanction and support wherever she thinks that justice is, and wherever she thinks that wrong has been done...I say that it is a narrow policy to suppose that this country or that is to be marked out as the eternal ally or the perpetual enemy of England. We have no eternal allies, and we have no perpetual enemies. Our interests are eternal and perpetual, and those interests it is our duty to follow... And if I might be allowed to express in one sentence the principle which I think ought to guide an English Minister, I would adopt the expression of Canning, and say that *with every British Minister, the interests of England ought to be the shibboleth of his policy.*" [Emphasis added] Speech to the House of Commons, March 1, 1848.

- Promotion, protection and safety of our overseas and coastal seaborne trade and our Sea Lines of Communication, including the ports that constitute the nodes of this trade.
- Support to marine scientific research, including that in Antarctica and the Arctic.
- (6) Provision of support — including succour and extrication-options — to our diaspora.

The question with regard to India's involvement in the South China Sea is simply this: *how many (if any) of these maritime interests does the South China Sea — and the developments therein — impact and to what degree?* The short answer is that of the foregoing enumeration, Serials 3 and 5(b) are impacted in the first degree by events and activities that induce security-related instability, while Serials (4) and (6) are impacted to a lesser degree.

Finally, India must ask itself whether or not it truly believes that 'freedom of navigation' is an intrinsic component of the aforementioned maritime interests. If so, India must carefully choose the time and spatial point of the translation of its geopolitical rhetoric in this regard into tangible action. In the meanwhile, New Delhi must keep a watchful eye on developments in the South China Sea.

DEVELOPMENT OF AEROSPACE INDUSTRY IN CHINA AND BRAZIL

VIVEK KAPUR

INTRODUCTION

India's aerospace industry has often been compared unfavourably to that of other countries that were at the same level as India was in 1947, when as a newly independent Third World country, it embarked upon a process of modernisation and nation building. This comparison is most often made with the People's Republic of China (PRC) and Brazil. Therefore, it is pertinent to take a look at the development of the aerospace industry in these two countries in order to compare it with the industry's growth in India. The benefit of the brief examination of the aerospace industries in the PRC and Brazil lies in ascertaining the role played by international cooperation and innovation in the development of these foreign aerospace industries.

GENESIS OF AIRCRAFT INDUSTRY IN CHINA

The Chinese had experimented with manned flight in several periods of their long history. Experiments were carried out with kites large enough to be able to carry a man aloft for observation of the surrounding area from a military perspective.¹ These experiments were followed by experiments

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1. Joseph J. Cornish, III, "Go Fly a Kite", http://www.naturalhistorymag.com/htmlsite/master.html?http://www.naturalhistorymag.com/htmlsite/editors_pick/1957_04_pick.html. Accessed on April 13, 2016.

In the early years of the development of Chinese aviation, especially military aviation, the main source of assistance, guidance, advice, financial support, and equipment for the Chinese Air Force was the Soviet Union.

with manned hydrogen filled balloons and rudimentary autogyros. However, nothing much came of these experiments until the early 20th century. In the chaotic period towards the last years of the Qing Empire, in 1910, an aircraft factory was set up by the Qing government at Nanyuan. The first aircraft built here was tested in 1911 but failed, resulting in cessation of further activities aimed at modern aviation technology for the time being in China.²

Several warlords in China, in the early 20th century, fielded air assets in the form of 'squadrons' of about ten aircraft each.³ The current day People's Liberation Army Air Force (PLAAF), the air force of the PRC, traces its origin to 1924.⁴ Several aircraft repair facilities were set up at various Chinese locations such as Qinghe and Beijing in the early 20th century. During the time of the joint rule of China by the Chinese Nationalists and the Communist Party of China (CPC), an aviation bureau was established in 1924, at the Huangpu Military Academy. Out of the intake of 50 pupils in the first batch of pilot trainees at this training institution, 18 were sent to the Soviet Union for training. In the early years of the development of Chinese aviation, especially military aviation, the main source of assistance, guidance, advice, financial support, and equipment for the Chinese Air Force was the Soviet Union.⁵ The Nationalist government undertook the establishment of a number of aircraft factories at Hanzhou, Shanghai, Nanjing and Wuchang in the early 1930s.⁶ These factories were set up with the assistance of various foreign powers from Europe and the US. The Central Nanchan Aircraft Factory was established in the early 1930s,⁷ in collaboration with the Italian firms

2. D. R. Mohanty, "The Dragon Flying High? Examining China's Aerospace Industry: The Maoist Era", *Strategic Analysis*, vol. 23, issue 12, 2000.

3. Xue Guangqiu, *War Wings: The United States and Chinese Military Aviation, 1929-1949* (London: Greenwood Press, 2001), pp. 30-36.

4. Mohanty, n.2.

5. Ibid.

6. Ibid.

7. Ibid.

and this factory was designed to produce aircraft under licence. The Shaoguan Aircraft Factory was established, in the early 1930s, in collaboration with Curtiss Aeroplane and Motor Company, later to become the Intercontinental Aircraft Corporation of the United States, and was also run jointly with the same American firm.⁸ The Air Force No. 3 Aircraft Factory was established at Chengdu by the mid-1930s. Another factory was established by the mid-1930s, in the Guizhou province for the production of American origin aviation specific piston engines.⁹

In 1930 and 1931, 43 American military aircraft worth \$ 1 million were delivered to China. In 1933, the American Curtiss Hawk fighter was demonstrated to the Chinese government.

In 1930 and 1931, 43 American military aircraft worth \$ 1 million were delivered to China¹⁰. In 1933, the American Curtiss Hawk fighter was demonstrated to the Chinese government. As a consequence, on indication of firm interest from the Chinese, the American Curtiss Airplane Company sent Mr. William Pawley to China for negotiating aircraft sales as well as setting up aircraft manufacturing factories in China. After protracted negotiations, Mr. Pawley signed a contract for the setting up of an aircraft factory at Hangzhou, at a cost of \$ 250,000. The Chinese Nationalist government was to repay this amount in five years. The factory was ready in mid-1934 and after repairing ten Curtiss Hawk aircraft, went on to manufacture 127 Hawk fighters, at least initially from imported kits, over the next 30 months.¹¹ The Central Aircraft Factory at Hangzhou was manufacturing 30 Vultee dive bombers in July 1937, when war with Japan broke out. After being bombed and damaged by the Japanese, this factory was shifted to Loiwing, close to the Burma border. At this location, the factory initially continued to manufacture Hawk fighters and Vultee dive bombers, though with some difficulties due to the incomplete infrastructure, inhospitable climate, and poor lines

8. Ibid.

9. Ibid.

10. Guangqiu, n. 3, pp. 41-43.

11. Ibid., pp. 69-70.

of communication at the new location. These adverse factors led to the production rate at the new location of the factory staying very low. The factory was again bombed by the Japanese in late 1940¹².

The brief history of the establishment of aircraft repair as well as production facilities covered above brings out very clearly that the Chinese aircraft industry owed its origin and initial development to extensive cooperation with countries that were more technologically advanced in general as well as specifically in the field of aviation. These aircraft factories set up in China had the capability to repair as well as produce aircraft. Production, however, remained rudimentary at the time, in part due to a general lack of skills and technical acumen in the workforce which was a consequence of the less than modern education system then in vogue, and the predominantly non-industrial nature of the Chinese economy. Aircraft design was apparently not carried out at all by the Chinese in the first half of the 20th century. The factories set up in the early 20th century remained just aircraft repair facilities, except for one factory at Hanzhou, that was set up and run in cooperation with the US.¹³

The Nationalist government apparently understood the importance of domestic skills in aviation and took serious steps to remedy the shortfall in human resource quality, especially with regard to high technology fields of endeavour such as aviation, and efforts were initiated to put in place a long-term plan for upgradation of the available human resource quality in the country. Several students were sent to technologically advanced foreign countries, especially to the Soviet Union and the US, to gain modern education well-grounded in science, especially in the field of aerospace technology. By the 1940s, the number of specially selected students sent abroad for such education and training exceeded 1,000.¹⁴ These students included several who later became China's leading experts in different fields of the aerospace industry, from rocket technology to aircraft, aircraft systems, and engine design. At the same time, aviation engineering courses were established at

12. *Ibid.*, pp. 131-135.

13. J. Niosi and J.Y.Zhao, "China's Catching up in Aerospace", *Int. J. Technology and Globalisation*, vol. 7, nos. 1/2, p.81.

14. Mohanty, n.2.

several universities in China, while facilities for research and experiments in aviation such as wind tunnels, were set up at universities with aircraft engineering courses, as well as at aviation factories and research institutes. This heavy investment in the setting up of an education system focussed on upgradation of aerospace knowledge and skills proved to be a boon in later years.

The first aircraft factory in China that did actually build aircraft, unlike the earlier effectively repair facilities, the Central Aircraft Manufacturing Company (CAMCO) was set up in 1934, six years before India built its first aircraft factory. Both countries set up their first aircraft factories in collaboration with the same American company, Intercontinental Aircraft Corporation of New York. Mr Pawley, a senior executive of this company, was involved in the establishment of aircraft factories in both China and India. As in India, the CAMCO aircraft factory set up at Hangzhou manufactured the Curtiss Hawk fighter and Vengeance dive bomber under licence, as the first two combat aircraft to be built in the country.

CHINESE AEROSPACE INDUSTRY POST 1949

The PRC was born through an armed struggle by the Chinese Communists, led by Mao Zedong, who later became the chairman of the Communist Party of China (CPC) against the Nationalists and the Japanese forces of occupation. The CPC was formed in 1921 initially as a study group within the Nationalist Party. The struggle between the CPC and the Chinese Nationalist government was characterised by the foot soldier, only infantry and irregular militia-based armed struggle.¹⁵ While mechanised forces were not used in any major way, application of aerial combat assets in the civil war between the CPC and the Nationalists was negligible. The CPC, at that time, did not possess any military aviation capability. The few Chinese aircraft that existed at the time were owned and operated by the Chinese Nationalist government.¹⁶ A very few relatively inconclusive air raids were

15. Chinadaily.com, "Oct. 1949: PRC is Established", http://www.chinadaily.com.cn/60th/2009-09/01/content_8642545.htm. Accessed on March, 17, 2015.

16. K. Hayward, *The Chinese Aerospace Industry — A Background Paper* (London: Royal Aeronautical Society, 2013), p. 4.

carried out by the Nationalist aviation forces against the Communist People's Liberation Army (PLA). The CPC prevailed over the Chinese Nationalists for a variety of reasons and established the PRC on October 1, 1949.¹⁷ The PRC inherited the few aircraft that the Nationalists had operated in addition to captured Japanese aircraft and personnel. The PRC now also owned the factories set up in China for the Nationalist government in collaboration with the US and other countries in the 1920s, 1930s, and 1940s. Thereafter the PRC was forced, for the next two decades, to rely upon the Soviet Union for its military supplies due to the geopolitics of the time.

After its formation in October 1949, the PRC commenced to build modern military forces and initiated steps to develop its economy and industrial capabilities. Yefim Gordon and Dmitriy Komissarov (2008) in their well-researched book on the Chinese aircraft industry, bring out that the modern Chinese aircraft industry was effectively born on April 17, 1951¹⁸ when the Central Military Commission (CMC) and Government Administration Council promulgated the "Resolution on Building an Aviation Industry". They then go on to describe in detail the progression of the setting up of the aircraft industry in the PRC in the early 1950s, bringing out the following points. The PRC decided to utilise the assistance of the Soviet Union in setting up facilities for production of aircraft. The Bureau of Aviation Industry (BAI) was set up in 1951 as the first authority to supervise the production of aircraft in China. Aircraft factories were set up under the PRC government ownership and control, with Soviet assistance, at several locations such as Nanchang, Shenyang, Chengdu, Harbin, and Xian to manufacture different aircraft. Actual production of aircraft at these factories commenced only in 1954, after the Korean War had ended.¹⁹ Yefim Gordon and Dmitriy Komissarov further bring out that these factories were originally set up to manufacture aircraft under licence. The factory at Nanchang commenced to make the CJ-5 trainer, a copy of the Soviet Yak-18 trainer aircraft, in 1954. This was the first aircraft manufactured in China to achieve a large production run. The CJ-5 was

17. n.15.

18. Yefim Gordon, and Dmitriy Komissarov, *Chinese Aircraft: Chinese Aviation Industry Since 1951* (Manchester: Hikoki Publications Ltd., 2008), p. 7.

19. *Ibid.*, p.7.

followed by the CJ-6, an entirely Chinese developed improved version of the earlier CJ-5, and then the J-5 subsonic jet fighter (a copy of the Soviet MiG-17) made at Shenyang in 1955, the J-6 supersonic jet fighter (a copy of the Soviet MiG-19) from 1959 and the supersonic J-7 (a variant of the Mach²⁰ 2.0 capable Soviet MiG-21) in 1961. In 1957, manufacture of transport / utility aircraft was commenced at Nanchang with the Y-5, a copy of the Soviet era An-2 biplane; preparations began in 1966 to manufacture the Y-7 (a variant of the Soviet An-24). In 1959, the Harbin Aircraft Factory commenced production of China's first helicopter, the Z-5 (a copy of the Soviet Mi-4 helicopter). Power plants for aviation applications were manufactured at the Zhuzhou plant. As the scope of aircraft building activities steadily increased, the BAI was upgraded to become the Third Ministry of Machine-Building by the end of the 1950s.²¹ Towards the late 1950s, the ill-conceived 'Great Leap Forward' launched by Chairman Mao, along with the steady and progressive deterioration in relations between the PRC and Soviet Union affected the Chinese aircraft industry adversely, leading to poor quality of output and stalled programmes. This period also saw the cooling of relations between PRC and the Soviet Union being followed by a total break in good relations in the 1960s. With the break in relations, the flow of technology from the Soviet Union stopped and all Soviet advisers, academics, and technicians were withdrawn from Chinese factories and research institutes. Deprived of the close interaction and guidance of the Soviets, China's aircraft industry was now forced to go it alone. Recovery from the Great Leap Forward led to the 'Cultural Revolution' launched by Chairman Mao in order to reassert his political position. The 'Cultural Revolution' also caused great harm to the Chinese aircraft industry as it laid emphasis on the Communist ideology over scientific and industrial progress. This situation continued till Mao's death in 1976.²²

In the late 1950s, Chinese aerospace professionals leveraged the education system and knowledge base built up since the setting up of China's first

20. The Mach number refers to a ratio of the speed achieved by a body or fluid to the local speed of sound at those conditions. Thus, Mach 2.0 indicates that the body is travelling at two times the ambient local speed of sound.

21. Gordon and Komissarov, n.18, p.7.

22. Ibid., pp.7-9.

Till the Sino-Soviet split in the early 1960s, the PRC had been building Soviet aircraft under licence with full support in technology and knowhow from the Soviets. After the split, Chinese aerospace professionals were forced to build and develop aircraft totally on their own.

aviation technology focussed universities. These aviation technology focussed universities offered courses in aviation. In addition, the knowledge brought back by students sponsored for aerospace courses abroad was also available. These measures helped China to internalise the knowledge gained through licensed production of Soviet designs. These Chinese aerospace professionals now moved towards building aircraft that involved major modification of the Soviet originals in order to meet local needs. The Soviet era MiG-19-based J-6 supersonic fighter was heavily modified to

develop the country's first dedicated strike aircraft, the Q-5, export versions of which are called the A-5.²³ Till the Sino-Soviet split in the early 1960s, the PRC had been building Soviet aircraft under licence with full support in technology and knowhow from the Soviets. After the split, Chinese aerospace professionals were forced to build and develop aircraft totally on their own. This period also led to the realisation in China that it needed to access and import several essential advanced technologies to be able to compete with the global leaders in aerospace.²⁴

It is important to understand that technology transfer is not like a tablet that can be swallowed. In order to obtain full technology transfer, the receiver of the technology requires being adequately knowledgeable in the relevant scientific and engineering principles of the concerned domain for the new technology being transferred to be understood by him, and internalised. A layman is unlikely to understand the theory and design philosophy of any new technological product unless he has the scientific and engineering knowledge to absorb it. Fortunately for the PRC, the build-up of skills through sending students abroad and the setting up of aerospace technology departments and

23. Ibid., pp. 143-163.

24. Niosi and Zhao, n.13, p.81.

research centres in universities in the country provided a pool of scientists and technicians with the required basic foundation of aerospace design and manufacture who were able to understand and absorb the technology made available to them through licensed manufacture of foreign aircraft.

The success of the indigenously designed Q-5 led to the development of the J-8 interceptor in the early 1960s to meet Chinese military needs. The Chinese designers in this case took the J-7, itself based on the initial Soviet MiG-21 design, as the foundation on which to develop the larger and more powerful J-8 interceptor. This programme also saw success with the original J-8 design entering frontline military service and undergoing upgradations and modifications over the years to improve from the original basic supersonic interceptor aircraft to a more able aircraft with some multi-role capabilities and improved avionics and systems. Late versions of the J-8-II and J-8-III continue in frontline service in the PLAAF even today.²⁵ The development of the J-8 is noteworthy in the context of much of the work on the aircraft development having taken place during the years of Chairman Mao's 'Great Leap Forward' and 'Cultural Revolution', the political movements which led to severe dislocation of all advanced technology industries and infrastructure in China; the fact that the J-8 design team was able to retain coherence and focus during these troubled times speaks volumes about the dedication, management skills and high design skill levels available amongst China's aerospace professionals even in the 1950s and 1960s. During this period, due to the severe dislocation of personnel and resources, most of the output of China's aircraft industry was sub-standard and was often found unfit for induction into service by the PLAAF, making the success of the J-8 even more noteworthy.²⁶

For the decade of the 1960s, China was forced to go forward totally alone in the aerospace industry due to the impending split with the Soviet Union having come through and China's inability to deal with the West due to the prevailing political situation.

25. Gordon and Komissarov, n.18, pp. 75-89.

26. *Ibid.*, pp. 7-8.

For the decade of the 1960s, China was forced to go forward totally alone in the aerospace industry due to the impending split with the Soviet Union having come through and China's inability to deal with the West due to the prevailing political situation. However, from the early 1970s, the situation improved to a great degree for China. In the game of international *realpolitik* and great power manoeuvring, the United States saw advantage in reaching out to the PRC, then estranged from the Soviets, to align against the common enemy, the Soviet Union. This led to exploration through intermediaries of the possibility of normalised relations between the PRC and US. Attempts to rebuild relations between the US and PRC achieved success, exemplified by the visit to Beijing by US President Nixon in 1972.²⁷ While political peace was made between the PRC and US, and economic ties were enhanced, the situation was not normalised to the extent that completely free transfer of armaments and other cutting edge technology was permitted into the PRC from the West. The movement of high technologies to China from the West was closely monitored by the US as well as by the European agencies. However, despite this reluctance to part with cutting edge technology, several civil and dual use technologies were cleared for transfer to the PRC for the supposedly civil space programme, aimed at enabling Chinese satellites to provide services to improve the lot of the common man, as well as for Chinese aviation, mainly civil.

Through this opening up to the West and increase in economic linkages, China gained considerable access to Western aerospace technology. Chinese aviation firms won contracts to build sub-components for the US McDonnell Douglas MD-82/83 airliners. The MD-82/83 airliners were also fully assembled in China²⁸. This licensed production and the inevitable reverse engineering carried out by Chinese scientists and engineers enabled this new phase of international cooperation to fill the gaps in China's indigenous aerospace capability while also introducing advanced Western technologies, concepts and methods into China's aerospace industry. The Chinese imported 13 French SA 321Ja "Super Frelon" medium helicopters in 1977-

27. Niosi, and Zhao, n. 13, p. 82.

28. Gordon and Komissarov, n. 18, pp. 9-10.

78 and promptly reverse engineered them to commence building them in China as the Z-8 in various variants to meet the country's requirements. The principal sub-contracts won by Chinese aviation firms progressively came to form linkages with almost all major aerospace companies in the West; with Boeing, for the manufacture of vertical fins, horizontal stabilisers and rear fuselage; with McDonnell Douglas for the manufacture of the nose section and horizontal stabilisers for the MD-82 and MD-90. In addition, there was a wide array of smaller contracts for aircraft doors, wing sections, turbine disks, blades, bores, rings, atmosphere instruments, meteorological radars, general radar instruments, navigation and control systems, pumps, and valves. The Chinese industry progressed from purely compensation trade, akin to offsets in today's Indian context, to becoming a competitive global supplier of components, including being the sole supplier of some items such as the Boeing-747 wing rear ribs, Boeing-737 maintenance doors, BAe 146 doors, Dash-8 cargo doors and gas turbine components²⁹.

In these contracts for sub-contract work, the Chinese firms involved had to build components with the quality and reliability expected by Western aerospace majors and conforming to Western civil aviation certification standards. This need forced the PRC's aerospace industry to upgrade its standards and capability on a war-footing, with the inevitable spillover to its military and other purely domestic programmes. Several Western aero-engine manufacturers also commenced to make engine components in China and a few even set up complete engine assembly facilities. This assisted the Chinese in supplementing the knowledge gained from licensed production of Soviet aircraft and engines with equivalent Western knowledge. The latter was usually more advanced and had higher quality and specifications. Many Chinese civil aircraft also began to be made to meet Western airworthiness regulations and with Western power plants to increase their fuel efficiency and export potential³⁰. Over time, the involvement of Chinese firms moved to more complex and cutting edge products in terms of their sub-contracting

29. P. Nolan and J. Zhang, *The Challenge Of Globalization for Large Chinese Firms*, UNCTAD/OSG/DP/162 No. 162 (Geneva: UNCTAD, 2002).

30. Gordon and Komissarov, n. 18, p. 9.

deals. Many of these deals had unintended spinoffs. For instance, the performance of jet engines, in terms of thrust, fuel efficiency, and noise signature, is dependent upon not merely the basic engine design and construction, but also on the design of the nacelle that the engine is housed in. The manufacture of Western airliners under licence enabled Chinese engineers and scientists to absorb the then state-of-the-art in the design of engine nacelles amongst other critical design features. This learning could then be utilised in other areas of China's aerospace industry in the design of fighter, utility and transport aircraft.

The development of the Chinese aerospace industry, thus, owes considerably to international cooperation between China and countries that were more advanced in science and technology, in general, and specifically, in the aerospace industry. An important feature of the Chinese experience was the building up of a firm scientific and engineering foundation in aerospace knowledge to enable the absorption of advanced technology. The ability to be able to access both Soviet and Western technologies assisted the Chinese in understanding and internalising both. This put them in a position to make use of the more appropriate technology for each unique situation. Wherever in-country education fell short, they did not hesitate to sponsor suitable people to undergo the required courses in foreign universities or to invite outside experts to help upgrade the system in Chinese universities. Availability of this well trained and highly educated workforce proved crucial in absorbing transfers of technology and even in reverse engineering foreign designs.

The process of configuring the Chinese aerospace industry to enable upgradation of Chinese capabilities in aerospace saw several structural changes as well. The Third Ministry of Machine Building that had been formed in the late 1950s was made the Ministry of Aviation Industry in 1982. Still later, it became the Ministry of Aviation and Aerospace Industry. In 1993, this ministry formed a very large government owned company called China Aviation Industry Corporation (AVIC) as a separate entity. AVIC was a huge company, with almost 500,000 employees and a large number

of facilities spread all over China³¹. In 1999, in an attempt to bring in greater efficiency, China established ten new state owned aviation corporations and AVIC was split into two organisations, AVIC-I (which was to prioritise work on large and medium size aircraft, fighters and bombers) and AVIC-II (which was to prioritise light and medium aircraft such as feeder class passenger aircraft and helicopters). The two AVICs were equal economic entities, authorised to operate as holding companies. At that time, both parts of AVIC had approximately 560,000 employees³². The two AVICs often had somewhat confusing and even overlapping mandates. In 2008, the two parts of AVIC were merged to once again to form a single entity called AVIC. AVIC has many subsidiary companies engaged in various aspects of the aerospace industry.

Many of the subsidiary companies of AVIC have entered into independent collaborative agreements with Western aerospace companies for sub-contracting work. In addition, these subsidiary companies have, either alone or in concert with other sister companies, undertaken licensed manufacture of foreign aircraft and also design and development work on new indigenous aircraft projects³³.

The preparations for developing the aerospace industry did not stop at just the cooperative arrangements with foreign aerospace firms from technologically advanced countries and industry restructuring. The Chinese had understood as early as in the early 20th century that upgradation of the knowledge and skills of the population were the key to being able to compete in the modern world. Hence, as was seen earlier in this paper, they initiated the twin track programme from the 1920s to 1940s of sending selected students to foreign countries for education in aerospace technologies and, in parallel, of setting up departments of aviation technology in Chinese universities, complete with wind tunnels and other infrastructure, to enable education, training and research to be undertaken. The focus on education and research to develop the human skills continued apace in later years also.

31. Niosi and Zhao, n. 13, p. 82.

32. Gordon and Komissarov, n. 18, pp. 9-18.

33. Ibid.

BUAA maintains a large infrastructure aimed at aerospace education and research. It also utilises international cooperation to keep abreast of the latest technological advances in the world.

Several Chinese universities offer advanced courses in aerospace and aircraft design, engineering and manufacturing. A few of the prominent Chinese universities offering such courses are the Beijing University of Aeronautics and Astronautics (BUAA), Nanjing Aeronautics and Astronautics University (NUAA) in Nanjing, Harbin Institute of Technology (HIT), Tsinghua University (Beijing), and Northwestern Polytechnic University (NPU) in Xian. NPU was established originally in 1938 as the Northwest Institute of Engineering, in Hanzhong, central China; it was moved to Xian in 1957, and was renamed as NPU.³⁴ BUAA and NUAA were founded in 1952. In 2012-13, BUAA had over 3,300 faculty and staff members, 26,000 students and 88 laboratories. In addition, BUAA had 152 cooperation agreements with over 40 foreign universities and research organisations in the advanced Western countries, including the US, Germany, France, and also with Russia. It also calls over 1,000 foreign experts every year to lecture at the university or to conduct research. In this manner, BUAA maintains a large infrastructure aimed at aerospace education and research. It also utilises international cooperation to keep abreast of the latest technological advances in the world. The sponsoring of research by foreign experts in BUAA could be expected to help induct BUAA faculty and students into the methods and areas of cutting edge research. Such activities could also reasonably be expected to help upgrade China's research infrastructure to world standards. These academic endeavours enable BUAA to produce well trained graduates able to make an effective contribution to China's aerospace industry in addition to the research in aerospace technologies also being carried out at BUAA. The situation with the other Chinese universities offering aerospace courses is similar to that of BUAA, though the scale of staff, students and cooperative arrangements naturally varies somewhat. NUAA, meanwhile, has evolved from being a teaching technical university

34. Ibid., pp. 82-84.

to a dedicated research centre. NPU has an Aircraft Department which was founded in 1952, and its National Laboratory of Aerodynamics Design and Research owns the largest low-speed wind tunnel in Asia, as well as several other wind tunnels. These facilities obviously enable students and faculty alike to carry out research activities in different aspects of aerospace technologies. Tsinghua University, located in Beijing, one of the top higher education institutions in the country, includes China's School of Aerospace³⁵.

The PRC's institutional infrastructure includes more than 30 government owned laboratories. All of these are placed under AVIC overall. These laboratories cover almost all aspects of aerospace technology. These laboratories are improving steadily and are well manned. The Research and Development (R&D) personnel strength at individual laboratories varies from as low as 110 to as many as 2,500 R&D personnel. The output from these laboratories is also steadily improving³⁶.

There has been a steady policy of setting up an ever increasing number of educational and research institutes in the aerospace field since the early 1950s in China. The PRC has transformed these into centres of excellence in the respective fields and utilises them to facilitate inward technology transfer from technology owners, in both Russia and the West. Of these laboratories, one of the earliest and the largest today is the Beijing International Aeronautical Materials Corporation (BIAM). Founded in 1956, it conducts advanced R&D in aerospace materials such as titanium, aluminium alloys, super-alloys, and composite materials. BIAM has a total staff of approximately 2,700, including 1,400 research personnel. The China Gas Turbine Research Establishment

There has been a steady policy of setting up an ever increasing number of educational and research institutes in the aerospace field since the early 1950s in China. The PRC has transformed these into centres of excellence in the respective fields and utilises them to facilitate inward technology transfer from technology owners, in both Russia and the West.

35. Ibid.

36. Niosi and Zhao, n.13, pp. 83-85.

(CGTE) founded in 1965 is located in Chengdu. CGTE employs 900 R&D staff, and conducts R&D in aero-engine technology. A third one deserving special mention is the Chengdu Aircraft Design Institute (CADI), a subsidiary of the Chengdu Aircraft Industry Corporation. CADI has 1,800 employees including, 1300 technical people who specialise in 80 sub-disciplines of the aerospace industry³⁷.

Cooperative deals to manufacture aerospace components by Chinese firms for Western aerospace majors has led to China gaining technology for construction of airframe structures, including skin panels and their fitment, composite materials complex structure fabrication, assembly of wings and entire aircraft, Fly-By-Wire (FBW) components and architecture, gas turbine engine components, environmental control systems, landing gears, and navigation and communication equipment. These inward technology transfers have been obtained from a large number of Western aerospace companies through sub-contracts and other cooperative arrangements³⁸.

Understandably, despite the extensive economic interlinkages, sub-contract work and cooperative manufacturing tie-ups with Chinese companies, the owners of the most advanced technologies were loath to share their very latest cutting edge civil as well as military technologies with the PRC. When faced with such situations, the PRC has demonstrated a pragmatic determination to obtain the desired technologies through resorting to conventional espionage as well as through cyber attack and other technological means such as hacking into computer systems operated by foreign high technology companies and foreign government agencies³⁹.

INNOVATION IN THE PRC'S AEROSPACE INDUSTRY

The examination of the PRC's aerospace industry brings out the role of innovation also. The PRC adopted an innovative state-led education system to build up a human resource bank of highly qualified and capable aerospace scientists and engineers. It also set up research facilities in several locations.

37. Ibid.

38. Ibid., pp. 85-86.

39. Hayward, n. 16, p. 8.

Thereafter, at the structural level, the PRC tried out several different structures for the domestic aerospace industry to finally settle on the single holding company with a multitude of subsidiary corporations model. In acquisition of technology and advanced knowhow and knowwhy, the PRC utilised licensed manufacturing and sub-component and component supplier contracts to gain access to advanced technology. Where this failed, PRC did not hesitate to utilise conventional espionage and cyber technology to gain access to restricted technology and knowledge. In its manufacturing level also, it displayed great innovation in modifying foreign designs to fully meet domestic requirements. This progressively led on to the design and development of its own equipment.

The PRC has applied innovation in many ways in developing its aerospace industry. Incremental innovation can be seen in the progressive improvement of the Soviet aircraft being built under licence to achieve greater performance and reliability in order to meet local requirements. Disruptive innovation is seen in the Chinese endeavours to build modern aircraft able to compete effectively with the best on offer from the more advanced aerospace powers in the West and Russia. Such a challenge from China, if successful, could overturn the very structure of the global aerospace industry, causing great upheaval in the process.

SUMMARY OF ROLE OF COOPERATION IN DEVELOPMENT OF THE PRC'S AEROSPACE INDUSTRY

To sum up, quite clearly, it is evident that China has successfully utilised international cooperation through sub-contracting work and licensing deals to progressively build up its indigenous capabilities in the aerospace industry. Where the desired technology could not be obtained through these means, the PRC pragmatically resorted to espionage and cyber attacks to gain access to advanced aerospace technologies. The major factor for its success lies in the PRC's decision to establish an effective education and scientific research infrastructure especially focussed at upgrading the country's knowledge and skill levels in the field of aerospace technology. This effort formed the foundation that has enabled the PRC to effectively absorb and internalise

technology from disparate sources. Today, China possesses the full range of aerospace specific design and development, testing, production, marketing, upgrading, in-service product support, and management capabilities. These make the PRC one of the few countries in the world with the capability to design and manufacture the entire range of aircraft and associated systems. The presence of a large domestic market gives the Chinese aerospace industry scope to grow in the near to medium term future to a level where it is able to present a viable challenge to today's world leaders in aerospace technologies and products. China has also cooperated with the less advanced countries in the aerospace industry. An example is cooperation with Pakistan for the K-8 'Karakoram' jet trainer and the JF-17 'Thunder' / FC-1 'Xiaolong' which in translation is 'Fierce Dragon' fighter. In both these cases, Pakistan, with its greater exposure to Western aircraft, helped set the performance parameters and through licensed production, helped secure a larger production run for the aircraft. The launch export customer for both the K-8 and FC-1 / JF-17 was Pakistan. This initial sale helped increase the orders for the aircraft as well as to generate interest in other customers for the same aircraft. Pakistan which builds the JF-17 under licence from CAC has also displayed this aircraft at international air shows⁴⁰. The K-8 / JL-8 jet trainer is operated by Egypt, Ghana, Myanmar, Namibia, Pakistan, China, Sri Lanka, Sudan, Tanzania, Zambia, and Zimbabwe⁴¹.

DEVELOPMENT OF THE AEROSPACE INDUSTRY IN BRAZIL

The Political Situation and Early Aviation in Brazil

Brazil was, since the time of European colonial expansion into South America, a plantation colony under Portuguese control. In 1822, the ruler of Brazil declared its independence from Portugal. The first republic was declared in 1889 after a *coup d'état*. This republic lasted till 1930. However,

40. Business inquirer.net, "Pakistan Sells its JF-17 Fighter Jet at Paris Air Show", <http://business.inquirer.net/193568/pakistan-sells-its-jf-17-fighter-jet-at-paris-air-show>. Accessed on May 26, 2016.

41. Airforce-technology.com, "K-8 Karakorum Light Attack and Jet Trainer Aircraft, Pakistan", <http://www.airforce-technology.com/projects/hongdu-k8/>. Accessed on May 18, 2016.

though nominally democratic, in reality, power during this first republic was concentrated in the hands of a few large landowners. Mr. Vargas, a leader with fascist leanings, seized power in a bloodless coup in 1930. He then ruled for 15 years till 1945, when he was overthrown in another bloodless coup, ushering in a democratic system of governance. However, political instability in the post-World War II years led to a military coup in 1964. The military then ruled the country till 1985.

Early Brazilian Aviation Innovators

Alberto Santos Dumont was born in Brazil in 1873, to a rich coffee planter. At the age of 18, he went to Paris for his education. While in Paris he commenced experiments with hot air balloons, including developing steering mechanisms for these devices. This led him further towards dirigibles. After solving the problems with hot air balloons, he turned his attention to heavier than air flight. After several attempts between September and November 1906, he achieved a series of flights of a maximum of 220 metres (m) distance at a height of 6 m above ground level⁴². Dumont is regarded in Brazil as the pioneer of flight, in that, unlike the Wright Brothers, he completed his first flight, including an unaided take-off from flat land, straight level flight and landing without any ramp or such device. Moreover, this feat was conducted on a fixed day and not based on prevailing weather, especially wind, conditions. Also, it was done in front of witnesses and judges. Dumont is a hero in Brazil and his feat enthused the country about aviation⁴³.

DEVELOPMENT OF AEROSPACE INDUSTRY IN BRAZIL

The Brazilian Aeronautics Ministry was created on January 21, 1941. Its objective was to develop, expand and coordinate the activities of the technical and economic aspects of national aviation. It sought the ends of both technological progress and national security.

42. Smithsonian.education.org, "Highlights in Aviation Alberto Santos Dumont", <http://www.smithsonianeducation.org/scitech/impacto/graphic/aviation/alberto.html>. Accessed on March, 17 2015.

43. A. Downie, "A Century on, Brazil Still Claims Flight's First", <http://www.csmonitor.com/2006/1023/p07s02-woam.html>. Accessed on March, 16 2015.

In 1954, the Institute for Research and Development (IPD) was also set up within CTA. IPD's departments included aircraft, electronics, materials, and engines. IPD's objectives included testing and approving new aircraft developed in Brazil or those modified in Brazil.

At the end of World War II, a group of *Força Aérea Brasileira* (FAB), the Brazilian Air Force officers led by Brig. Casimiro Montenegro, in collaboration with the Massachusetts Institute of Technology (MIT), began to plan the establishment of a Brazilian aircraft industry. On January 29, 1946, this body was named the Organising Committee of Aeronautics Technical Centre (COCTA)⁴⁴.

COCTA was tasked to establish the scientific and technical body of the Ministry of Aviation. This scientific and technical body of the Ministry of Aviation, called the Aeronautics Technical Centre (CTA) was officially established at Rio de Janeiro on March 25, 1949. The city of São José dos Campos (SP) was chosen to host the facility's technology centre due to its favourable topography, availability of adequate electricity supply, and comfortable climate. Its job done, the COCTA was disbanded in 1953.

A premier national level training institute, the Aeronautics Technological Institute (ITA), was established on January 16, 1950. ITA was headquartered at the CTA's Department of Science Aerospace and Technology (DCTA). The CTA and its ITA were transferred from Rio de Janeiro to Sao Jose Campos in 1950. The aeronautical engineering course taught at the Army Technical School at Rio de Janeiro was also transferred to the ITA.

The class that commenced its course in 1947 at Rio de Janeiro graduated in 1950 from San Jose dos fields. The students at ITA were all national scholarship holders who were provided free tuition as well as free boarding and lodging, with health care included⁴⁵. Progressively, ITA began to offer courses in other specialisations with relevance to the aircraft industry such as electronics, mechanical engineering, and aeronautics infrastructure. In

44. Embraer.com, "Our History", <http://www.embraer.com/en-US/ConhecaEmbraer/our/Pages/default.aspx>. Accessed on March, 16 2015.

45. J.E. Cassiolato, *Transfer of Technology for Successful Integration into the Global Economy* (New York and Geneva: United Nations, 2002), p. 11.

addition to graduate level courses, it later began to offer Masters and Doctoral level courses also.

In 1954, the CTA's new facilities at Sao Jose dos Campos were being built. CTA was the scientific and technical body of the Ministry of Aeronautics. It was to carry out activities on behalf of the FAB, civil aviation and the aviation industry, according to the plans and programmes of the Aeronautics Ministry. In addition, the CTA's mission was to conduct scientific and technological research projects in order to increase the available knowledge base.

In 1954, the Institute for Research and Development (IPD) was also set up within CTA. IPD's departments included aircraft, electronics, materials, and engines⁴⁶. IPD's objectives included testing and approving new aircraft developed in Brazil or those modified in Brazil.

It can be seen that over time, the country focussed almost all its aviation facilities at one location. These facilities included education, training, design and manufacture and R&D facilities. Such colocation could have advantages of better coordination and utilisation of resources. In 1951, a unique aircraft development project called the *Convertiplano*, was initiated. This machine was to feature a single engine driving four propellers. This machine was designed by the CTA and DCTA and German Professor Heinrich Focke, the German pioneer designer of helicopters, was the team leader for this project. The *Convertiplano* was designed to take off like a helicopter and then to fly horizontally like a normal aircraft⁴⁷.

Private companies to make aircraft in Brazil started to be formed in the years after World War II. In 1954, businessman José Carlos de Barros Neiva founded the *Indústria Aeronáutica Neiva*. This company was initially

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46. Downie, n. 43.

47. n. 44.

located at the airport at Rio de Janeiro but later moved to Botucatu city. It started to design and manufacture gliders. But, in later years, it went on to manufacture the light aircraft Paulistinha, a light trainer for civil and military use of which as many as 800 were produced for use in Brazil as well as in its neighbouring countries. This aircraft was manufactured till 1967⁴⁸. Later, this company produced the Regent U-42, a four-seat high wing monoplane for observation duties in military use. The U-42 design started in 1959, and first flew in 1961. A civil version was also developed. Another version for the FAB had a provision to carry light armament⁴⁹. This company later produced more designs similar to the U-42, in collaboration with American light aircraft firms. In 1960, Nevia opened an engineering centre in Sao Paulo dos Campos where CTA was also located⁵⁰. A few other small companies to manufacture light aircraft were also set up in various parts of Brazil in the post-World War II years⁵¹. Till the 1960s, all aircraft manufactured in Brazil had been light aircraft. In 1964-65, a medium size aircraft able to carry up to 20 passengers was cleared for development by the government and the project was initiated at CTA.

The Brazilian military was vocal in its view that for effective security, the country could not rely upon imported equipment for its aviation users, and required to design and build aircraft within the country. In the years immediately after the military coup in 1964, the earlier close cooperation between the military and public sector technicians was revived. The most important event in the decade of the 1960s from the aviation viewpoint in Brazil was the formation of Embraer (Empresa Brasileira de Aeronautica – Brazilian Aeronautical Corporation) in 1969. The Brazilian government held a majority stake in Embraer.

Embraer was formed as a state owned and operated concern⁵². It took over responsibility for developing the twin turboprop 20 passenger aircraft, called the Bandeirante, which had been assigned to CTA a few years earlier.

48. Ibid.

49. Ibid.

50. Ibid.

51. Ibid.

52. This was similar to a Public Sector Undertaking (PSU) in the Indian context.

The government provided a lot of support to Embraer through avoidance of red tape, in terms of orders, international agreements as well as finance from state-owned banks⁵³. Embraer started production of aircraft in the 1970s in collaboration with foreign partners.

This strategy was chosen to avoid technological bottlenecks and to achieve rapid sales and economic sustainability. In addition, Embraer decided to avoid vertical integration⁵⁴. It was feared that vertical integration may lead to fragmentation of the industry, with efforts being devoted to too many subsidiary aspects of the aircraft industry. Instead, Embraer decided to focus just on designing aircraft, producing the fuselage and assembling the final product. Embraer wilfully refrained from investing in the manufacture of high technology high value components that could require significant resource allocation, alongside possible time and cost overruns⁵⁵. In pursuit of this avoidance of a vertical integration strategy, in the 1970s, Embraer signed long-term supply contracts with various component suppliers.

The Embraer designed Ipanema light agricultural aircraft flew in 1970. Embraer commenced manufacture of the Xavante under licence from Aermacchi in 1971. In 1978, the FAB tasked Embraer to develop a training aircraft to fill the gap between basic trainers and operational aircraft. The output of this project was the EMB-312 Tucano. Embraer's two best selling aircraft were the Tucano military trainer and the Bandeirante twin turboprop unpressurised aircraft. Both these aircraft were designed in Brazil but of the latter's value, more than half was imported⁵⁶.

Embraer carried out fruitful collaborations with Italian aircraft manufacturers in building the Xavante jet trainer, the Aermacchi MB-326, originally, under licence from Aermacchi. In this deal, several Embraer technicians were sent to Aermacchi's facilities in Italy to assimilate the

53. A.Goldstein, *Embraer: From National Champion To Global Player* (Paris: OECD, 2002), p. 100.

54. Vertical integration refers to a company carrying out most upstream and downstream activities involved in making its main product in-house. For example, if a steel company was involved in ore mining, its transportation to factories and shipping of finished products to the market, it would be a vertically integrated company. China's aircraft industry is vertically integrated as it makes all the components required itself.

55. OECD, N-217.

56. Goldstein, n. 53, p. 100.

technology involved in the aircraft's production. This process helped internalise the knowledge gained in licensed production of the Xavante. Later, the AMX light fighter/ground attack aircraft was developed and manufactured, in cooperation with Aeritalia and Aermacchi.

Brazil also used the threat of a sharp increase in import duties to force manufacturers of general aviation light aircraft to manufacture their products in Brazil. Piper of the US that followed the Brazilian 'forced path', increased its share of the Brazilian light aircraft market dramatically over its competitors Cessna and Beech. This process helped Brazil gain technical and organisational knowledge in series production⁵⁷. Embraer also initiated a process of encouraging local privately held firms to supply an increasing number of components for its products, thus, setting up an aviation ecosystem in the country. Embraer maintained a strong focus on exports. This export orientation enabled larger production runs, covered the costs of development and production, and forced the company to comply with international certification standards while also demanding exacting quality standards.

Embraer also decided to capitalise on building aircraft for harsh climatic, environmental and infrastructural conditions. It aimed at building rugged aircraft able to operate from backward areas, with minimum support infrastructure, often from compacted dirt airstrips, and at low cost, with ease of maintenance built into the design. This strategy delivered great success to the company⁵⁸. Embraer achieved success of sales of its Bandeirante commuter aircraft and Tucano trainer by developing and selling products that were not as advanced as those on offer from Western companies but served the purpose, with innovative design features to achieve high performance at a relatively low cost point. In the 1980s, despite financial troubles, Embraer introduced the EMB-120 Brasilia and a 30-seat pressurised twin turboprop aircraft derived from the Bandeirante. In the 1980s, Embraer got the Brasilia certified for operation, and the Tucano turboprop trainer, and the light aircraft Xingu were successfully exported to the highly competitive

57. *Ibid.*, p. 100.

58. *Ibid.*, p. 100.

European region, while Embraer commenced development of its EMB-145 series of jet propelled commercial aircraft. Meanwhile, the first AMX built in Brazil was rolled out and delivered. The world recession of the late 1980s and increased protectionism of the advanced economies, however, forced Embraer into a dire financial situation⁵⁹.

In December 1994, Embraer was privatised. The government continued to hold a stake in the company and also held a golden share, thus, holding veto power in company activities. Other conditions of the privatisation included a limitation of 40 percent on foreign ownership, a six-month moratorium on layoffs, and strictures banning major changes in business directions. The company also underwent an internal renewal process to improve efficiency and competitiveness⁶⁰. Privatisation was used as a tool to make the company more efficient and productive while still retaining government control through the golden share.

In the 1990s, Embraer continued to design and build more jet powered aircraft for the short haul and business aviation markets. In order to address assessed markets, Embraer developed the ERJ 135 and the Embraer 170 and 190 aircraft in addition to its Phenom and Legacy series of business jets.

ANALYSIS OF EMBRAER'S SUCCESS

After privatisation, Embraer has restructured to reduce costs, including outsourcing several administrative and routine maintenance services and tasks. Embraer continued development of its regional jets of close to 50 passenger seats each on seeing an emerging market for these. Later, it developed other aircraft with less as well as more seats. The basic strategy of Embraer did not change.

Embraer continued to aim for the world market more than trying to service the domestic market alone. This is shown very clearly by the revenue break-up of the company. From 1997 onwards, more than 80 percent of Embraer's revenues have come from the export market. This percentage increased to

59. *Ibid.*, p. 100.

60. *Ibid.*, p. 100.

over 95 percent from 1999 till 2001 at least⁶¹. The turnover of the Brazilian Aerospace Industry in 2005 was \$ 3.41 billion⁶². In the years 2012 to 2014, the revenues were above \$ 6 billion, peaking at \$6.29 billion in the year 2014⁶³. In 2015, revenues fell slightly to \$ 5.93 billion⁶⁴. Of this, 90 percent was from export sales.

In another division, 87.3 percent of the revenues came from activities in aeronautics, 9.29 percent from defence and 0.24 percent from space⁶⁵. Thus, Embraer has focussed primarily on the civil market with defence and space activities contributing a mere 9.29 per cent and 0.24 per cent of Embraer's revenues.

Embraer has cooperative agreements with companies in the US, Europe, China, Asia, and Africa. These cooperative agreements span a diverse range of activities. Some agreements are in relation to Embraer sourcing components, parts, and equipment for its products. Others are for sales and servicing of its aircraft, and still others involve Embraer cooperating with companies in other geographical locations to build its aircraft designs under licence. Embraer is the fourth largest aerospace company after Boeing, Airbus and Bombardier. It competes against Bombardier in the short haul regional airliner and business jet markets. Embraer's aircraft fly in the skies of all continents. Without doubt, Embraer is a major success story of how the aerospace industry in a developing country was able to develop its capabilities to an extent where it is able to compete head to head with some of the most advanced aerospace companies in the world.

THE ROLE OF COOPERATION IN BRAZIL'S AEROSPACE INDUSTRY

Cooperation, as seen earlier in this paper, has played a very prominent role in the development of Brazil's aerospace industry. In fact, this aspect

61. *Ibid.*, p. 103.

62. Statista.com, "Embraer's Net Revenue from FY 2005 to FY 2015 (in billion U.S. dollars)", <http://www.statista.com/statistics/269936/net-revenue-of-embraer-since-2005/>. Accessed on May 18, 2016.

63. *Ibid.*

64. *Ibid.*

65. W.Bartels, "Aerospace Industries Association of Brazil: Aeronautics in Brazil", (presentation delivered in Vienna/, Austria, on June 19-21, 2006).

of cooperation continues to play an even larger role today than it did in the past. Brazil used cooperation with the more advanced countries to gain knowledge of the state-of-the-art in aerospace technologies elsewhere in the world. This took the form of licensed manufacture of foreign designs. Internalisation of the knowledge gained was assisted by the presence of a well-educated and trained pool of aerospace professionals. Brazil's Embraer opted to avoid the traditional path of aircraft manufacturers of making almost all the required parts itself and focussing on just design, airframe construction and integration of all components to complete the machine from the very beginning of its

foray into the aircraft industry. Boeing and Airbus adopted a similar strategy only in the late 1990s⁶⁶. At the time that Embraer opted for this strategy, there was no precedent in the aircraft industry to help hazard a guess about its feasibility. The strategy worked for Embraer, and, in hindsight, this proved to be prophetic.

Today, even legendary names such as Boeing in the US are airframe manufacturers and integrators of all the components that go into an aircraft. The components, parts and even sub-assemblies required for an aircraft, while these may be designed or their performance characteristics decided at Boeing, are manufactured at locations as diverse as the US, Asia and even Africa, in search of efficient manufacturing to the required quality at the least cost. The reason that Brazil has been able to reach the position of Embraer being the fourth largest aerospace company in the world, ahead of China, despite

Brazil used cooperation with the more advanced countries to gain knowledge of the state-of-the-art in aerospace technologies elsewhere in the world. This took the form of licensed manufacture of foreign designs. Internalisation of the knowledge gained was assisted by the presence of a well-educated and trained pool of aerospace professionals.

66. N-217, N-219, N-220; Mustafa Erdem Sakiç, "Systems Integration in Question – A Comparison of Airbus and Boeing", International Research and Regulation Seminar, Paris, June 10-12, 2015, pp. 2-12.

the latter's size and resources, may lie in the international cooperation and airframe maker and integrator business plan chosen by Embraer. Brazil also relied upon international cooperation to set up its aerospace infrastructure. MIT of the US was asked to assist in setting up CTA and its subsidiary departments and facilities.

Embraer continues to follow its strategy of designing the aircraft overall, building the airframe and integrating component and sub-component parts sourced from a large number of vendors both within Brazil and from other countries. Such a strategy inherently relies upon cooperation for success.

Embraer has active cooperative arrangements with companies and facilities in the following countries:

- Belgium.
- Chile.
- China.
- France.
- Germany.
- Italy.
- Japan.
- Spain.
- Sweden.
- United Kingdom.
- United States.
- Russia.

These partnerships include sourcing of complete components, co-development of technologies and components, risk sharing in the overall Embraer project by component suppliers, testing of designs in test facilities such as wing testing in Russia's TsAGI's transonic wind tunnel, licensed assembly of Embraer aircraft and technology transfer, both inbound and outbound⁶⁷.

The examination of the aerospace industry in Brazil and China brings out the importance and relevance of international cooperation for the

67. Golgstein, n. 53, pp. 108-112.

effective development of an aerospace industry. Thus, it can be concluded that cooperation between countries less advanced in aerospace and those more advanced in this field is desirable for the less advanced country to achieve inward transfer of technology. However, the caveat is that the technology receiving country should have an education policy and system that can prepare a sufficiently large number of personnel educated and trained in aerospace knowledge and skills, including to the advanced levels of Masters and Doctoral levels in education and state-of-the-art cutting edge technology and designing concepts, manufacturing, integration skills. Such personnel, if up to the speed on the technology available in the country and with an educated view of the more advanced technology being developed elsewhere, would be the key in effective inward transfer of technology and its internalisation. Cooperation between countries having about the same level of technology in aerospace is also desirable. This helps each learn from the strengths of the other to fill any gaps that may exist in each part's capabilities⁶⁸. A spinoff is the larger production runs potentially possible, with economies of scale being a benefit. Thus, Embraer licenses the manufacture of its aircraft to Chinese companies to achieve sales in China and to gain potentially low cost parts suppliers, while the Chinese learn from Brazil's strengths in short haul aircraft design and manufacture. The end result is a win-win situation for both countries. It goes without saying that the capabilities in the two cooperating countries should be complementary for this strategy to succeed. For example, Brazil imported fighters from Europe, the Mirage-III earlier and now the Swedish Gripen, but exported the Tucano trainer and light commercial aircraft such as the Xingu and its regional jets to European operators. The two case studies of China and Brazil offer pointers towards successful cooperation.

68. An example of this is the cooperation between China and Brazil. China has a more rounded multiple capabilities-based aerospace industry which, however, has till date been unable to match global standards in design, efficiency and certification, especially in the area of civil aviation products. On the other hand, China has the ability to carry out quick and efficient low cost manufacturing and advanced R&D in many aspects of the aerospace industry. Brazil is a world leader in designing and integrating commuter and short haul civil aircraft. Thus, the ongoing cooperation between them through assembly of Embraer's regional jets in China helps each party learn and benefit from the other's key competencies that are lacked by the other partner.

ROLE OF INNOVATION IN BRAZIL'S AEROSPACE INDUSTRY

Apart from the role of cooperation, the aspect of innovation has also been at play in the development of Brazil's aerospace industry. Brazil's first aviator, Alberto Santos Dumont, displayed remarkable technical innovation in his experiments, with steerable hot air balloons and dirigibles in Paris, leading on to his heavier than air aircraft designs. In Brazil, the setting up of an aerospace industry by the government displayed innovation in the first instance in establishing a training and research centre for design and development activities. Thereafter, the country utilised cooperation to gain access to technology that could be readily internalised. The first aircraft to be designed in Brazil, the *Convertoplano*, featured the innovation of a single engine driving four different propellers. Later, Brazil chose the niche of rugged and easy to maintain aircraft able to operate in less developed regions with little aviation infrastructure as its Unique Service Proposition (USP). In addition, it eschewed establishing of its presence in all parts of the aviation industry to being a designer, airframe builder and integrator alone, well before this strategy was the norm in other countries. For its products, it was one of the first to choose to build regional commuter aircraft, trainers and light business aviation aircraft and short haul airliners only⁶⁹. Embraer also decided to focus on the export market much more than its own domestic market. These innovations have helped it to achieve success in the highly competitive global aerospace market.

CONCLUSION

The brief examination of the development of the aerospace industries in the PRC and Brazil brings out similarities between them in their formation. In both cases, the governments in power recognised the importance of an independent and capable aerospace industry. The governments also understood the importance of modern education, especially in aerospace disciplines. In both cases, first, a pool of educated and trained personnel was

69. Boeing, Airbus, Dassault , etc. all produce a wide range of aircraft, while Bombardier, that specialises in business jets and short haul airliners such as those marketed by Embraer, entered the aviation arena in 1986 by buying *Candair*, which company had earlier built a wide range of aircraft..

built up. The PRC's and Brazil's military also understood the importance of being self-sufficient in aerospace technologies and products and so gave wholehearted support to their domestic aerospace industries. In both cases, the most suitable students available were chosen for undergoing education in the aerospace field, both within their parent countries as well as in the more advanced countries. Also, an effective infrastructure for education, training and R&D in aircraft technologies was established. This was done with active government support and through obtaining guidance and assistance from leading education, training and R&D institutes in the more advanced countries. In this process, international cooperation was utilised to set in place the necessary infrastructure and specialised scientific knowledge in aerospace technologies. Such international cooperation, as covered earlier, involved asking leading institutes of scientific research for assistance in establishing syllabi, research facilities, and to train faculty. Exchange programmes, for faculty and students, with these leading scientific institutes were maintained in later years also. Thereafter, licensed production of aircraft was undertaken more with an aim to internalise new knowledge. The presence of a pool of well-educated and motivated personnel made this technology transfer possible. Thereafter, the PRC, for its security compulsions, decided to engage in the full process of aircraft design, development support and maintenance, including the main structure and all components and sub-components. Brazil, on the other hand, opted to design and build airframes and to integrate the components and sub-components as the designer-integrator. It chose to avoid investing in high technology areas that could result in cost and time overruns. Both these aerospace industries were initiated under government control as state-owned and operated enterprises; the PRC's aerospace industry continues to be state-owned and operated, while Brazil privatised its aerospace industry over two decades ago. The PRC is competitive in the military aspects of this industry, while Brazil has achieved global competitiveness in its chosen field of regional and business jet design, sales and support. In addition, it has one tandem seat turboprop trainer, the EMB-312 "Tucano", which is

also offered in the EMB-314 light attack variant⁷⁰. The Tucano has achieved several export sales including to the UK and France.⁷¹

LESSONS AND LEARNING FROM THE CASE STUDY

Three major takeaways from this examination are:

- Firstly, the importance of the government and defence forces recognising the importance of domestic self-sufficiency in the aerospace field.
- Secondly, the need to build up a good base of well-educated and trained aerospace personnel comprising scientists, engineers and skilled workmen to be able to develop aerospace technologies, and
- Thirdly, the utilisation of international cooperation and innovation to internalise technology transfers from the more advanced countries for own benefit.

70. Embraer.com, "Tucano Operators Conference", <http://www.embraer.com.br/en-us/imprensaeventos/press-releases/noticias/pages/embraer-organiza-a-1-conferencia-dos-operadores-do-tucano.aspx>. Accessed on May 26, 2016.

71. Of the industrially advanced countries, the EMB-312 trainer aircraft was flown by France and the UK. France ordered 80 Tucano aircraft in the early 1990s. The order for 80 was reduced to 50, with induction starting in 1994. These aircraft were withdrawn from service after 15 years despite many flying hours remaining on them. [airforce-technology.com, "EMB-312 Tucano Trainer Aircraft, Brazil", http://www.airforce-technology.com/projects/emb-312-tucano-trainer-aircraft/](http://www.airforce-technology.com/projects/emb-312-tucano-trainer-aircraft/). Accessed on May 26, 2016.

EVOLUTION OF IAF HELICOPTERS - II CONSOLIDATION POST-1971 WAR

BS NIJJAR

By the late 1960s, an increase in Counter-Insurgency (COIN) operations and establishment of Indian Army/Assam Rifles outposts in relatively hostile areas of Mizoram and Nagaland, with an associated presence in Tripura, necessitated an increase in the commitment for the air maintenance effort by the Indian Air Force (IAF). This was largely undertaken by the C-47 Dakotas. There were also reports by ground troops about a substantial amount of stores being irrecoverable due to their being air-dropped in inaccessible ravines. The errors in drop accuracy were mainly on account of the small size of the Drop Zones (DZs). It was clear by the late 1960s that helicopters were an alternative worth exploring. The platform had already demonstrated these capabilities during the re-taking of Aizawl in the Mizoram operations.

Further, the significant success of helicopter operations in the outcome of the Bangladesh War of independence was partly due to the lessons learnt during the COIN operations in the northeast, along with the extensive planning carried out prior to the actual commencement of hostilities. This included devolving the decision-making to the Tactical Air Commands (TACs) set up especially for the purpose and, in a few cases, even to the field level. However, the roles in which helicopters could be employed kept on diversifying. Increased requirements logically

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When the Mi-8s, which were almost twice as capable as the Mi-4s, were offered by the Soviets, there was no hesitation to acquire these twin engine helicopters powered by the latest turbine engines.

led to further inductions of newer and more capable platforms.

INDUCTION OF MI-8S IN VIP AND OFFSHORE ROLES

When the Mi-8s, which were almost twice as capable as the Mi-4s, were offered by the Soviets, there was no hesitation to acquire these twin engine helicopters powered by the latest turbine engines. These capable helicopters, along with the economics of acquiring them from the Soviet

Union, fitted perfectly with the IAF's requirements of the times.

After duly evaluating them in the North-East Frontier Agency (NEFA) in mid-1969, initial orders for 36 Mi-8s were placed to equip two Helicopter Units (HUs) viz. no 118 HU and 119 HU. This was followed by replacing the Mi-4s of 109 HU. Gradually, these helicopters took over the air maintenance tasks from the Dakotas in both the eastern and western sectors. As was the case with all helicopters, these were also tasked to undertake a role for VIP duties from time to time. However, it was only in 1984 that the Mi-8s also formally became a part of the Air Headquarters (HQ) Communication Squadron, which was formed on November 1, 1947, at Air Force Station, Palam, to convey VVIPs/VIPs of India and visiting foreign heads of states and governments. Post 1971 operations, it was an Mi-8 helicopter which transported Pakistani President ZA Bhutto and his party from Chandigarh to Simla for the historic Simla Accord in June 1972.¹

The progressive induction of Mi-8s continued, with these gradually replacing the Mi-4s which were finally de-commissioned by 1981 after having been in service for over 20 years. The Mi-8s thereafter were also increasingly tasked with additional ground breaking responsibilities. These included supporting offshore oil exploration activities by the Oil & Natural Gas Commission of India (ONGC) and the Indian endeavours in Antarctica.

1. Pushpinder Singh, *History of the Indian Air Force: Volume III* (New Delhi: The Society of Aerospace Studies, 2007), p. 59.

In 1972, the initial efforts of ONGC for oil exploration were supported by Chetak helicopters of No.121 Helicopter Flight (HF). These single engine helicopters equipped with floats, made the first passenger trip to the Sagar-Samrat offshore drilling rig in 'Bombay High' in September 1973. Their relatively smaller size made it possible for them to land on smaller decks also. However, their size also limited their payload capacity and, thus, a need was felt to have a larger helicopter for this role.

To meet the increased tasks, the Mi-8s were inducted into 121 HF in October 1974 to support the ever increasing efforts of ONGC in its offshore oil exploration in the Arabian Sea. This role continues till today with an upgradation of the Mi-8s to the Mi-17s.

Earlier, in May 1972, the helicopters from 107 HU had already proven their worth and had been called upon to conduct searches over the sea for 22 ONGC personnel on board a small vessel. Having successfully located the vessel, vital medicines, water and food were dropped for the vessel. This effort, in addition to having an inherently high safety margin due to the twin engines, governed the decision for their induction in the offshore role. Hence, to meet the increased tasks, the Mi-8s were inducted into 121 HF in October 1974 to support the ever increasing efforts of ONGC in its offshore oil exploration in the Arabian Sea.² This role continues till today with an upgradation of the Mi-8s to the Mi-17s.

THE ANTARCTICA CONNECTION

With an intention to undertake scientific research and exploration in Antarctica, the first expedition of 77 days commenced on December 6, 1981, and was further followed up by yearly expeditions. The first two expeditions were largely exploratory. For the third expedition, the Government of India (GoI) tasked the three Services to help establish a permanent station. During this expedition, which established Dakshin-Gangotri as the first permanent station, the three Services played a major role. A total of 13 IAF personnel, including a doctor, formed a part of this mission. Thereafter,

2. Ibid., p. 59.

during the fourth expedition, the second permanent station, "Maitree Hill", was established and preliminary reconnaissance for a South Pole expedition was also carried out.³

Two Mi-8s formed a part of the third expedition which left Vasco Da Gama (Goa) on December 3, 1983, aboard the *Finnpolaris* which was a Finnish ice-class cargo vessel. On December 28, 1983, the Mi-8s commenced flying by ferrying the advance party of army engineers to the chosen site. On the very first day, while undertaking underslung operations from the deck of the ship, one of the Mi-8s crashed into the icy waters. There was no loss of life and all personnel on board were rescued. However, the loss meant that all the equipment on board the helicopter was now to be transported inside the fuselage as the crew had also realised the perils of undertaking underslung operations under windy conditions. Such an operation from a ship was probably being attempted for the first time.⁴ However to the credit of the operating crew, the second helicopter remained serviceable and by January 28, 1984, it had flown over 220 sorties, transporting over 200 tonnes of load.

Many lessons were learnt while operating the helicopters from the deck of a ship. The varied operations included logistic support operations, casualty evacuation, aerial reconnaissance and iceberg landings in often near white-out conditions in hilly, rough and icy terrain. The challenge of keeping the machine airworthy at all times was readily taken up by the accompanying technical personnel. The lessons included aero-medical aspects of protection of eyes from the glare from the snow, and measures to be undertaken for preventing hypothermia and frostbite.⁵ These pioneers also laid a foundation and drafted standard operating procedures for the conduct of helicopter operations for subsequent expeditions. Thus, the helicopters made an immense contribution to the success of these expeditions and, more importantly, gained the experience of working for prolonged durations

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3. Flt Lt Vijayan EK, "Memoirs", Member IVth Indian Scientific Expedition to Antarctica, Centre for Armed Forces Historical Research (CAFHR), USI Archives.
 4. National Centre for Antarctic & Ocean Research, "Scientific Report of Third Indian Expedition to Antarctica: Introduction & Album", <http://hdl.handle.net/123456789/670>. Accessed on July 5, 2016.
 5. Sqn Ldr KI Trivedi, "Assignment to Icy Continent", Member IIIrd Indian Scientific Expedition to Antarctica, CAFHR Archive.

under sub-zero temperatures. Little did they know that the experience so gained would be utilised back home also, as warning bells were ringing in the region of sub-zero temperatures within India, but at a much higher altitude, where the highest battlefield in the world, at the Siachen glacier, was about to be activated.

THE SIACHEN GLACIER: OP MEGHDOOT, INDUCTION OF MI-17 AND MI-26

The battle for controlling the Siachen glacier started immediately after the 1971 War. Mountaineering expeditions from various parts of the world had been to the Siachen area much prior to 1970. However, from the early 1970s, Pakistan started charging a licence fee for these expeditions, and by 1978, in an attempt to legitimise its claim, it also started sending military officers as a part of the expeditions for liaison duties.⁶ Subsequently, it started depicting those areas to be a part of Pakistan in its maps.

A chance reporting of the matter by a Japanese expedition member set the alarm bells ringing in the Indian establishment. By this time, within the Indian polity, there was some recognition about the importance of the area and, thus, India also devised a counter strategy and started sending exploratory army expeditions to the area. These commenced in 1978 in the form of annual expeditions and patrols to the region.⁷

The onus of providing air cover for these expeditions fell upon the helicopters of 114 HU. They were called in to provide the necessary air support to the first ever army exploratory expedition which was led by Col Narendra Kumar of the Army High Altitude Warfare School. The first sortie to Siachen was launched on September 20, 1978, by a Chetak helicopter, mainly in the logistic support and casevac (casualty evacuation) role. As this expedition progressed, the first casevac was undertaken on October 6, 1978, from the Siachen Advance Base Camp.⁸ The Chetak helicopters were soon

6. Jasjit Singh, *Kargil 1999: Pakistan's Fourth War for Kashmir* (New Delhi: KW Publishers, 1999), p. 81.

7. CAFHR, "Siachin", Air HQ Letter No. 99717/83/38/Org dtd February 4, 1993, CAFHR Archive.

8. Manmohan Bahadur, "NDTV.com: I Have Rescued Jawans at Siachin You Never Forget it- February 5, 2016", <http://www.ndtv.com/opinion/ive-rescued-jawans-at-siachen-you-never-forget-it-1273940>. Accessed on March 10, 2016.

modified with “snow-skids” to land on snow covered helipads, however, it was clear that the Cheetah (SA 215 Lama) helicopter would be more suited to operate in the prevailing conditions. As early as May 8, 1969, the Cheetah helicopter (SA 315), being produced by Hindustan Aeronautics Limited (HAL), had landed at an altitude of 22,500 ft in Karakoram as a part of flight trials. Hence, the Cheetah was subsequently tasked extensively to undertake operations in the Ladakh sector, especially in the Siachen glacier. A task, which is continuing to this day as a part of Operation Meghdoot which was launched in 1984.

On March 28, 1984 India launched Operation Meghdoot to preempt Pakistan’s intention of securing the Siachen glacier. The glacier was secured by April 17, 1984, and Pakistan’s repeated attempts to gain a foothold in the Saltoro watershed were thwarted by the Indian troops. However, due to the almost daily exchange of fire, it became an active battlefield. The army, till date, continues to undertake patrols at heights of upto 20,000 ft with temperatures as low as minus 40°. Motorable roads at these heights are virtually non-existent.

These conditions mandated the use of helicopters that could operate at those altitudes with sufficient load lifting capacities. It was already clear during the conduct of the operations that the Cheetah was most suited to undertake these operations but a need was felt to augment and replace the Mi-8s as they were operating at the boundaries of their manufacturer-specified performance limits. In certain cases, the graphs for the expected altitude of operation were not even specified by the manufacturer⁹—the graphs were being used by extrapolating the lines.

Hence, the Mi-17s were inducted on June 10, 1985 (No. 127 HU was raised)¹⁰ and they commenced their operations as part of Operation Meghdoot by September 1985. Even though at those altitudes, the Mi-17 could lift only 25 percent of its payload lifting capacity at sea level, it was the best helicopter

9. Rajesh Isser, *The Purple Legacy: Indian Air Force Helicopters in Service of the Nation* (New Delhi: Pentagon Press, 2012), p. 138.

10. Singh, n.1, p.60.

available and, thus, was utilised for all high altitude operations.¹¹ Casevac, communication and logistic supply sorties to the forward posts involving landing of the helicopter continued to be undertaken by the Cheetah.

The build-up of troops also needed a huge infrastructure, the build-up of which was limited by the road access which was open during the summer months only. Recognising the strategic importance of the region and also being aware of the relative ease of access to the region by the Chinese and Pakistani troops, along with an imperative need to build up a sizeable presence, India evaluated, and placed orders for, the world's largest helicopter, the Mi-26 (Bhim) from the Soviet Union.

The first two of the four helicopters ordered arrived by ship on April 25, 1986, and had their maiden flights on May 31, 1986, and June 1, 1986, respectively. By July 29, 1986, high altitude trials were conducted in Thoise and Siachen, with a hover at Kumar post. On September 9, 1986, the first landing was executed at Daulet Beg Oldi (DBO) at 17,000 ft, the world's highest landing zone. Thereafter, started one of the most significant operational uses of the heavy lift helicopter, with heli-lift of a one-tonner, a jonga, prefabricated huts and other supplies to DBO, along with hospital containers to Thoise (Thoise being an acronym for a transit halt of induction to Siachen). The maximum lifting capacity at favourable temperatures was 5,000 kg at DBO. The Mi-26, thus, contributed significantly by heli-lifting heavy as well as odd sized stores to forward areas where the ground defences were built and reinforced .

The Mi-26 was also thereafter moved to the eastern part of the country to heli-lift army field guns, ammunition, trailers, wheeled vehicles and bulldozers. The heli-lifting of dozers to multiple locations resulted in the construction of the strategically important Hayuliang to Walong road by the Border Roads Task Force (BRTF) in record time.¹² The development of the road, besides improving connectivity and contributing to the development of the region, also improved the security infrastructure of the region.

11.. CAFHR, "Air Maintenance by Mi-17 Hepters in Siachin Area", A report by 153 HU, April 18, 1994.

12. CAFHR, "126 HFAF: Brief History Oct 85- Aug 04", A report by No.126 HF, CAFHR Archive

It is understood that the army's proposal for its own aviation corps was mooted in 1963, after the 1962 War. Effective use of transport aircraft and helicopters during the operations in both the western and the eastern theatres to support the retreating ground forces governed the proposal.

Thus, the conduct and progress of Operation Meghdoot played a pivotal role in the expansion of the helicopter fleets of both the IAF and the army as a part of the Army Aviation Corps. The army already had a rich history of its Air Observation Post Flights (AOP Flts) taking part in various operations since their establishment prior to independence.

ARMY AVIATION CORPS (AAC) AND INDUCTION OF THE MI-25/35 HELICOPTER

The proposal by the army for significantly expanding its own limited air assets was mooted as far back as 1949. The Joint Staff Committee (JSC), while examining the proposal, had entrusted the task to the IAF. The JSC had also agreed that the IAF needed to consolidate and, consequently, had approved the tasking of the IAF to meet all the requirements of the army.¹³

It is understood that the army's proposal for its own aviation corps was mooted in 1963, after the 1962 War. Effective use of transport aircraft and helicopters during the operations in both the western and the eastern theatres to support the retreating ground forces governed the proposal. In 1969-71, a decision was also taken to equip the AOP flights with the Chetak for the plains, and the Cheetahs for the mountains.¹⁴

By this time, there was adequate awareness about the roles that an armed helicopter can play in the kind of conflict situations being faced by the country. Also, the modification on the Chetak, to enable it to carry rocket pods, as was done during the 1971 Bangladesh liberation operations, was discontinued. Hence, when an opportunity arose, the first of the dedicated assault helicopters, the Mi-25s, were inducted into the IAF's inventory in November 1983, with the raising of No. 125 (Helicopter) Squadron.

13. History Division, GoI, "Experience of Air Force and Air Force Matters:JPC Paper No. 28(49) on Intercommunication Flight for the Army, November 18,1949", File no. 601/1513/H

14. Rajiv Ghose, *Army Aviation in Modern Warfare* (New Delhi: KW Publishers, 2011), p. 16

By the time the second attack helicopter squadron was formed in March 1990 (104 Sqn), the AAC had already been formed, on November 1, 1986. The salient points of the government's decision to create the AAC were¹⁵:

- All Air OP units to be transferred to the army, and to be wholly manned, maintained and controlled by it.
- The army to have its own utility helicopter units, which would be wholly manned, maintained and controlled by it.
- Attack helicopter units would continue to be IAF assets, but placed under the command and control of the army for the duration of the operations.
- The army would create its own Air Traffic Control (ATC) facilities at the army's aviation bases.
- The army would create its own organisational infrastructure for the management of its army aviation units.

Presently, with its own fleet of helicopters, the army is operating a mix of Chetak, Cheetah and Advanced Light Helicopters (ALHs), besides undertaking exercises with the two attack helicopter squadrons of the IAF.

Presently, with its own fleet of helicopters, the army is operating a mix of Chetak, Cheetah and Advanced Light Helicopters (ALHs), besides undertaking exercises with the two attack helicopter squadrons of the IAF. The creation of the AAC was a long drawn out process and caused much heartburn between the two "sister" Services. The debate over the projected requirement of the attack helicopter and requirement of their own fleets of transport aircraft continues till today.

However, with the Government of India's decision to intervene militarily in the events occurring in Sri Lanka, for the first time, simultaneous operations by the helicopters being operated by the army and air force were conducted. The joint structure to exercise control over the IAF helicopters (including the attack helicopters) had been activated for the first time since 1971 and was immediately put to test.

15. Vijay Oberoi, *Indian Army Aviation 2025* (New Delhi: KW Publishers, 2007), p. 6

SRI LANKA OPERATIONS: OPERATION PAWAN

On July 30, 1987, induction of the Indian Peace-Keeping Force (IPKF) started in Sri Lanka after the signing of the Indo-Sri Lanka agreement, with an initial task of “supervising the surrender of arms of all militant groups”. The Indian forces had to commit to active operations against the Liberation Tigers of Tamil Eelam (LTTE) when 12 LTTE cadres committed suicide in the custody of the Sri Lankan Army (SLA) on October 10, 1987. This intervention was mainly to enforce the surrender of arms. By May 1988, the strength of the IPKF had been progressively increased to 60,000 troops. Operations were conducted till it was assessed, politically as well as militarily, that elections could be held. Provincial council elections were thereafter held on November 19, 1988; the presidential election on December 19, 1988; and the parliamentary elections on February 10, 1989. This was followed by the de-induction of IPKF troops from Sri Lanka which was completed by March 25, 1990.

Specifically, the involvement of IAF helicopters commenced on July 24, 1987, i.e. even before the accord was signed in Colombo on July 29, 1987. They were tasked to land at Jaffna to pick up LTTE supremo Prabhakaran who proceeded to Delhi via Thanjavur for discussions. The first troops were airlifted on July 30, 1987, and six Mi-17s were put on standby at Thanjavur as a part of a Quick Reaction Force (QRF) under the direct control of Air Headquarters (HQ). These Mi-17s were later replaced by the Mi-8s which were the first to be inducted—five at Jaffna and one at Trincomalee. During August to September 1987, the LTTE’s top echelons freely utilised these helicopters to move around and meet their cadres and other personnel. The LTTE was, thus, fully exposed to all the happenings of the IPKF, with the reverse not being so.

Initially, helicopters provided extensive air maintenance and logistics support to the army. With the commencement of hostilities, the Mi-8s were often escorted by the Mi-25s (inducted on October 23, 1987) to provide suppressive fire. Subsequent operations by the Mi-25s proved to be highly effective owing to their accurate engagement of targets. The use of the Mi-8s, Mi-17s, armed Chetaks and Mi-25s resulted in the LTTE adopting guerrilla

type warfare tactics. To counter these, a number of Special Heliborne Operation (SHBO) missions were planned and executed. By the end of March 1990, the Mi-80s had heli-lifted 68,579 troops and over 8,971 tonnes in over 19,545 operational missions. The Mi-17s heli-lifted over 26,331 troops and 4,150 tonnes of load in over 5,036 sorties. The air effort on the part of the Anti-Tank Guided Missile (ATGM) Chetak and Mi-25s amounted to 587 and 1,023 sorties respectively.¹⁶ The operations against the militants in the COIN mode utilising the firepower of the Mi-25s and the tactical mobility of the Mi-8/MI-17s was highly effective and proved to be a real force multiplier. An important highlight of these operations was the effectiveness of the Mi-25s in jungle terrain. The initial hesitation to use the newly acquired gunships paved the way for their full-fledged deployment, with the escalation of the hostilities. Their successful employment in a carefully calibrated manner to avoid civilian casualties resulted in evolving procedures for undertaking escort and close support missions to own troops, wherein they acted as ‘an airborne artillery’, neutralising the LTTE war-waging assets. Numerous lessons were also learnt during the actual conduct of operations.

A classical example of one such coordinated mission was undertaken during Operation Checkmate (June 17, 1988 to September 15, 1988) on June 23, 1988. The mission plan involved searching of hideouts with the help of heliborne para-commandos, who would be winched down from helicopters into clearings in the jungle and be picked up again after a search of the area—this exercise was repeated for multiple sites. The Mi-8 would be escorted by an Mi-25 gunship.¹⁷ During the first such mission itself, the Mi-8 and the commandos were fired upon while being winched down. The timely intervention by the Mi-25s resulted in limiting the casualties, and possible loss of the aircraft. Thereafter, this format of a tactical heli-insertion and extraction escorted by the gunship was standardised for all such missions. The extensive use of helicopters in both the armed, logistic support and casevac roles, in close coordination with, and in direct support of, the army,

16. Bharat Kumar, *Operation Pawan: Role of Air Power with IPKF* (New Delhi: Manohar Publishers, 2015), pp. 392-395.

17. *Ibid.*, p. 233.

resulted in formalising procedures as well as promoting the cause of the army to extend the scope of its own helicopter fleet, now known as the Recce and Observation (R&O) flights.

This experience gained in operating the Mi-8s/Mi-17s and Mi-25s in such an integrated mode was also thereafter effectively utilised in the tasking of helicopters for various United Nations (UN) missions.

ROLE OF HELICOPTERS IN UN MISSIONS : PART I

In October 1993, helicopters were inducted into Somalia in support of Indian troops as a part of the UN peace-keeping mission. Two Chetaks in the ATGM configuration were inducted to undertake the tasks of road opening, convoy escort, aerial reconnaissance, communication and casevac. This mission by the IAF for the UN was undertaken after a gap of over 30 years and lasted till December 21,1994.

For the first time, helicopters formed a part of such a mission.¹⁸ The pre-departure preparation by the Chetak ATGMs included live firing of missiles in the Pokhran range. The first sortie was launched within an hour of the Indian contingent's arrival from India. The helicopters were mostly used in the recce and casevac roles. During one such casevac operation, they were utilised to provided evacuation services to the "bandits" who had attacked the soldiers of the Mahar regiment of the Indian Army.¹⁹

Thus, the experience gained during this mission and the contribution made by the Indian contingent to the overall UN tasks, paved the way for the participation by Indian helicopters in subsequent missions also. Meanwhile, hostilities with Pakistan were once again about to commence, this time in the Kargil sector.

KARGIL OPERATIONS: OPERATION SAFED SAGAR

In May 1999, clandestinely carried out infiltration by regular Pakistan Army troops in the Kargil-Dras sector was detected. The Pakistani troops had occupied positions of advantage which enabled them to threaten the

18. Isser, n. 9, p. 8.

19. IAF, "IAF Contingent in Somalia", www.indianairforce.nic.in/show_page.php?pg_id=136. Accessed on August 8, 2016.

Kargil valley and the national highway 1A. The Indian Army, though initially caught by surprise, moved in swiftly to clear the occupied posts, and suffered heavy casualties. The Cabinet Committee on Security (CCS) approved limited IAF offensive action on own side of the Line of Control (LoC), probably to avoid the escalatory effect of air power. The IAF combat power had to be applied in the mountainous terrain at an altitude exceeding 15,000ft and, to its credit, it did so without any delay.

The IAF was also called upon to deploy the Mi-25s/35s but were unable to do so due to their operating limitations, and instead deployed the Mi-17s with an intention of pounding the enemy positions with rocket projectiles while remaining on own side of the LoC. The initial estimate of 600 infiltrators was a gross underestimation of the numbers involved as were their capabilities in terms of availability of Surface-to-Air Missiles (SAMs). By May 28,1999, three IAF aircraft, a MiG-27, a MiG-21 and an Mi-17 were lost—the MiG-27 due to an engine malfunction and other two to enemy action.

As a result of the loss of the Mi-17, and after a careful reassessment of the threat, the offensive role for the Mi-17s was discontinued, and thereafter, these were used for the tasks of casevac, troop induction, air maintenance and tactical air support. The Chetak and Cheetah helicopters were also tasked extensively and besides undertaking routine duties of Search and Rescue (SAR) and communication, undertook at least 50 Airborne Forward Air Control (ABFAC) missions between May 1999 and July 19, 1999.²⁰ Notably, it was during these operations that Flying Officer Gunjan Saxena became the first woman pilot in the IAF to fly a helicopter in a war zone without crossing the LoC.²¹ It was an achievement of sorts as the women helicopter pilots who had been first inducted for training in 1993, had, till then, been utilised for non-combat aircrew duties only.

The operation which ended in July 1999, taught valuable lessons to the military planners in terms of the need for accurate intelligence based upon threat perception, concept of “jointness” in operations and application of air power in high altitude operations. The success of the helicopter as an

20. Isser, n. 9, p. 168.

21. “MOD Approves Induction of Women as Fighter Pilots”, *India Strategic*, vol. 10, November 11, 2015.

The loss of a helicopter during the Kargil operation and the inability to use the Mi-25 attack helicopter, did stimulate the thought in the IAF establishment to have a rotor wing capability for undertaking attack helicopter operations at higher altitudes also.

offensive platform had fuelled the invention of counter-measures in terms of shoulder-fired munitions. Consequently, the necessity of constantly changing tactics and availability of onboard counter-measures was also realised. The inability of utilising the Mi-25s/35s at the operating altitudes required for undertaking the Kargil operations brought back the focus on the indigenous manufacturing capabilities of HAL. A need was felt to design a helicopter for the unique operational environment faced by the Indian armed forces, especially in the high altitude regions.

By the turn of the century, the Mi-17s had been undertaking operations under Operation Meghdoot for over 15 years; they were operating at their performance limits and there was now a need to augment them. The process for acquisition which had been initiated in the mid-1990s fructified in 2000, when the Mi-171Vs (Mi-17 One Vees) were inducted between 2000 to 2003. These were essentially upgraded versions of the Mi-17s, with a rear opening ramp instead of a clamshell door.

Thus, the loss of a helicopter during the Kargil operation and the inability to use the Mi-25 attack helicopter, did stimulate the thought in the IAF establishment to have a rotor wing capability for undertaking attack helicopter operations at higher altitudes also. However, the learning curve by the IAF helicopters continued to rise, with the acceptance of a greater role in UN peace-keeping missions which were in addition to the ongoing commitments for Operation Meghdoot and air maintenance tasks in the eastern sector.

ROLE OF HELICOPTERS IN UN MISSIONS : PART II

The first UN mission in 1993 was followed by the United Nations Mission in Sierra Leone (UNAMSIL) from December 1999 to February 2001. The IAF contributed a self-contained contingent of 212 personnel along with eight

helicopters (three each of Mi-35 and Mi-8 helicopters along with two Chetaks). The operational highlight of this mission was the mounting of "Operation Khukri" in coordination with three Chinooks and one C-130 of the Royal Air Force, to rescue two companies of 5/8 Gorkha Rifles which had been under siege by the rebels/militants for over two months. In a well planned, coordinated and executed action, over 222 troops were extricated by a forceful and decisive action.²² The plan, having in-built flexibility, which was executed under trying circumstances and adverse weather conditions, contributed

immensely to the experience as also evidenced by the figures of the ammunition used, which included firing of 7,906 12.7mm rounds and over 918 Rocket Projectiles (RPs). This highlighted the potential and the ability of IAF helicopters to undertake missions in coordination with friendly forces.

By the time the IAF helicopters were tasked to undertake other such operations in the Democratic Republic of Congo (DRC) as a part of the United Nations Mission in the Republic of Congo (MONUC), they were well prepared for the task at hand. MONUC was an eight-year commitment in support of the Indian Army and UN forces, commencing in 2003. The mandate of the mission was to lend offensive support to the humanitarian tasks of the peace-keeping force during which over 18,000 accident-free sorties were flown by the Mi-17s, and the Mi-25s clocked over 5,000 flight hours during various missions.

Contributions to UN missions further expanded with the UN mission in Sudan (UNMIS) in 2005. The operations in Sudan were undertaken from October 2005 to December 2010, according to well established Standard Operating Procedures (SOPs), and the coordination achieved with their

The mission was different from the others as it had to operate under the "peace-enforcement" mandate which was different from the earlier "peace-keeping" mandate. The helicopters were utilised in multiple roles and, by the end of the mission, had airlifted 14,35,814 kg of load, transporting 71,814 passengers, while clocking 10,420 hours of flying.

22. Isser, n. 9 , p. 247.

own and allied UN troops was of a very high degree. This mission was different from the others as it had to operate under the “peace-enforcement” mandate which was different from the earlier “peace-keeping” mandate. The helicopters were utilised in multiple roles and, by the end of the mission, had airlifted 14,35,814 kg of load, transporting 71,814 passengers, while clocking 10,420 hours of flying.²³ The professionalism and competence shown by the personnel involved stood them in good stead and was well appreciated and recognised by the UN. However, with the IAF being increasingly tasked for the movement of Central Armed Paramilitary Forces (CAPFs) during the anti-Naxal operations back in India and also on the suggestion by the IAF to recall around 15 helicopters deputed for UN peace-keeping operations due to resource constraints, the UN missions undertaken by the helicopters came to an end.²⁴

These resource constraints were a result of the extensive demands having been placed upon a limited number of helicopters with the immediate cause being the tasking of helicopters for fighting the Naxals in addition to the tasking for Operation Meghdoot.

The state of IAF helicopters, predominantly of Russian origin, was also highlighted during an audit of the “Mi series” of IAF helicopters, undertaken by the Comptroller and Auditor General (CAG). This independent and comprehensive evaluation was carried out by the CAG, Government of India (GoI) in 2008-09, and submitted its report in Financial Year (FY) 2010-11.

CAG REPORT²⁵

The audit conducted by CAG on the operation and maintenance aspects of the Mi series of helicopters of the IAF, which constitute around 60 percent of its total helicopter fleet, submitted its report in FY 2010-11. The auditor pointed out a deficit of 26 percent in total availability of helicopters

23. *Ibid.*, p. 9.

24. *Indiatoday.in*, “Anti-Naxal Ops: IAF for Recall of Choppers on UN Missions”, www.indiatoday.intoday.in/story/antinaxal-ops-iaf-for-recall-of-choppers-on-un-missions/1/102248.html. Accessed on April 11, 2016.

25. CAG Audit Reports, “Operation and Maintenance of MI Series Helicopters of the IAF”, http://www.cag.gov.in/sites/default/files/audit_report_files/Union_Performance_Defence_Union_Government_Air_Force_and_Navy_7_2010.pdf. Accessed on April 11, 2016.

compared to the numbers required for achieving the current operational projections. For attack helicopters, the holdings were projected to be 46 percent below the actual requirement. It further added that the existing fleet is ageing and nearly 78 percent of the helicopters have completed their prescribed life, and Total Technical Life (TTL) extension has been carried out on them to elongate their life. Serviceability levels were also projected to be consistently short of 75 percent.

The CAG further directed the Defence Ministry to address the IAF's current shortfall in the helicopter fleet by ensuring that there were no further slippages in the acquisition programmes, and expedite the ongoing procurement processes. This is significant, as the build-up of the helicopter fleet through the initial years had been keeping pace with the expected requirements, however, post acquisition of the Mi-17s in 1985, and despite the Kargil conflict, the expansion had slowed down and the IAF had countered it by increasing the Total Technical Life (TTL) of the Mi-17s from 15 years to 35 years and had also reduced the tasking. Limited availability of spares was also a reason for the reduced availability of helicopters. As per the report, significant numbers of helicopters were deployed for UN and VIP duties and this had an adverse impact on the availability of helicopters for their primary tasks. Thus, this observation effectively ended the participation for IAF helicopters in UN missions, in a way, depriving them of the rich operational experience in international missions, with interactions with other nations' armed forces. The limited availability of the helicopters may also be attributed to the increasingly complex Defence Procurement Procedure, a debate which continues till today.

Similar sentiments were echoed by the then Chief of the Air Staff (CAS) Air Chief Mshl FH Major, who, in an interview to a magazine in 2008, agreed that the acquisition process in the case of helicopters had suffered after the 1990s. However, he envisaged that the helicopter fleet would undergo a major transformation with the upgradations to the existing Mi-17s and Mi-35s. He also added that a global Request for Proposal (RFP) for 24 state-of-the-art

attack helicopters and 12 heavy lift helicopters, was being carried out.²⁶ The procurement process which had been initiated before 2008 for the attack helicopters, and for the heavy lift helicopters, remains incomplete till today. The increasing complexities involved in the procurement process, ostensibly to keep it transparent and fair, and much of it beyond the purview of the IAF, delayed the planned inductions, which had been remarked upon in the CAG report. Certain measures were, therefore, initiated in right earnest to address the issues highlighted during the audit.

The Mi-17 V5s (Vee Fives) were inducted on February 17, 2012,²⁷ for which the contract was signed in December 2008 (for a total of 80 in number)²⁸. This number has now increased to a total of 159. The Mi-17 V5s, with an operational ceiling of 6,000m and a standard range of 580 km, are equipped with the advanced KNEI-8 avionics suite which is manufactured by Radio-Electronic Technologies Concern (KRET)²⁹ of Russia and includes multi-function displays integrating them with the onboard Night Vision Forward Looking Infra Red (FLIR) system. The helicopter is also armed with the Shturm-V missiles, S-8 rockets, a 23 mm machine gun and up to eight sub-machine guns, with the cockpit and vital component suitably protected by armoured plates. Additional survivability is also ensured with provisioning of self-sealing fuel tanks, which are filled with polyurethane foam along with engine-exhaust Infrared (IR) suppressors, flares dispensers and jamming equipment.³⁰ Provision of the equipment indicates the IAF's persistence with a proven design and a continuation in the multi-role/multi-mission type of deployments envisaged for its helicopters with medium lift capability and an enhanced capability of undertaking similar operations by night. Over the years, a critical aspect significantly impacting IAF upgradation plans had been the unforeseen delay in achieving the long cherished dream of having its own expertise for manufacturing helicopters.

26. "IAF to Acquire 24 Attack and 12 Heavy Lift Helicopters-Gulshan Luthra", *India Strategic*, vol. 2, Issue 2, February 2008.

27. Rotor India, "IAF Formally Inducts Russian Chopper Mi-17 V5", QE March 31, 2012.

28. Rotor India, "Kazan Helicopters Delivers Mi-17 V 5 to IAF", QE December 31, 2011.

29. "KRET to Supply Avionics for Mi-17 V5", <http://kret.com/en/news/3205/>. Accessed on April 15, 2016.

30. Airforce-Technology, "Mi-17 V5 Military Transport Helicopter", <http://www.airforce-technology.com/projects/mi-17v-5-military-transport-helicopter/>. Accessed on April 15, 2016.

INDIGENOUS HELICOPTER MANUFACTURING PROGRAMME

A committee constituted by the Government of India in 1967, known as the Aeronautics Committee had decided that HAL should build up its own design competence in producing rotary wing aircraft. The aim was to design, develop and produce advanced state-of-the-art helicopters for the armed forces. A Helicopter Design Bureau was established in 1970 which was renamed as the Rotary Wing Research & Design Centre (RWRDC) in 1998, to carry out focussed research. In June 2005, this design centre became a part of the Helicopter Division which itself was established in 1974. It is also an AS 9100C and 14001:2004 certified organisation. The experience gained during the licensed manufacture of the Chetak and Cheetah stood in good stead for the design and development of the Cheetal and Lancer helicopters. The Lancer was a light attack helicopter developed from the basic structure of the Cheetah, with bullet-proof front panels and a gun-cum- rocket pod fitted on either side. The Cheetal is the reengineered version of the Cheetah which set the world record of the highest landing at 'Saser Kangri' in 2006.

The experience gained during the production of these helicopters formed the basis for the development of the Advanced Light Helicopter (ALH) which was christened 'Dhruv'. Built to the standards specified in the Federal Aviation Regulations (FAR 29), the basic design catered for its utilisation in multiple roles for both civilian and military purposes. Extensive use of composites which amount to nearly one-third of its total All Up Weight (AUW) along with the modern avionics and engine governing systems, demonstrated an indigenous design and system integration capability which is at par, if not better, with any other manufacturer in the world.

Once the basic system was developed, it was made available to the Services, even though this took a considerable amount of time; subsequent enhancements have materialised at a faster rate. Till date, three versions of the Dhruv helicopter have entered service with the IAF, with initial deliveries of four aircraft in 2003.³¹ The initial configuration of the Mk I (Mark one) was

31. Army-Technology, "Dhruv Advanced Light Helicopter (ALH), India", www.army-technology.com/projects/dhruv/. Accessed on April 11, 2016.

The helicopter display team, which is one of the two such professional display teams in the world, has performed in over 35 air shows in India and abroad. These professional displays played an important role in exhibiting the entire range of capabilities of the helicopter and also paved the way for their export to Ecuador, Nepal and Mauritius.

a conventional cockpit, with mechanical gauges and Turbomeca TM-333-2B2 engines. The Mk II was similar to the Mk I but was equipped with a glass cockpit developed by a joint venture between HAL and Israel Aerospace Industries (IAI). The Mk III which was inducted in February 2012³² is equipped with the "Shakti" engine having a power output of 1400 SHP (Shaft Horse Power). This engine which was co-developed by HAL and Turbomeca (Safran) of France is also likely to power the Light Utility Helicopter (LUH).³³ The development history and efforts indicate an active attempt on the part of HAL to fill the technology gaps by building up

strategic partnerships with global concerns, as evidenced in case of its tie-up with one of the world's leading manufacturer of aero-engines (Safran), with which it has had a relationship of over 60 years.³⁴ The co-development of the Shakti engine and its licensed production would continue to play a crucial role in the development of technologies and induction of systems which would provide the crucial edge to the armed forces and which would also make pure economic sense and preserve national economic resources.

The recent thrust on the "Make in India" campaign augurs well for the indigenous production and manufacturing of helicopters. This had got a fillip much before the current campaign when the Dhruv helicopter became a natural choice for a formation display team of helicopters being raised by the IAF. The team, christened the 'Sarang' (derived from the Sanskrit word

32. "IAF Inducts ALH MK-III Helicopters", *India Strategic*, www.indiastrategic.in/topstories1371_IAF_inducts_ALH.htm. Accessed on April 11, 2016.

33. Safran, "Ardiden 1H/1U", www.turbomeca.com/helicopter-engines/1000-2000-shp/ardiden/ardiden-1h/1u. Accessed on April 11, 2016.

34. Safran, "Press Release:Turbomeca and HAL Forge Support Partnership for Indian Customers, June 17,2015", <http://www.safran-helicopter-engines.com/engine-partnerships/partnerships/shakti/shakti>. Accessed on April 11, 2016

for peacock), was formed in 2003 and owes its genesis to the erstwhile 'Advanced Light Helicopter' Evaluation Flight (AEF) which had been formed at the Aircraft and Systems Testing Establishment (ASTE), Bangalore, on March 18, 2002. The helicopter display team, which is one of the two such professional display teams in the world, has performed in over 35 air shows in India and abroad.³⁵ These professional displays played an important role in exhibiting the entire range of capabilities of the helicopter and also paved the way for their export to Ecuador, Nepal and Mauritius.

The RWRDC which had designed the ALH (Dhruv), under production since FY 2001/2002³⁶, was thereafter tasked to weaponise it. The Weapon Systems Integrated (WSI) version of the Dhruv has been christened "Rudra". The army and air force helicopters have been modified with stub wings to carry up to eight anti-armour missiles, four air-to-air missiles or four rocket pods for 70mm and 68mm rockets. A contract had also been awarded by HAL to the Nexter systems in December 2006 to install a THL 20 20mm gun turret armed with the M621 low-recoil cannon on the Dhruv variants. The version for the Indian Army is to have the indigenously developed Nag anti-tank missile, with imaging infrared guidance.³⁷ These options were explored by HAL probably on the specific requests made by the army and IAF based on the types of roles envisaged by each of the two Services and the extensive experience already available while operating the Mi-25s/Mi-35s.

However, the helicopter still had a limited offensive capability at the unique altitudes at which the Indian Army and IAF were being tasked

Borrowing heavily from the ALH (Dhruv), the LCH differs in having a sleek and narrow fuselage, tail wheel type of tri-cycle crashworthy landing gear, crashworthy and self-sealing fuel tanks and armour protection.

35. Press Information Bureau(PIB) GoI, "IAF'S Sarang Helicopter Display Team To Set Hearts Flutter," February 17, 2015", <http://pib.nic.in/newsite/PrintRelease.aspx?relid=115524>. Accessed on April 11, 2016.

36. www.hal-india.com, "Dhruv", www.Hal-india.com/Common/Uploads/DMS/Civil%20Variant.pdf. Accessed on April 11, 2016.

37. n. 31.

to undertake operations. The lessons from the 1999 Kargil War and the continued “blow hot-blow cold” situation prevailing in the Siachen glacier necessitated the requirement of a helicopter which had substantial offensive capability to perform at those altitudes. The unique requirements also needed a unique approach and, thus, a Light Combat Helicopter (LCH) project was announced in 2006 by HAL with its Technology Demonstrator-1 (TD-1) version making its first flight on March 23, 2010, just seventeen months after the sanction of funds. Borrowing heavily from the ALH (Dhruv), the LCH differs in having a sleek and narrow fuselage, tail wheel type of tri-cycle crashworthy landing gear, crashworthy and self-sealing fuel tanks and armour protection. Aiming to have a day/night targeting capability with a helmet pointed sight and electro-optical pod consisting of a Charge Coupled Device (CCD) camera/Forward Looking Infra-Red (FLIR)/ Laser Range Finder (LRF)/Laser Designator (LD), its battle survivability would be ensured by the self-protection suite consisting of radar/laser missile warning systems and Counter-Measures Dispensing System (CMDS). HAL, with all its experience, was able to progressively integrate the systems and produced three more prototypes (TD-2, 3 & 4). These flew on June 28, 2011, November 12, 2014, and December 01, 2015, (TD-4) respectively. Having completed the performance trials which included trials for cold weather, hot weather and hot and high weather operations (most adverse conditions for helicopter operations) in 2015, the Light Combat Helicopter (LCH) achieved another milestone by satisfactorily firing rockets (70 mm) from its prototype, TD-3, in a weaponised configuration. The LCH is now undergoing certification trials and has also participated in the IAF’s ‘Iron Fist 2016’ exercise on March 18, 2016.³⁸

The development of the LCH has demonstrated the unique advantages in having indigenous capability which can be effectively tailored to suit specific roles as envisaged by the armed forces: a mandatory expertise to have, especially when compared with procurement of “off the shelf systems”,

38. HAL-India, “Media Release March 14,2016- Indigenous LCH Fires Rockets; Will Participate in ‘Iron Fist’ Exercise-2016”, http://www.hal-india.com/Indigenous%20LCH/ND_154. Accessed on April 16, 2016.

modifications on which are governed by contractual obligations and do not necessarily involve transfer of technology.

A similar much delayed project for procurement of the Light Utility Helicopter (LUH) by the three Services as a replacement for the ageing Chetak/Cheetah is likely to be governed by proposed indigenous manufacture of the Ka-226T, the deal for which was signed by HAL with the Russian firm Rostec in December 2015.³⁹ The co-axial technology available on the K-226T, along with the modular concept of the role equipment is likely to further enhance the technical expertise of the RWRDC, the future work of which would be governed by the orders received from end users (both civil and military). The futuristic plans in the pipeline by HAL also include the design and development of the Indian Multi-Role Helicopter (IMRH), which would be a medium lift helicopter, and also the development of the Rotary Wing Unmanned Aerial Vehicle (RUAV), which is being designed and developed jointly by HAL, Aeronautical Development Establishment (ADE) and Indian Institute of Technology (IIT) Kanpur.⁴⁰ The RUAV project displays an understanding of the direction in which the technologies are going to evolve in the near future.

PRESENT CAPABILITY AND FUTURE ROADMAP

Through the years, the IAF has been exploring additional roles for its rotary wing arm to fully exploit its overall combat potential. These efforts also received a fillip with the induction of the attack helicopters in 1985. Recognising the important role which may be played by helicopters in future operations, the IAF, on its part, had also initiated a Helicopter Combat Leader (HCL) course to be conducted in the Tactics and Combat Development and Training Establishment (TACDE) as early as June 1997⁴¹, in order to train helicopter pilots on the lines of the Fighter Combat Leader (FCL) and

39. www.capsindia.org, "Manufacturing of Ka-226T Helicopter By HAL: A Make in India Initiative," *CAPS In-Focus*, March 1, 2016.

40. www.hal-india.com, "Rotary Wing", www.hal-india.com/Rotary%20Wing/M_147. Accessed on April 11, 2016.

41. Bharat-Rakshak, "Comment dated July 26,2016 by Teshter Master Sr., McLean, Virginia, on article titled TACDE ", <http://www.bharat-rakshak.com/IAF/units/squadrons/13-tacde.html#Aircraft%20Types>. Accessed on August 1, 2016.

There is a distinct shift in the IAF's plan to move from the assault helicopter concept of Russian origin to a purely attack one of Western origin. The Mi-25/35 has the capability to insert or extricate troops from a heavily defended area whereas the AH64E with a two-crew complement is a dedicated attack helicopter.

Fighter Strike Leader (FSL) courses. This unique effort, probably the only one in the world, oriented the rotary wing arm of the IAF force and imparted the necessary continuity training to maintain their combat potential in addition to the other peace-time tasks such as Humanitarian Assistance and Disaster Relief (HADR) and logistics support operations.

Currently, the vintage Mi-8s and some Mi-17s are being phased out and new units have been raised with the latest Mi-17V5 helicopters. Through the orders placed in 2008 and 2012, around 151 Mi-17V5s have

been purchased. In September 2015, the Defence Acquisitions Council (DAC) also cleared the purchase of an additional 48 Mi-17V5s for the IAF.⁴² This would significantly address the concern mentioned in the CAG report that "a large proportion of the helicopter fleet will reach the end of their operational lives in the near future."

Simultaneously, the case for procurement and expansion of the helicopter fleet with the induction of 15 Chinook (CH-47F) and 22 Apache (AH 64E Block III) helicopters, with an option of placing follow-on orders for seven Chinook's and 11 Apaches, is near fructification. The AH-64E sale is likely to include 50 T77-GE-701D engines, 12 An/APG-78 fire control radars, 12 AN/APR-48A radar frequency interferometers, 812 AGM-114-L-3 hellfire longbow missiles, 542 AGM 114R-3 hellfire missiles, 245 stinger block I-92H missiles and 23 modernised target acquisition designation sight/Pilot Night Vision Sensors(PNVS), rockets, training and dummy missiles as well as 30 mm ammunition.⁴³ With this acquisition, there is a distinct shift in

42. Flight Global.com, "India Approves Third Batch of Mi-17 V5 Rotorcraft", www.flightglobal.com/news/articles/india-approves-third-batch-of-mi-17-v5-rotorcraft-416360/. Accessed on April 4, 2016.

43. Rotor India, "22 AH-64D Apache Longbow Block IIIs for IAF", QE December 31, 2011, vol. 11, issue 2.

the IAF's plan to move from the assault helicopter concept of Russian origin to a purely attack one of Western origin. The Mi-25/35 has the capability to insert or extricate troops from a heavily defended area whereas the AH64E with a two-crew complement is a dedicated attack helicopter with an all-weather, day/night capability. Procurement of limited numbers indicates that the Apache will be a replacement for the ageing Mi-25/35 and aims at maintaining the status-quo as far as the numbers are concerned. However, the expansion plans

of the army and IAF do indicate the requirement of combat helicopters in larger numbers, as indicated in the force restructuring plans of the army. Considering the geographical attributes of the potential battle zones of the future, especially along the north, the wait for the LCH would be worthwhile, in economic terms as well as in evolving a platform specifically tailored to the requirements. Here the impact of increased standoff ranges of Ground-Based Surface-to-Air Defence Weapon Systems (GBADWS) and availability of portable Man-Portable-Air Defence Systems (MANPADS) in the future land battle scenarios would have to be carefully considered.

On the other hand, the CH-47F "Chinook" is being purchased as a replacement for the ageing Mi-26. However, a major difference remains between the two regarding the load lifting capabilities in terms of both size and weight of the cargo, with the Mi-26 clearly being the more capable one. The Mi-26 lifts a staggering 20 tonnes and the Chinook 9.6 tonnes with corresponding reductions with increase in operating altitude and conditions. However, the CH-47F has been evaluated to be more technically sound in terms of its life-cycle costs as well in meeting the criteria which must have been stated in the Air Staff Qualitative Requirements (ASQRs) specified for the same. With the induction of the Chinook and the Ka-226T, the IAF would

HAL will continue to play a pivotal role as far as the future of Indian helicopters is concerned and needs to build upon the expertise it has gained through 11 joint venture companies, which are as diverse as the Rolls-Royce overseas holdings of the United Kingdom (UK) and Snecma of France, besides many Indian concerns.

be operating helicopters with all the three possible rotor combinations viz. the conventional tail rotor main rotor type, the tandem rotor type as in the Chinook, and the co-axial contra-rotating type as in case of the Ka-226T. Operating the three diverse types, differing purely in terms of rotor systems, comes with its own set of maintenance and logistic support concerns in terms of availability of spares and establishment of Maintenance, Repair and Overhaul (MRO) facilities. Training of the air and operating crews would also have to be tailored to cater to these unique challenges.

A careful consideration of all the aspects and exercising due economic jurisprudence in building own indigenous capability would be the governing factors to be considered for all future procurements, for which a clearly defined roadmap led by the armed forces and the DAC is a must. HAL will continue to play a pivotal role as far as the future of Indian helicopters is concerned and needs to build upon the expertise it has gained through 11 joint venture companies⁴⁴, which are as diverse as the Rolls-Royce overseas holdings of the United Kingdom (UK) and Snecma of France, besides many Indian concerns. Hence, the technology gaps are being filled by HAL through the joint venture and joint development route.

THE EVOLUTION CONTINUES

The saga of helicopters in the armed forces which began with the induction of the Sikorsky S.55 in the IAF inventory in March 1954, continues. Helicopters have proved themselves to be a worthy platform in virtually every facet of modern warfare as well as in their utilisation in peace-time roles, and have become an integral part of the IAF force structure.

The requirements of these versatile platforms projected by the Indian Coast Guard (ICG) and the law enforcement agencies are also a testimony to the usefulness of the platform in a myriad roles. However, with the cost of operations being inherently high, the “helinomics” or the economics of operating them would continue to play an important role in their procurement and evolution. This also is probably the single most important factor in the

44. HAL-India, “Joint Venture Companies”, http://www.hal-india.com/Joint%20Venture%20Companies/M_29. Accessed on August 6, 2016.

gap between the projected and envisaged expansion of civil as well as military helicopters in India. Added to these are the development costs involved in the future development of unmanned rotary wing systems which will also play an important role in the future battlefield scenario.

Their proven track record and expected involvement in tasks as varied as counter-air campaigns, Battlefield Air Interdiction (BAI) and Battlefield Air Support Missions (BAS), urban warfare, counter-surface operations, combat enabling air operations, combat enabling ground operations and sub-conventional warfare, besides nation building/HADR, aerial diplomacy and perception management show the indisputable necessity of helicopters being an integral part of the experienced IAF force structure.⁴⁵ Their full potential and effective contribution towards the overall air power can only be truly realised by developing a clear understanding of their characteristics and limitations. Despite their perceived vulnerabilities in battle situations, helicopters would remain an important part of the current and future armed forces force structures and battlefield applications.

45. IAP 2000-12, *Basic Doctrine of the IAF* (New Delhi: Indian Air Force, 2012), pp. 79-123.

NUCLEAR SECURITY SUMMITS: JOURNEY SO FAR AND WHAT NEXT?

SITAKANTA MISHRA

Global efforts like the Nuclear Security Summit (NSS), an “action-forcing event”¹ for building an effective and sustainable nuclear security regime, have significantly sensitised nations on safe-keeping of nuclear technology and materials, with many tangible steps. Still, there remain many unfinished challenging works; uncertainties about what path should be taken beyond the Summits to maintain the global momentum generated so far to defend against nuclear terrorism.

Before dwelling on such issues, one may contemplate the rationale behind the NSS initiative: what objective it achieved, and why the Summit process concluded. At the outset, the concern for nuclear safety and security is as old as nuclear technology itself. Safe-keep of nuclear materials, nuclear warheads, and nuclear knowhow was of utmost importance during the Cold War, mainly to avoid the chances of inadvertent use, espionage, surprise attack, etc. It was mainly an issue of security threats from a state adversary. But the emergence of the fear of nuclear terrorism *per se* can be traced back to the 1970s when Larry Collins and Dominique Lapierre wrote the thriller *The Fifth Horseman*, narrating Libya’s Muammar Gaddafi’s attempt to force the US to support the Palestinian cause by threatening to blow up New York city

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1. Gary Samore, quoted in William Tobey, “Peering Down from the Summit: The Path to Nuclear Security 2010–2016 and Beyond”, <http://globalsummitry.oxfordjournals.org/content/globalsummitry/early/2016/10/01/global.guw011.full.pdf>, p. 7.

With the unfolding of the AQ Khan proliferation network, and emergence of Al Qaeda and splintering *jihadi* groups of transnational spread, a nuclear terror event was perceived as a reality. For that matter, 9/11 proved the non-state actors' capability and resolve.

with nuclear weapons. As a result, the French president was known to have cancelled his plan to sell nuclear reactors to Libya, and Paramount Pictures dropped its idea to make a movie based on the novel for fear that fanatics "may try to emulate the scenario that would unfold in the film."²

With the disintegration of the USSR and sporadic incidents of terrorist/extremist organisations' involvement in nuclear materials smuggling, the thriller stories of a nuclear holocaust during the 1970s and 1980s seemed more likely during the 1990s. With the unfolding of the AQ Khan proliferation network, and emergence of Al Qaeda and splintering *jihadi* groups of transnational spread, a nuclear terror event was perceived as a reality. For that matter, 9/11 proved the non-state actors' capability and resolve. Unexpectedly, in January 2007, four former US Cold War strategists – George P. Shultz, William J. Perry, Henry A. Kissinger and Sam Nunn – who were the votaries of nuclear deterrence, came out with a unanimous argument in the *Wall Street Journal* saying:

...the world is now on the precipice of a new and dangerous nuclear era. Most alarmingly, the likelihood that non-state terrorists will get their hands on nuclear weaponry is increasing. In today's war waged on world order by terrorists, nuclear weapons are the ultimate means of mass devastation. And non-state terrorist groups with nuclear weapons are conceptually outside the bounds of a deterrent strategy and present difficult new security challenges.³

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2. "Lapierre's Prediction of a Terrorist Attack on New York", http://www.the-south-asian.com/dec2001/lapierre_2.htm
 3. George P. Shultz, William J. Perry, Henry A. Kissinger and Sam Nunn, "A World Free of Nuclear Weapons", <http://www.wsj.com/articles/SB116787515251566636>, January 4, 2007.

Vindicating a shift in the offing in the global nuclear discourse since the end of the Cold War, the four Cold Warriors asserted, “Nuclear weapons today present tremendous dangers, but also an historic opportunity. US leadership will be required to take the world to the next stage — to a solid consensus for reversing reliance on nuclear weapons globally as a vital contribution to preventing their proliferation into potentially dangerous hands...”⁴ As the complete nuclear disarmament “goal cannot be reached quickly – perhaps not in my lifetime”, as said by Obama in his 2009 Prague speech, a commitment for “a new international effort to secure all vulnerable nuclear material around the world” within the framework of an international effort, the Nuclear Security Summit,⁵ was most pragmatic.

At the end of the four summits, there are confronting arguments on the intended objectives of the NSS and the degree of achievements thereof. Many point out the inability of the summit process to address the security of military assets, and the issue of nuclear disarmament that the summit did not touch upon.

Though initially, Obama, at Prague (April 5, 2009), had set the target “to secure all vulnerable nuclear material around the world within four years” through two summits, two more summits were organised subsequently, the fourth and last being the Washington Summit in 2016. At the end of the four summits, there are confronting arguments on the intended objectives of the NSS and the degree of achievements thereof. Many point out the inability of the summit process to address the security of military assets, and the issue of nuclear disarmament that the summit did not touch upon.

It is generally perceived that the most vulnerable nuclear material is the Highly Enriched Uranium (HEU) weapon grade materials, stored or used in different countries in the civilian sector, which are prone to misuse or

4. Ibid.

5. “Remarks by President Barack Obama”, <https://www.whitehouse.gov/the-press-office/remarks-president-barack-obama-prague-delivered>, April 5, 2009. Also at the bilateral level, in April 2010, US President Obama and Russian President Medvedev signed the New START Treaty to reduce the number of strategic nuclear weapons and decrease the probability that such weapons or their constituent materials could be acquired by terrorists.

smuggling,⁶ whereas the military assets are relatively better guarded and secured in the respective countries. Therefore, the NSS process, from the very beginning, zeroed upon the task of securing the vulnerable materials. According to the Arms Control Association, “The broad goal of the summit process is to address the threat of nuclear terrorism by minimizing and securing weapons-usable nuclear materials, enhancing international cooperation to prevent the illicit acquisition of nuclear material by non-state actors such as terrorist groups and smugglers, and taking steps to strengthen the global nuclear security system.”⁷

THE FOUR SUMMITS

One may wonder what objectives the four Summits have achieved, and more importantly, why the summit process has been stopped here. First, probably in pursuit of his responsibility as the Noble Peace Prize recipient, Obama had to adopt a new approach to secure the world from the scourge of nuclear weapons, separate from the traditional approach of nuclear disarmament. Second, Obama could steer, at the maximum, four summits within his two tenures as US president. Post-Obama, nuclear security will certainly remain a priority for subsequent US Administrations, but it may not be in the Obama way.

The four summits that spanned Obama’s presidency undoubtedly elevated the issue of nuclear security to the level of a global leaders’ summit and laid down the foundation for a sustainable nuclear security regime, almost at par with the nuclear safety regime. More importantly, the summit initiative believes that “any unsecured nuclear material is a threat everywhere”; but, “there aren’t any mandatory international standards for securing all nuclear materials”.⁸ Therefore, in the first summit at Washington DC in 2010, all 47 participating countries welcomed and joined “President

6. Over 2,000 tonnes of plutonium and HEU existed in dozens of countries for a variety of peaceful as well as military uses. There have been 18 documented cases of theft or loss of highly enriched uranium or plutonium, and perhaps others, not yet discovered.

7. “Nuclear Security Summit at a Glance”, <http://www.armscontrol.org/factsheets/NuclearSecuritySummit>

8. “Five Points on the Importance of the Nuclear Security Summit”, <http://talkingpointsmemo.com/fivepoints/five-points-importance-nuclear-security-summit>

Obama's call to secure all vulnerable nuclear material in four years",⁹ and called for "focussed national efforts to improve security and accounting of nuclear materials and strengthen regulations...."¹⁰ It brought together the highest authorities of states and secured their commitment for a "Work Plan consistent with respective national laws and international obligations, in all aspects of the storage, use, transportation and disposal of nuclear materials and in preventing non-state actors from obtaining the information required to use such material for malicious purposes."¹¹

The 2010 NSS Work Plan basically aimed at universalising the multilateral instruments like the International Convention for Suppression of Acts of Nuclear Terrorism (ICSANT), Convention on Physical Protection of Nuclear Material (CPPNM) and the 2005 Amendment to the Convention, United Nations Security Council Resolution (UNSCR) 1540 (2004) on preventing non-state actors from obtaining Weapons of Mass Destruction (WMD), and UNSCR 1373. The Work Plan also reiterated the role of the International Atomic Energy Agency (IAEA) and its "Information Circular (INFCIRC) 225 which provides guidance and recommendations for developing and implementing physical protection of nuclear materials and facilities",¹² support of national efforts to enhance nuclear security worldwide through its Nuclear Security Plan for 2010-13, Nuclear Security Guidelines, International Physical Protection Advisory Services (IPPAS), etc.

While noting the fundamental responsibility of states for safe-keeping of all nuclear materials and facilities under their jurisdiction, the Summit recognised the inherent rights of states to develop and use nuclear energy for peaceful purposes. For this, the Summit exhorted all states to build a robust domestic regulatory capacity and set better standards for the nuclear industry, including the private sector, for nurturing a better 'nuclear security culture'. The Summit

9. Communiqué of the Washington Nuclear Security Summit, <http://www.state.gov/documents/organization/237037.pdf>, April 13, 2010.

10. "Key Facts about the Nuclear Security Summit", <http://www.state.gov/documents/organization/247156.pdf>

11. "Work Plan of the Washington Nuclear Security Summit", <https://www.whitehouse.gov/the-press-office/work-plan-washington-nuclear-security-summit>

12. "Nuclear Security Work Plan Reference Document", <https://www.whitehouse.gov/the-press-office/nuclear-security-work-plan-reference-document>, April 13, 2010.

envisaged greater cooperation among states to detect, prevent, suppress, investigate, and prosecute acts of illicit nuclear trafficking through exchange of information and advanced scientific techniques like nuclear forensics, etc.

The **Seoul Summit 2012**, attended by 58 delegates from 53 nations and four international organisations (EU, UN, IAEA, and Interpol), was an important evolution over the first summit, primarily because it expanded the scope of nuclear security to include “radiological source security and the interface between nuclear safety and security.”¹³ This is largely attributed to the Fukushima reactor accident which demonstrated that a nuclear disaster can occur in an extremely technologically advanced country. Moreover, there was broad understanding about the transnational implications of an unauthorised release of radiation and the inability of the international system to adequately address the implications. Lastly, the participating states offered new voluntary commitments known as ‘house gifts’ or ‘gift baskets’ on issues where consensus is not required.

The gift basket option was developed precisely because many countries wanted to move at their own pace on ambitious visions. “They were created as a means to encourage countries to do more than the political consensus process” on areas ranging from HEU minimisation, separated plutonium repatriation, domestic regulatory frameworks to building centres of excellence for multilateral cooperation, etc.¹⁴ More than 30 countries participated in fourteen gift basket diplomacy statements at the 2012 Nuclear Security Summit in Seoul. During subsequent summits, more gifts in different issues areas were advanced by many members.¹⁵

In addition, the 2012 Seoul Communiqué,¹⁶ based on the objectives set out in the 2010 Washington Communiqué and ‘Work Plan’,¹⁷ identified 11

13. Kenneth N. Luongo, “Nuclear Security Governance for 21st Century: An Action Plan for Progress”, <http://www.nseg.org/Nuclear%20Security%20Governance%20for%20the%2021st%20Century%20-%20Ken%20Luongo.pdf>, p. 2.
14. Kenneth N. Luongo, Michelle Cann, “Nuclear Security: Seoul, the Netherlands, and Beyond”, http://uskoreainstitute.org/wp-content/uploads/2013/10/USKI-NSS-Report_Full.pdf, p. 17.
15. “2014 Gift Baskets”, <http://www.nss2016.org/2014/giftbaskets/>; “2016 Gift Baskets”, <http://www.nss2016.org/2016-gift-baskets/>
16. “Seoul Communiqué: 2012 Seoul Nuclear Security Summit”, <http://www.state.gov/documents/organization/236996.pdf>
17. “Work Plan of the Washington Nuclear Security Summit”, <http://www.state.gov/documents/organization/237041.pdf>

areas of priority and presented specific actions in each area. These include building of a global nuclear security architecture, reaffirmation of the central role of the IAEA, encouraging states for safe, secure and timely removal and disposition of unused nuclear materials from facilities, safe-keep of radioactive sources used in various sectors, strengthening transportation security, combating illicit trafficking, nuclear forensics, building a nuclear security culture, information security, and international cooperation. The communiqué reaffirmed the states' "voluntary and substantive efforts toward strengthening nuclear security and implementing political commitments made in this regard",¹⁸ resulting in over 100 new commitments made at the 2012 Summit.¹⁹

In the **2014 NSS in The Hague**, substantial achievements were discernible from the pledge in the Joint Statements issued by 35 participating nations.²⁰ Participant countries pledged to work closer together and submit to "peer reviews periodically" their sensitive nuclear security systems; nations, including Israel, Kazakhstan, Morocco and Turkey, but not Russia, vowed to "realise or exceed" the standards set out in a series of guidelines laid down by the IAEA to safeguard nuclear materials; contribute to developing IAEA nuclear security guidance documents; and provide technical support and assistance to other states.²¹

Additionally, member states were to cooperate in areas relating to cyber security emergency response and mitigation capabilities, financial contributions to the Nuclear Security Fund, promotion of R&D on nuclear security technologies, promotion of a 'nuclear security culture', participation in developing the World Institute for Nuclear Security training activities, and cooperation with neighbouring states to improve international and regional nuclear security.²² "Besides, 23 participating nations stated their

18. n. 16, p. 6.

19. "The Seoul Nuclear Security Summit Preparatory Secretariat", <http://www.state.gov/documents/organization/237130.pdf>

20. "2014 Joint Statements", <http://www.nss2016.org/2014/jointstatements>

21. "Third Nuclear Summit Ends with 35-Nation Pledge on Nuclear Security", *The Express Tribune*, <http://tribune.com.pk/story/687349/third-nuclear-summit-ends-with-35-nation-pledge-on-nuclear-security/>, March 26, 2014.

22. PR Chari, "The Hague Nuclear Security Summit: Evaluating Major Achievements", http://www.ipcs.org/print_article-details.php?recNo=4393, Article No. #4357, March 28, 2014.

The 2016 Summit was also known as a “transition summit” to plan how to sustain the nuclear security momentum, NSS vision and agenda beyond the summit level. In 2016, the participants made nearly 90 additional national commitments, besides the additional actions in the 2016 gift baskets and joint statements.

intentions at the summit meeting to comply with international guidelines regarding the security of the most lethal Category I radiological sources contained in the IAEA’s Code of Conduct on the Safety and Security of Radioactive Sources.”²³ With Japan’s leadership, five countries—France, South Korea, the United Kingdom and the United States—signed onto another gift basket relating to transport security for nuclear and radiological materials by forming a working group.²⁴

The fourth and last **summit at Washington DC in 2016** reiterated “the threat of nuclear and radiological terrorism

that remains, and evolving, as one of the greatest challenges to international security.” Therefore, the participant countries pledged “to continue to make nuclear security an enduring priority”.²⁵ The 2016 Summit was also known as a “transition summit” to plan how to sustain the nuclear security momentum, NSS vision and agenda beyond the summit level. In 2016, the participants made nearly 90 additional national commitments, besides the additional actions in the 2016 gift baskets and joint statements.

For sustaining the momentum and political attention generated on nuclear security as a global priority, the 2016 Summit provided three means:²⁶ (1) the Nuclear Security Contact Group, created as a mechanism by which senior officials routinely consult and synchronise national actions. The group will

23. Ibid.

24. Douglas P. Guarino, “Nations Pledge to Follow Security Guidelines for ‘Dirty Bomb’ Material”, <http://www.nti.org/gsn/article/nations-pledge-follow-security-guidelines-dirty-bomb-material/>, March 26, 2014.

25. “Nuclear Security Summit 2016 Communiqué”, <https://www.whitehouse.gov/the-press-office/2016/04/01/nuclear-security-summit-2016-communicu%C3%A9>

26. Samantha Pitts-Kiefer, “2016 Nuclear Security Summit Progress Report: Building and Sustaining an Effective Global System”, <http://www.nti.org/analysis/articles/2016-nuclear-security-summit-progress-report/>, April 25, 2016.

meet annually, maintaining the network of senior officials and experts.²⁷ Thirty-nine participants, in addition to the UN and INTERPOL, have indicated their intent to participate in the group. (2) A number of Action Plans were prepared in support of the UN, IAEA, INTERPOL, GCINT, and the Global Partnership against the Spread of Weapons and Materials of Mass Destruction. In addition, a number of joint statements were made on crucial issues like countering nuclear smuggling, cyber security, forensics, maritime supply chain security, national nuclear detection architecture, security of high activity radioactive sources, certified training for nuclear security management, etc. (3) The CPPNM was identified as the institutional mechanism for continuing the dialogue in the long-term.

The nuclear security regime is often viewed as not well-defined or not matured, unlike the nuclear safety regime. The NSS process has undoubtedly addressed this by laying down the foundation for a stronger and more comprehensive nuclear security regime.

In addition, the 2016 Communiqué has also reaffirmed the commitment on the “shared goals of nuclear disarmament, nuclear non-proliferation and peaceful use of nuclear energy” while underlining the imperative of “more work remains to be done to prevent non-state actors from obtaining nuclear and other radioactive materials.”²⁸ All this essentially vindicates the commitment and resolve of the comity of nations, though limited, to carry forward the momentum generated regarding the safe-keep of nuclear material and technology.

THE TANGIBLE OUTCOMES

The summit process made “some serious progress” in many important areas.²⁹ The nuclear security regime is often viewed as not well-defined

27. “Fact Sheet: Joint Statement on Sustaining Action to Strengthen Global Nuclear Security Architecture”, April 6, 2016, <http://www.nss2016.org/document-center-docs/2016/4/4/fact-sheet-joint-statement-on-sustaining-action-to-strengthen-global-nuclear-security-architecture>

28. “Nuclear Security Summit 2016 Communiqué”, <https://static1.squarespace.com/static/568be36505f8e2af8023adf7/t/56fef01a2eeb810fd917abb9/1459548186895/Communiqu%C3%A9.pdf>, April 1, 2016.

29. Mathew Bunn, “The Nuclear Security Summit: Wins, Losses, and Draws”, <http://thebulletin.org/nuclear-security-summit-wins-losses-and-draws9310>, April 8, 2016.

or not matured, unlike the nuclear safety regime. The NSS process has undoubtedly addressed this by laying down the foundation for a stronger and more comprehensive nuclear security regime, almost at par with the nuclear security regime. In addition, each summit has seen an increasing number of participants and voluntary contributions by individual, and groups of, countries in the pursuit of enhancing nuclear security. A snapshot of the progress achieved by 2016 can be obtained from the NSS 2016 official website where it highlights that:

Over 40 Summit countries have engaged in capacity building....Over 30 countries have updated national laws, regulations, or structures relating to nuclear security. Over 20 countries have held or invited peer review missions.... China, India, and Jordan have pledged to strengthen nuclear security implementation through subscribing to the 2014 Joint Statement on Strengthening Nuclear Security Implementation (INFCIRC 869), bringing the total number to 38. Eighteen countries have taken steps to increase the security of radioactive sources. Seventeen countries have been involved in removal or disposal of nuclear materials, or minimization of HEU. Sixteen countries have ratified nuclear security treaties or taken particular steps to implement them. Fifteen countries have carried out physical security upgrades or acquired security or detection equipment. A dozen countries have joined or launched new international or regional structures to support nuclear security cooperation. Twelve countries have indicated their financial contributions.... And 10 countries noted steps taken to support or implement UNSC Resolution 1540.³⁰

The Fact Sheet of the NSS, dated April 6, 2016, elaborates on such progress and the success achieved since the beginning of the NSS process, which can be categorised under the following heads.³¹

30. "Highlights of National Progress Reports, March 31– April 1, 2016", <http://www.nss2016.org/news/2016/4/5/highlights-from-national-progress-reports-nuclear-security-summit>, April 5, 2016.

31. "Fact Sheet: The Nuclear Security Summits: Securing the World from Nuclear Terrorism", <http://www.nss2016.org/document-center-docs/2016/3/31/fact-sheet-the-nuclear-security-summits-securing-the-world-from-nuclear-terrorism>

- **Collective of Leaders:** The Nuclear Security Summit has managed to garner leaders' unity and attention across the globe. As an offshoot of the NSS process, more than 60 world leaders who joined hands at the four summits have been working together on the single agenda of preventing nuclear terrorism through the safe-keep of nuclear material. The collectivity among various governments, national leaders, civil society organisations, etc. shown during the last one decade for strengthening the nuclear security governance structure, is unprecedented. As nuclear security remains the exclusive domain of national governments, personal commitments by, and attention from, national leaders is most desirable. This newfound collectivity will help to arrive at universal commitments and, at the same time, single out and gang up against nations having a nexus with non-state actors or that are feared to have joined hands with them.
- **National Commitments and Actions:** Collectively, the participants of the NSS have made many national commitments of which many have already been implemented. During the course of the four summits, national commitments have increased in scope, and expanded from the commitments offered at the first summit in April 2010 to the multinational commitments offered in 2012, 2014, and 2016. The "house gifts" and "gift baskets," are responsible for the "most notable outcomes of the NSS process and have helped improve the security of nuclear and radiological materials and facilities globally".³²

National commitments are not legally—but politically—binding, as they are pronounced generally by the leaders and senior officials of the concerned countries'. In 2010, around 60 house gifts were offered, including pledges to ratify the nuclear security treaties, create new nuclear security centres of excellence and training initiatives, and contribute to the IAEA Nuclear Security Fund. By the 2012 Seoul Summit, more than 90 percent of the house gifts from 2010 had been fulfilled,

32. Michelle Cann, Kelsey Davenport, and Jenna Parker, "The Nuclear Security Summit: Accomplishments of the Process", <https://pgstest.files.wordpress.com/2016/03/nss-report-final.pdf>

and approximately 100 new national commitments were made. Around 100 national commitments and 13 joint statements were offered in Seoul alone, including commitments on nuclear material removal, reactor and isotope production conversion research projects, and capacity building exercises and training.³³ Forty-nine countries made Joint Statement commitments on various aspects during The Hague Summit 2014.³⁴

On the occasion of the 2016 Washington Nuclear Security Summit, the state parties reaffirmed their commitment to improving further the national detection architectures with the goal to combat illicit trafficking and prevent malicious acts. All the states committed themselves to efficient use of available nuclear detection resources. They further reaffirmed their commitment to the IAEA's recommendations, giving particular attention to the following principles: (i) an effective nuclear security detection architecture to be derived from a comprehensive, integrated detection strategy prepared by the state; (ii) the national nuclear security detection architecture to take into consideration that individual organisations' roles in the field of detection are unambiguously clear; (iii) the nuclear security culture is an effective tool that can strengthen the efficiency of the nuclear security detection systems; (iv) implementation should account for, and integrate, border and interior detection capabilities.³⁵

These commitments are not just verbal promises or assurances, rather, it is clear that a number tangible steps have been taken by the states in this regard to fulfill the commitments made in the following areas.

- **Elimination of Nuclear Materials:** A number of countries had reserved radioactive sources, including HEU, even though they had no big nuclear energy or weapon production plans, costing them high for their safe-keep and against the potential risk of diversion. Through the NSS, the national

33. "Nuclear Security: Seoul, the Netherlands, and Beyond", http://uskoreainstitute.org/wp-content/uploads/2013/10/USKI-NSS-Report_Full.pdf, p. 18.

34. "List of 2014 NSS Joint Statement Commitments (by country)", http://nuclearsecuritymatters.belfercenter.org/files/nuclearmatters/files/2014_nss_joint_statements_-_by_country.pdf

35. "Nuclear Security Summit 2016 Statement on National Nuclear Detection Architectures", <http://www.formin.fi/public/download.aspx?ID=156370&GUID=%7BDD8E6E6A-64EC-4A1C-8443-DF56F6C41061%7D>, p. 2.

commitments on nuclear material removal and protection efforts have generated important global security achievements, including reducing the number of countries that possess weapons-usable nuclear materials from 32 in 2010 to 24 by the end of 2015.³⁶ To give one example, Ukraine has completed its 2010 Summit pledge to eliminate all HEU from its territory by 2012.

The Seoul Communiqué encouraged states to minimise the use of HEU and announced a voluntary, specific action plan for how it would do this by the end of 2013. It also recommended the conversion of HEU-fuelled reactors to Low-Enriched Uranium (LEU) fuel and preferential use of LEU in commercial applications. Several countries pledged to repatriate the HEU in their territories to its country of origin. Belgium, France, the Netherlands, and the United States committed to support the conversion of the European medical isotope production to no-HEU-based processes by 2015. At the summit in 2014, the US announced that “it would remove HEU and plutonium from several civilian sites in Germany, Kazakhstan, Switzerland, and Japan before the next summit.”³⁷

- In addition, Belgium, France, South Korea and the US committed to cooperating on a project to produce high-density LEU fuel to facilitate the conversion of more research reactors from HEU to LEU fuel. Leaders of twelve nations — Chile, Czech Republic, Denmark, Georgia, Hungary, Mexico, Republic of Korea, Romania, Sweden, Turkey, Ukraine, and Vietnam – “agreed upon a joint statement marking the elimination of HEU from within their borders” on the eve of the Hague Summit.³⁸ They encouraged all countries to support HEU minimisation and elimination efforts from their territories. During these eight years, more than 1,500 kg of HEU and separated plutonium has been recovered or eliminated. Fourteen countries, and Taiwan have become HEU-free; the entire

36. Kelsey Davenport, Kingston Reif, “Nuclear Summit Seeks Sustainable Results”, *Arms Control Today*, March 2016.

37. “The March 2016 Nuclear Security Summit”, <https://www.fas.org/sgp/crs/nuke/IN10463.pdf>, March 14, 2016.

38. <https://www.whitehouse.gov/the-press-office/2014/03/24/joint-statement-countries-free-highly-enriched-uranium-heu>

Prior to the summit process, only 18 summit participants had ratified the 2005 Amendment to the Convention on the Protection of Nuclear Materials (CPPNM/A). Since the 2010 Summit, 26 participating countries acted on national commitments to ratify the CPPNM/A.

South America and wide swaths of Central Europe have eliminated or removed all their weapons-usable material, almost four tonnes worth.³⁹ Once Indonesia completes disposal of its HEU, Southeast Asia will become one more region free of all such material. In 2016, Japan removed over 500 kg of HEU and separated plutonium from its fast critical assembly. The conversion of the Kyoto University Critical Assembly to the use of LEU is underway.

- **Stronger Security Practice:** Arguably, a majority of summit participants now have a stronger domestic nuclear security practice or

have the resolve to strive for it. Around forty countries, including China and India, have pledged to implement stronger nuclear security practices by incorporating international guidelines into national laws, inviting international peer reviews and “committing to continuous review and improvement of their nuclear security system.”⁴⁰ As per the White House Fact Sheet (March 29, 2016), all summit countries have reported progress in enhancing nuclear security practices, including 37 countries committing to increase cooperation to counter nuclear smuggling, and 14 countries pledging to improve nuclear detection practices at ports. Around 30 countries have agreed to further cooperate on the security and managing the end of life of their most dangerous source as well as to explore alternative technology to ultimately replace high activity radioactive sources. As of December 2015, 131 states were participating in the IAEA’s Incident and Trafficking Database (ITDB) programme.⁴¹

39. Richard Weitz and Yaleglobal Online, “Life after the Nuclear Security Summits: Are We Safe?”, *Eurasia Review*, April 16, 2016.

40. “FACT SHEET: The Nuclear Security Summits: Securing the World from Nuclear Terrorism”, The White House, Office of the Press Secretary, <https://www.whitehouse.gov/the-press-office/2016/03/29/fact-sheet-nuclear-security-summits-securing-world-nuclear-terrorism>, March 29, 2016.

41. “IAEA Incident And Trafficking Database (ITDB): Incidents of Nuclear and Other Radioactive Material out of Regulatory Control 2016 Fact Sheet”, <http://www-ns.iaea.org/downloads/security/itdb-fact-sheet.pdf>

- Stronger Legal Basis:** The summit process has expedited the universalisation of legal instruments relating to nuclear safety-security governance. National commitments have spurred states to take action to ratify relevant nuclear security treaties. Prior to the summit process, only 18 summit participants had ratified the 2005 Amendment to the Convention on the Protection of Nuclear Materials (CPPNM/A). Since the 2010 Summit, 26 participating countries acted on national commitments to ratify the CPPNM/A. Pakistan, which did not ratify the amended CPPNM for long, has ratified it recently as part of its response to the NSS process. Undoubtedly, as a result of the NSS momentum, currently 152 countries are parties to the convention, and with Nicaragua's acceptance in April 2016, the threshold of one-third majority has been reached.⁴² The amended CPPNM entered into force on May 8, 2016. In that same time period, 17 summit participants completed ratification of the International Convention on the Suppression of Acts of Nuclear Terrorism (ICSANT).
- New Institutions / Centres of Excellence:** An innovative step initiated by the NSS process since 2010 is the establishment of national or collaborative Centres of Excellence (CoEs) as support centres, with the aim to improve nuclear security through training, education, technology research and development.⁴³ Besides, regional support centres have been conceptualised to integrate training and advice on nuclear safety-security and safeguards. In Asia, South Korea, Japan and China began discussing the potential for collaboration in 2012 and two years later, they formed the Asia Regional Network working group under the Nuclear Security

An innovative step initiated by the NSS process since 2010 is the establishment of national or collaborative Centres of Excellence (CoEs) as support centres, with the aim to improve nuclear security through training, education, technology research and development.

42. "Nuclear Security Agreement to Enter into Force", <http://www.world-nuclear-news.org/NP-Nuclear-security-agreement-to-enter-into-force-0804168.html>, April 8, 2016.

43. "Highlights of the National Commitments made at the Nuclear Security Summit", <http://www.whitehouse.gov/the-press-office/highlights-national-commitments-made-nss>

Support Centre Network (NSSC Network) established by the IAEA in 2012.⁴⁴

- Many other countries have offered to join hands, both bilaterally and regionally. China has announced cooperation with the US on a nuclear CoE; Japan has launched a regional support centre for nuclear security; Kazakhstan was considering the establishment of an international training centre for nuclear security. The US had worked with Brazil to establish a nuclear security CoE and had also pursued numerous engagement programmes across the globe to develop capacity. Around 15 other countries, including Italy, the UK, India, Pakistan, have established centres of excellence for training, education, and research. Certainly, a greater level of coordination and transparency in the operations of these centres is needed and the IAEA is trying to establish a global portfolio of CoEs, and their activities.
- **Stronger Security Architecture:** The enthusiastic participation of nations and their voluntary contributions give the impression that the NSS has strengthened the resolve, as well as the process, for creating a stronger nuclear security architecture around the world. Initiatives like the removal and elimination of nuclear material, ratification and implementation of treaties, conversion of reactors, establishment and coordination of CoEs, strengthened regulations, enhancement of technology and capability “are tangible, concrete evidence of improved nuclear security.”⁴⁵ Through substantial national commitments and work in that direction, the international community has perceptibly made it harder than ever for terrorists to acquire nuclear technology and material. Perhaps slow, but measurable, progress has been made on global nuclear security since 2012 and it is expected to enhance in the years ahead.

As rightly said by Dutch Prime Minister Mark Rutte, at The Hague on March 25, 2014, “The long-running debate on improving the security of

44. “Workshop Report: Collaboration Among Centers of Excellence in Asia”, https://www.wins.org/files/csis_sf_coe-workshop-summary__11-26-14.pdf

45. n. 40.

nuclear material has been like running a marathon....”⁴⁶ No number of security measures can be enough as the threats are dynamic in nature. While the terrorist threats are persisting, and nuclear and radioactive materials are being increasingly used in numerous sectors—and this trend is likely to increase in the years ahead—the fear of misuse and misappropriation will remain. The motivations and capabilities of the Islamic State of Iraq and Syria (ISIS) to conduct radiological terrorism are believed to have grown. Many radioactive materials in different parts of the world are still vulnerable. In addition, the international nuclear security architecture continues to be fragmented and predominantly based on non-binding measures. Given “the uneven and limited nature of summit commitments”, the regime being a “patchwork of many treaty commitments”, and the lack of universal participation, there is a lot of unfinished work required to be accomplished even after the four rounds of the summit process.⁴⁷

A PROGNOSIS

The summits have brought the nuclear security issue to the centrestage of the global agenda. The world will realise the benefits of this initiative in the decades ahead. However, some questions have been raised, though they are beyond the mandate of the NSS and can have no definite answers: “Did the summits get us further along the road of eliminating nuclear weapons?”⁴⁸ Did the summits increase the likelihood of more countries’ access to civil nuclear energy? Though most countries have shown enthusiasm in the summits, is nuclear security cooperation immune to power rivalry? Is there any mandatory international standard for the security of all nuclear materials? Undoubtedly, the summits are important, but are they adequate?

46. “Opening Address by Prime Minister Rutte at the Nuclear Security Summit Speech”, March 24, 2014, <https://www.government.nl/documents/speeches/2014/03/24/opening-address-by-rutte-at-the-nuclear-security-summit>

47. Miles A. Pomper, “The Nuclear Security Summit will Leave Unfinished Work”, *Bulletin of Atomic Scientists*, February 25, 2016.

48. Neil Joeck, “Obama’s Disappointing Nuclear Security Legacy”, *Foreign Policy*, <http://foreignpolicy.com/2016/04/12/obama-nuclear-security/>, April 12, 2016.

There can be no precise answers to many prevailing uncertainties either. Even after the NSS process, the nuclear security regime “still lags well behind the other nuclear regimes.”⁴⁹ Firstly, under the current system, every country seems to be trying to make its own rules for securing nuclear materials. None of them has to tell anyone else what those rules are, or be held accountable for following them. The existing conventions in force are limited in scope and effectiveness. The current regime relies almost totally on national protection and control systems. “Lack of universality, binding standards, transparency and accountability mechanisms, compulsory IAEA oversight, and broadened scope to include nuclear weapons and other non-civilian dimensions” are some of the problems the NSS process needs to address.⁵⁰ Also, there is an urgent need for “balancing the principles of national sovereignty with international responsibility.”⁵¹

Secondly, there are still huge gaps in the security architecture. “Despite the achievements of the Nuclear Security Summits, the threat of nuclear terrorism is not necessarily diminishing,”⁵² and the risk of nuclear terrorism cannot be eliminated completely. Reportedly, in 2014, there were 170 incidents when nuclear or radiological materials were lost, stolen, or out of government control and 70 percent of these incidents occurred in the US, Canada, and France.⁵³

Thirdly, many also doubt whether nuclear security will see sustainable progress without high-profile leadership and attention. The USA-Russia cooperation is constrained. Russia has raised substantive objections to continuing the summits, and feels that the US and its allies are unduly limiting Russia’s role. Therefore, Russia boycotted the last summit. Does it mark a North-South divide over the global nuclear security governance and management?

49. NSGEG, “Improving Nuclear Security Regime Cohesion”, The Stanley Foundation, <http://www.nsgg.org/Nuclear%20Security%20Regime%20Cohesion.pdf>

50. Ramesh Thakur, “The Global Governance Architecture of Nuclear Security”, The Stanley Foundation, March 2013, http://www.stanleyfoundation.org/publications/pab/Thakur_PAB_313.pdf

51. n. 49, p. 3.

52. Nilsu Goren, “The Middle East: Culprit for my Nuclear Security Insomnia”, <http://thebulletin.org/what-path-nuclear-security-beyond-2016-summit/middle-east-culprit-my-nuclear-security-insomnia>, May 22, 2016.

53. “Five Points on the Importance of the Nuclear Security Summit”, <http://talkingpointsmemo.com/fivepoints/five-points-importance-nuclear-security-summit>

Lastly, there are scholars who see the Summits as part of the “hype” on nuclear terrorism and there is no universally employed definition of “nuclear security”. Therefore, the Summits have always aroused plenty of speculation.⁵⁴ As the NSS process has now ended, which path nuclear security efforts would embark on post-2016, is anybody’s guess. No one is clear about how to establish a sustainable accountability framework for nuclear security. Post-2016, can nuclear security efforts register “continuous improvement or dangerous decline?”⁵⁵ Above all, no mechanism has been thought about yet to control or regulate military nuclear materials; and the NSS process has failed to establish regional approaches to nuclear security.

DASHING FORWARD

As pointed out earlier, despite all odds, nuclear security is not a race that anybody wants to lose. As the NSS process was an ad-hoc or temporary mechanism, not a permanent institution, there was much speculation about its logical extension. Also about what mechanism is available could ensure a sustainable nuclear security regime post-NSS. Everybody feels that there is a need for something beyond the Summit process to sustain this momentum. In that context, the last Summit has resulted in some “action plans intended to transfer segments of the summit agenda to the existing nuclear security mechanisms and institutions.”⁵⁶ The five action plans of the UN, IAEA, Interpol, GICNT, and Global Partnership aim to carry forward the Summit agenda.⁵⁷ Each of these action plans undertakes specific responsibilities. For example, the UN emphasises full implementation of UNSCR 1540 which obliges states not to support the non-state actors seeking access to weapons of mass destruction.

Secondly, the Summit has established a mechanism through a joint statement by 17 countries for sustainability in reporting and information

54. Minsu Crowder-Han, “Debunking Nuclear Security Hype on the Eve of the Nuclear Security Summit”, *Bulletin of the Atomic Scientists*, <http://thebulletin.org/debunking-nuclear-security-hype-eve-nuclear-security-summit9214>, March 10, 2016.

55. Matthew Bunn, “Nuclear Security: Continuous Improvement or Dangerous Decline?”, *Bulletin of the Atomic Scientists*, March 27, 2016.

56. Hubert Foy, “Nuclear Security: From Summits to Mechanisms”, *Bulletin of the Atomic Scientists*, May 5, 2016.

57. “Action Plans 2016”, <http://www.nss2016.org/2016-action-plans/>

sharing.⁵⁸ This will encourage states to share more information on their domestic systems. It will also help to increase transparency for building international confidence to establish and maintain effective national nuclear security regimes.

Thirdly, for implementation of the summit agenda, the Nuclear Security Contact Group, created through a joint statement in Washington, will be convened annually.⁵⁹ The group is entrusted to discuss a broad range of nuclear security-related issues, including identifying emerging trends that may require more focussed attention; promote and assess implementation of nuclear security commitments; develop and maintain linkages to non-governmental experts and nuclear industry; determine any additional steps that may be appropriate to support these goals; and, make recommendations on convening any future Nuclear Security Summits.⁶⁰

All these measures aim to carry forward the summit agenda and are considered to be the productive path ahead. But how vigorously it will be pursued during the post-Obama presidency remains to be seen. Many are of the opinion that more summits should be convened or regional approaches to nuclear security should be arranged as “risk environment can best be assessed at the regional level”.⁶¹ There can be no magic solution to nuclear security threats and challenges on the ground. The imperative is continuous and requires concerted efforts by national governments, the world community, and multilateral institutions, to make the nuclear security architecture sustainable at any cost.

58. “Joint Statement on Sustainability in Reporting and Information Sharing”, <http://www.nss2016.org/document-center-docs/2016/4/1/joint-statement-on-consolidated-reporting>, April 05, 2016.

59. “Joint Statement on Sustaining Action to Strengthen Global Nuclear Security”, <https://www.whitehouse.gov/the-press-office/2016/04/01/joint-statement-sustaining-action-strengthen-global-nuclear-security>

60. Ibid.

61. Nilsu Goren, “House Gifts, Gift Baskets, and the Gift of Nuclear Security After 2016”, *Bulletin of the Atomic Scientists*, <http://thebulletin.org/what-path-nuclear-security-beyond-2016-summit>, March 25, 2016.

CHANGING CONTOURS OF US-IRAN NUCLEAR RELATIONS

HINA PANDEY

The P-5+1 Iranian nuclear deal concluded on July 14, 2015, was hailed as a landmark deal, having the potential to overcome the mutual resentment between the US and Iran—long estranged, though once former allies of three decades. One and a half years later, much has changed in the dynamics of Iran’s nuclear programme. The nuclear deal has for now been able to contain Iran from developing weapons capability. However, the Iranian nuclear issue, as a bone of contention in the US-Iran nuclear dyad, has been not completely phased out.

In this context, this paper attempts to comprehend the US-Iran nuclear relationship in contemporary times. It is divided into three parts: (a) a broad overview of the history of US-Iran relations; (b) an analysis of the domestic push and pull in the US that evolved during the unfolding of the P5+1 nuclear deal; (c) an assessment of the nuclear deal and whether it has influenced the US-Iran nuclear dynamics positively to explore the possibilities of cooperation in other areas in the future.

It is noteworthy that it was only the nuclear dimension that defined the nature of US-Iran relations for almost 30 years, even in the absence of any official bilateral ties between the two countries. The Iranian nuclear issue from the outside had always influenced the US domestic politics and foreign/security policy. On the other hand, Iran’s nuclear narrative often fluctuated in response to the American brandishing of Iran as a nuclear threat.

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After the breaking up of US-Iranian ties, the American interests in Iran were represented by the Swiss government and Iranian interests in the United States were represented by the Iranian Interests Section of the Pakistan Embassy in the US.

Specifically, the issue of nuclear enrichment largely dominated US-Iran nuclear relations.

US-IRAN RELATIONS: A HISTORICAL OVERVIEW

Political Relations

The nature of US-Iran relations is complex. These two countries have supported each other's strategic goals, cooperated on sensitive dual use technologies, represented opposite camps during the Iran-Iraq War in 1988, their domestic constituencies have undergone a period of trial due to extreme political crises erupting out of their bilateral interactions, and refused to forge direct communication between each other. The Governments of Iran and the US did not maintain bilateral relations for three decades since the Iranian revolution (1979). After the breaking up of US-Iranian ties, the American interests in Iran were represented by the Swiss government and Iranian interests in the United States were represented by the Iranian Interests Section of the Pakistan Embassy in the US. In the recent years, since 2011, the US has maintained a virtual embassy of Iran on its official website.¹

Historically, American involvement in Iran's domestic socio-political sphere has been deep. The range of activities varied—from individual ventures, to educational, cultural and technological exchanges, and subsequently expanded towards economic and military assistance. Observers of US-Iran relations have commented, "...In the last half of the twentieth century, American-Iranian interactions have covered virtually the whole field of international affairs..."² Iran, especially the Shah, had been the pillar of the US' containment policy in the Middle East that played an integral part in sustaining the US preeminence during the Cold War era.

1. For details see the official website of the Virtual US Embassy of Iran at <http://iran.usembassy.gov/>.
2. Willim. R. Polk, *Understanding Iran* (Palgrave Macmillian, 2009), p.169.

The first point of interaction between the two countries dates back to the time when American democracy was still coming of age. In the year 1856, the Treaty of Commerce and Navigation was signed, marking the beginning of the first ever diplomatic interaction between the two countries. However, much before the conclusion of the treaty, American missionaries had already sent their representatives, as early as in the year 1829. The nature of activities was limited to running schools, hospitals, and, at times, publication of Iranian religious texts in the Farsi font. During this period of limited interaction through the people-to-people ties, the US had convinced Iran of its benign intentions. This principle element of Iranian acceptance defined US-Iran relations for almost a century. Viewed in this context, the American officials working for the Iranian government within the *Majles*, responsible for running the fiscal affairs of the government, doesn't come as a surprise. W. Morgan Shuster and A.C. Millspuagh were two American citizens who were hired by the Iranian *Majles* from the period from 1910-11 and 1922-27 respectively.³ Such was the nature of proximity in US-Iran relations.

Ambassadorial relations between the two were established much later, at the end of World War II. In fact, by then, the US had recognised Iran's significance for its own strategic gains.

Ambassadorial relations between the two were established much later, at the end of World War II. In fact, by then, the US had recognised Iran's significance for its own strategic gains. During the Roosevelt Presidency, Secretary of State Cordell Hull had broadened the scope of American foreign policy and urged the president to support Iran's independence and prosperity in the year 1943. By the year 1947, the US policy of containment was taking shape—a loan of \$25 million was already sanctioned by the US to Iran by June that very year. The loan enabled Iran to buy used American military equipment. In the subsequent two years, the arms shipments arrived, leading to closer ties between the US Ambassador to Iran George Allan and Muhamad Reza Shah by 1949-50.⁴

3. Ibid., pp. 170-171.

4. Ibid., pp. 173-174.

The relations continued to advance in warmth, characterised by state visits, the American 'Four-Point' programme, and oil trade. It is significant to mention here that Iran was the first country to receive economic aid under the Four-Point Programme in 1950. It is to be noted that the programme was "...was designed to help strengthen Iran's economy and to help underwrite her political integrity", in the words of the programme's first director.⁵ In 1953, a pro-US democratic prime minister was installed in a US supported coup, after the overthrow of the government of Mohammad Mossadegh. This was followed by an era of very close alliance and friendship between Shah Mohammad Reza Pahlavi's regime and the US government. It was during this time that Iran was invaded by the United Kingdom and the Soviet Union, both US allies, but the relations continued to be positive after the war, until the later years of Mossadegh, who was overthrown in a coup organised by the US Central Intelligence Agency (CIA) and aided by the British M-I6. Until the fall of the Shah in 1979, Iran was one of the United States' closest allies. This was followed by a long period of estrangement between the two countries.

Unfortunately, the 1979 revolution ousted the pro-American Shah and replaced him with the anti-American Supreme Leader Ayatollah Khomeini. This set the stage for mutually antagonistic attitudes between the US and Iran. In the following years, the American perception of Tehran and vice-versa remained negative for several reasons: (a) the radical Khomeini had ousted a regime that served the US' interest in the region, thereby upsetting the US' grand strategy; (b) Iran's seizure of the US Embassy for 444 days; (c) and, Hezbollah's terror attacks, including the bombing of the US Marines' barracks in Beirut that took a toll of many American lives in 1983. Likewise, for Iran too, the US represented an arch enemy, with a proclivity towards regime change to serve its own interests.

The ascendancy of President Carter to the White House from 1977-81 coincided with Iran's domestic political upheaval. The Shah's regime, as a representative of the American interest in the Persian Gulf, was unable to

5. Lisa Reynolds Wolfe, "Cold War Iran: The Point Four Agreement", *Cold War Studies*, June 15, 2011, Available at <http://www.coldwarstudies.com/2011/06/15/cold-war-iran-the-point-four-agreement/>. Accessed on August 15, 2016.

contain the opposition forces led by Ayatollah Khomeini. Ultimately, the government fell, leading to the establishment of an Islamic revolutionary government. It was during this phase of the US-Iran association that the hostage crisis too erupted as a reaction to the provision of the Shah's medical asylum by the United States. The captivity of 52 American nationals for 444 days by Iranian radicals had a severe political-economic fallout for Iran. Its financial deposits and assets abroad were frozen by the US and the bilateral arms relationship came to a halt.⁶ The hostage crisis ended with the signing of the Algiers Accord on January 19, 1981, but it led to lasting economic and diplomatic damage that greatly shaped the subsequent American perception of Iran. The political equation between the two countries worsened to such a point that for the next 30 years, the US was unable to establish any working relationship with the ayatollahs/ clerics/radicals who continued to dominate Iran's foreign policy to a large extent.

Subsequent Administrations of Presidents Reagan, Bush-I, Clinton and Bush-II too experienced a similar fate. Although, the hostage crisis had ended on the first day of the Reagan presidency, within months, newer issues entered the US-Iran bilateral dynamics. It was during this Administration that the two countries witnessed their first military confrontation. The 1980s generally marked the most volatile period in relations between the United States and Iran during the revolution's first three decades. Armed and aided by Iran, Hezbollah was responsible for the first suicide bombings against American targets in 1983 and 1984 on the US Embassy in Beirut and the US Marine peace-keepers' barracks. The US Marines suffered 241 casualties—the highest loss of US military personnel in a single incident since World War II.⁷ The relationship throughout this phase remained stagnant. Furthermore, the traumatic experience of the Iran-Iraq War (1980-88) that witnessed US support against Iran and the accidental shooting of an Iranian aircraft by the US, killing 290 Iranians on board, worsened the relations.

6. Gary Sick, "The Carter Administration", in *The Iran Primer* (Washington: USIP Press, 2010), pp.129-132.

7. Geoffrey Kemp, "The Reagan Administration", in *The Iran Primer* (Washington: USIP Press, 2010), pp. 133-136.

Scholars have argued that due to these historical experiences, the American outlook defined Iran in adversarial terms not only because of conflating interests but also in terms of the moral compulsions of dealing with evil.⁸ Thus, when it comes to framing the US policy towards Iran, some American policy-makers have looked at the issue as a moral struggle between 'good' and 'evil'. This has manifested as a deeply held belief about Iran that the country poses a great danger to American interests. The succeeding Clinton Administration inherited a troubled relationship, with animosity on both sides. It is noteworthy that, in the year 2001, when Clinton demitted office, there were no major breakthroughs in the bilateral relations. However, it is argued by Bruce Riedel that during the second term of the Clinton Administration, the US and Iran had moved away from armed conflict to an indirect dialogue. Despite that, issues such as Iran's role in terrorism, its ties to Hezbollah and its pursuit of nuclear technology have continued to dominate the tensions between the two countries.

THE NUCLEAR DIMENSION

US-Iran Nuclear Cooperation: From Atoms for Peace to P5+1 Nuclear Deal

President Bush began with a positive engagement as both nations worked together in Afghanistan; however, one year later, with the revelation of Tehran's nuclear activity in Natanz, the possibility of further cooperation was doomed. Additionally, after the 9/11 attacks, the Administration had placed a high priority on fighting terrorism and countering nuclear proliferation. In his State of the Union Address (2002), Bush identified Iran among other two countries as the "Axis of Evil".⁹ Since 2002, the US indirectly led its campaign against Iran's acquisition of nuclear weapons capability, through its support and, at times, attempts to influence the International Atomic Energy Agency (IAEA) and the European Union (EU) 3+3 negotiations. With regard to the nuclear dimension, two clear phases

8. Ibid.

9. Richard N. Haas, Bruce Riedel, and Stephan J. Headly, "The H.W. Bush Administration Clinton Administration and George W. Bush Administration", in *The Iran Primer* (Washington: USIP Press), pp. 136-145.

of 'engagement' and 'containment' are visible in US-Iran bilateral relations. Post 1979 and especially, since 2002 onwards, the American attitude towards Iran's nuclear programme acquired a stringent tone. But, during the periods of stable political relations, the US and Iran had enjoyed an era of engagement during which the US extended its full cooperation towards Iran's civilian nuclear programme, debarring plutonium reprocessing, until the fall of the Shah's regime.

Historically, the US-Iran nuclear cooperation began under President Eisenhower's "Atoms for Peace" policy in 1953, but was later stalled after the Iranian revolution of 1979. It is ironical that the United States spent decades in addressing the proliferation challenge emanating from Iran, the same country, that it had supported technologically for its civilian nuclear programme. After the estrangement of relations, Iran's nuclear threat had figured prominently in the US' non-proliferation policy. For almost three decades, the US policy-makers spent Congressional time and resources in preventing a 'perceived' nuclear threat emanating from Tehran. Iran's nuclear aspirations were an extraordinary preoccupation of the United States for nearly three decades. Its nuclear programme was viewed by many American political pundits as the biggest threat to US interests.¹⁰ Furthermore, the US Congress spent an immeasurable amount of time on debates pertaining to sanctioning Iran, based on the 'fear' of nuclear weapons that Iran might acquire in the future. It is, indeed, true through the benefit of hindsight that the 'perception of threat', rather than the 'actual threat' itself motivated the US nuclear policy towards Iran in all these years.

Since the 1950s, Iran has maintained a civilian nuclear programme, legally recognised under the Non-Proliferation Treaty (NPT). In fact, much before joining the NPT, the United States itself had facilitated the development of peaceful nuclear technology in Iran through its "Atoms for Peace" programme. In the decade of the 1950s and 1960s, the United States provided many countries, including Iran, with the option of nuclear energy development. US assistance not only resulted in the training of scientists in

10. Paul R. Pillar, "Iran and US Foreign Policy", *Political Science Quarterly*, vol. 128 no. 2, 2013, pp. 211-232.

During the period of the Shah's regime in Iran (1974 onwards), US-Iran nuclear civilian nuclear cooperation accelerated to a point that the US wanted to become one of the major sources of nuclear equipment and technology in Iran.

these countries in the peaceful applications of nuclear technology, it also sold nuclear power reactors and enriched uranium fuel to these countries.¹¹

In 1957, the US and Iran signed a bilateral civilian nuclear cooperation agreement under which the United States supplied "...*information on the design, construction and operation of research reactors...*" to Iran. The cooperation in the civilian nuclear field flourished with the construction of a 5MWt research reactor along with 5.5 kg of Highly Enriched Fuel (HEU) fuel for the same. The first US assisted nuclear reactor in Iran went critical in 1967, after which the US-Iran nuclear

cooperation deepened.

Within two years, the bilateral agreement was extended for another 10 years. One year later (1968), Iran also became one of the first countries to sign the NPT, which was ratified by the Iranian Parliament two years later (1970). During the period of the Shah's regime in Iran (1974 onwards), US-Iran nuclear civilian nuclear cooperation accelerated to a point that the US wanted to become one of the major sources of nuclear equipment and technology in Iran. One must recognise that it was the same period when Iran began its domestic institutionalising of the nuclear energy programme. This resulted in the establishment of the Atomic Energy Organisation of Iran (AEOI) . The year also coincided with Iran completing its safeguards agreement with the IAEA.¹² Subsequently, countries such as the United States, France and West Germany sought lucrative power reactor deals with Iran. In 1974, Iran signed a contract with the German firm Kraftwerk Union (a subsidiary of Siemens) to build two reactors at Bushehr. It also purchased

11. The United States reportedly had supplied HEU fuel to 8 nuclear power reactors during the Shah's regime.

12. Mathew Fuhrmann, *Atomic Assistance: How Atoms for Peace Programs Cause Nuclear Insecurity* (Cornell University Press, 2011), p.82, and Ali Vaez and Karim Sadjadpour, "Iran's Nuclear Odyssey: Costs and Risks", 2013, Carnegie Endowment for International Peace and Federation of American Scientists.

nearly 600 tonnes of uranium yellowcake from South Africa.¹³

By 1977, Iran's AEOI had undergone an expansion in its nuclear programme, including more than 3,800 staff experts, engineers, technicians, and interns. Iranian students were also sent abroad for training. The AEOI witnessed a twelve-fold increase in the number of its nuclear scientists, from 67 to 862, in a period of three years (1977). The two countries also created a joint sub-commission on nuclear energy in order to facilitate a broad range of bilateral nuclear relations. The intimacy

of the nuclear equation could be assessed from the fact that direct contact was established between the US Atomic Energy Commission (AEC) and AEOI. As a part of US-Iran nuclear cooperation, Iran also proposed participation in the American commercial enrichment facility, as, since the very beginning, the Shah's regime was focussed on mastering the complete fuel cycle, along with the possession of plutonium reprocessing capabilities. However, as mentioned earlier, during the early stage, the US-Iran civilian nuclear cooperation had soured due to Iran's insistence on possessing the full fuel cycle capability. In the United States, the concerns about a possible diversion of dual use technology by countries has persisted. It is noteworthy to point out that the US Administration was also battling with the dilemma created by India's Peaceful Nuclear Explosion (PNE) in the year 1974. The US nuclear export control laws too had acquired a stringent tone, that led the US government to banning companies from selling nuclear technology to Iran.¹⁴

As a part of US-Iran nuclear cooperation, Iran also proposed participation in the American commercial enrichment facility, as, since the very beginning, the Shah's regime was focussed on mastering the complete fuel cycle, along with the possession of plutonium reprocessing capabilities.

13. David Albright and Andrea Stricker, "Iran's Nuclear Program", in *The Iran Primer* (Washington: USIPP Press, 2010), Available at <http://iranprimer.usip.org/resource/irans-nuclear-program>, Accessed on June 24, 2015.

14. Vaez and Sadjadpour, n.12, pp.1-62.

In fact, the United States had always been cautious in allowing the recipient country to conduct indigenous enrichment and reprocessing. This caution was exercised in dealing with Iran as well, despite the fact that historically both countries had shared a strong nuclear partnership. Eventually, by 1978, the Shah agreed to forego plans to build a plutonium processing plant, and agreed to put Iran's nuclear activities under enhanced monitoring, and also to send the spent nuclear fuel back to the United States. This breakthrough allowed the American companies to resume the sale of nuclear reactors to Iran. However, the subsequent regime change post the Iranian revolution resulted in these agreements becoming a moot point.

Post the 1979 revolution, Iran suspended its nuclear programme due to opposition from the supreme leader. It was alleged that the country's nuclear programme was revived in the closing phases of the Iran-Iraq War (1980-88). It was suspected that Iran wanted to guard against a future surprise attack by Iraq. Additionally, the alleged reports of a possible Iraqi clandestine nuclear programme during the period of the Iran-Iraq War provided impetus to the Iranian leadership's nuclear ambitions. One may argue that since then, the Iranian nuclear programme has also been encouraged as symbiotic to national pride by the leadership. However, while Iran denied any such allegations, it continued to maintain steady progress in its quest to achieve full nuclear fuel cycle capability.¹⁵

Interestingly, in the 1990s, Iran was also reported to have acquired nuclear power contracts from China and Russia. In 1991, it secretly imported one metric tonne of uranium hexafluoride (UF₆) from China. Under the IAEA safeguards agreement, Iran was obligated to report this to the agency, but it did not. Additionally, in early 1995, Russia too resumed construction of one of Iran's reactors at Bushehr that had been damaged during the Iran-Iraq War. Between the years 1994-96, Iran had also been reported to have purchased network design drawings and components for 500 P-1 centrifuges from the A.Q. Khan network. , According to the IAEA, in 1995, Iran received

15. David Albright and Andrea Stricker, "Iran's Nuclear Program", in *The Iran Primer* (Washington: USIP Press, 2010). Available at <http://iranprimer.usip.org/resource/irans-nuclear-program>. Accessed on June 24, 2015.

drawings for an even more sophisticated P-2 centrifuge from the network but claimed that it did not start work on the P-2 until 2002.¹⁶

IRAN'S NUCLEAR CRISIS: 2002-13

Incompatibility with the IAEA

In the year 2002, an Iranian exile group known as the Mujahedin-e-Khalq (MEK) revealed to the IAEA, the construction of a large industrial uranium enrichment facility in Tehran (Natanz). The recent 18-month-long nuclear crisis over Iran's nuclear programme was the manifestation of this revelation of sensitive information. The existence of the enrichment activity at Natanz, including the construction and operation of a gas centrifuge, was not known to the IAEA. This is one of the main sources of proliferation concerns emanating from Iran. Similarly, another heavy water reactor at Arak had also led to concerns in the IAEA, as its spent fuel was said to have contained plutonium which is well suited for military nuclear use. However, Iran has maintained that the reactor has been used for the production of radioisotopes for medical purposes.

When questioned later by the former head of the IAEA (El Baradei), about the true nature of this revealed enrichment facility, the (former) Vice President of Iran Gholameraza Aghazadeh, also the (then) head of the AEOL, responded vaguely. His reply to Baradei was, "...Of course, we will invite you soon and then we will clarify everything..."¹⁷ This revelation and Iran's ambiguous response began a series of inspections among the IAEA, Iran, EU-3 (UK, France, and Germany) Russia and China since 2003. It must be noted that throughout the period of these talks, Iran had emphasised on its right to have an enrichment capability, and had claimed its nuclear programme to be of a peaceful nature.

Meanwhile, intermittent IAEA inspections (continuing from 2003 onwards) and the nuclear negotiations further disclosed several other dubious

16. Paul Kerr, CRS Report for Congress, "Iran's Nuclear Programme Status", RL34454, Available at <https://www.fas.org/sgp/crs/nuke/RL34454.pdf>. Accessed on November 11, 2015.

17. Mohamed El Baradei, "Iran, 2003-2005: The Riddle of Taqqia" in *The Age of Deception: Nuclear Diplomacy in Treacherous Times* (USA: Picador Publishers,), p.112

layers in Iran's nuclear programme which cast doubts on its peaceful nature. In the due course of time, six UN Security Council (UNSC) Resolutions had also been passed on Iran between 2003-10.¹⁸ These UNSC Resolutions have resulted in many rounds of sanctions upon Iran, which left a severe impact on the country's economy. Additionally, during this time, Iran had also made progress on the uranium enrichment from a minimal amount to a significant quantity by 2010. It also simultaneously refused to accede to the IAEA's Additional Protocol on safeguards. It must be recognised that the Additional Protocol clause requires intrusive inspections by the IAEA.¹⁹

Because Iran's peaceful nuclear programme was under IAEA safeguards, it was obligated to report all its peaceful nuclear developments to the IAEA. Consequently, the IAEA too, had the right to monitor, and verify Iran's nuclear programme. However, the Arak and Natanz nuclear facilities escaped IAEA verification because the IAEA was unaware about their operation. Since Iran has not signed and ratified the Additional Protocol to the IAEA safeguards, the IAEA had no authority to inspect these undeclared nuclear facilities.

In 2012, the American Congressional Research Service argued in its report that Iran was enriching uranium in three centrifuge facilities: a pilot centrifuge facility and a larger commercial facility—both located at Natanz—and a centrifuge facility located near the city of Qom. Iran was also reported to have operated a variety of facilities and workshops involved in the production of centrifuges and related components. According to the report, the commercial facility was said to eventually hold more than 47,000 centrifuges.²⁰

Ever since the covert Iranian facilities were revealed, Iran came under the radar of the international community for provoking proliferation concerns.

18. These UNSC Resolutions can be noted as UNSC Resolution- SCR-1696 adopted on July 31, 2006; SCR- 1737, adopted on December 23, 2006; SCR 1747, adopted on March 24, 2007; SCR 1835, adopted on September 27, 2008; SCR 1803-adopted on March-2, 2008; SCR1929 adopted on June 9, 2010; for details of the UNSC resolutions and sanctions see, "UN Security Council Resolutions on Iran ", Fact Sheet and Brief, Kelsey Davenport, non-proliferation analyst, *Arms Control Association*, 2012, 202-463, Available at <http://www.armscontrol.org/factsheets/Security-Council-Resolutions-on-Iran>. Accessed on June 22, 2015.

19. While the talks were underway between the EU+3 and Iran, Iran had voluntarily accepted the inspections under the Additional Protocol (AP) to facilitate talks in good faith; however, Iran has consistently maintained opposition to the AP's inspections as a precondition for nuclear talks.

20. Kerr, n.16.

Although many elements complicate the Iranian nuclear problem, the foremost has been Iran's inconsistency in cooperating with the IAEA. This elevated concerns about a possible military dimension of the Iranian nuclear programme. Furthermore, claims and counter-claims by the US and Israel intelligence added more layers to the complexity. For instance, in 2009, the US Director of National Intelligence, Dennis Blair indicated during a Senate Armed Services Committee hearing that Iran's missile developments do not necessarily indicate that the government is pursuing nuclear weapons. He further stated that Iran's missile development was a separate issue.

Throughout the crisis, there were no clear answers as to what extent Iran had taken forward its nuclear weapons programme, but several facts, when linked together, contributed to the suspicion of a Possible Military Dimension (PMD) in Iran's nuclear ambitions. The former director of the IAEA in 2008 had said in a statement, "...*They (Iran) continue to insist that they are interested solely in using nuclear power for civilian purposes. We have yet to find a smoking gun that would prove them wrong...*".²¹ Furthermore, earlier Iran had also taken actions that interfered with the IAEA's investigations, including concealing its nuclear activities and providing misleading statements. For instance, as of August 2012, Iran had produced an amount of Low Enriched Uranium (LEU) containing up to 5 percent uranium-235 which, if further enriched, could theoretically produce enough HEU for several nuclear weapons. Additionally, the intermittent IAEA inspections of the Iranian nuclear facility had verified that Iran might have conducted procurement activities and research directly applicable to nuclear weapons development. The United States intelligence reports too, many times claimed that Tehran had the technical capability to eventually produce nuclear weapons.²² What remained clear during the period of the nuclear crisis was that Iran wanted to keep the nuclear weapons option open for the future. In 2010, the US Director of National Intelligence, James Clapper, too, reiterated the claim that Iran "*is keeping open the option to develop*" nuclear weapons. However, the Iranian government maintained that its plans were to expand its reliance on nuclear

21. Ibid.

22. Ibid.

The IAEA board adopted its first resolution in 2003, which called on Tehran to increase its cooperation with the agency's investigation and to suspend its uranium enrichment activities.

power in order to generate electricity. The Iranian officials, however, had repeatedly asserted that the country's nuclear programme was meant exclusively for peaceful purposes, justifying it on the basis of religion. For example, Supreme Leader Ayatollah Ali Khamenei declared during a June 3, 2008 speech that Iran is opposed to nuclear weapons "based on religious and Islamic beliefs as well as based on logic and wisdom." He added, "Nuclear weapons have no benefit but high costs to manufacture and keep them. Nuclear weapons

do not bring power to a nation because they are not applicable. Nuclear weapons cannot be used." Similarly, Iranian Foreign Ministry spokesperson Hassan Qashqavi stated on November 10, 2008, that "pursuance of nuclear weapons has no place in the country's defense doctrine."²³

In 2002, the IAEA began to investigate Iran's nuclear activities at Natanz and Arak on the basis of claims made by MEK and US- Israel intelligence suspicions. IAEA inspectors visited the sites the following February (2003). The IAEA board adopted its first resolution in 2003, which called on Tehran to increase its cooperation with the agency's investigation and to suspend its uranium enrichment activities. The subsequent month, Iran concluded an agreement with France, Germany, and the United Kingdom, collectively known as the "E-3," to suspend its enrichment activities and signed and implemented an (voluntary) Additional Protocol to its IAEA safeguards agreement. As a result, the IAEA board decided to refrain from referring the matter to the UNSC. The IAEA's investigation, as well as information that Tehran provided after the October 2003 agreement, ultimately revealed that Iran had engaged in a variety of clandestine nuclear-related activities, some of which violated Iran's safeguards agreement.²⁴

In the year 2007, Iran and the IAEA agreed to clarify outstanding questions regarding Tehran's nuclear programme. The two had a series of discussions

23. Ibid.

24. Ibid.

regarding these issues. The agency provided Iran with documents or, in some cases, descriptions of documents which had been provided to the IAEA by several governments. The documents indicated that Iranian entities may have conducted studies related to nuclear weapons development. Additionally, Iranian officials themselves acknowledged the authenticity of the information, but argued that the activities described were exclusively for non-nuclear purposes. In 2008, Tehran did provide some relevant information about these matters to the IAEA, but more substantive information was needed. Strangely, during the course of the negotiations, which began at the beginning of 2002, the voluntary implementation of the Additional Protocol revealed many discrepancies in the Iranian nuclear programme. It must be recognised that the IAEA's ability to inspect and monitor nuclear facilities, as well as obtain relevant information previously had remained limited to facilities that have been declared by the government. The IAEA had expressed concern that Iran had not been providing the agency with all relevant information about its nuclear programmes, but had never found it in violation of its safeguards agreement

Since 2010, the United States had also played a more direct role in the Iranian crisis. Iran and the P5+1 met in December 2010 and January 2011, however, the initial two meetings, held in Geneva and Istanbul, respectively, produced no results.

The Nuclear Opposition in the US

It is often argued in US strategic circles that the possession/acquisition of nuclear weapons by Iran might trigger a corresponding response by other Middle Eastern states. The fear of a cascade of nuclear proliferation, leading to instability in the region, had been a primary driver in the US' Iran policy. Additionally, the Iranian nuclear threat narrative had also been

The fear of a cascade of nuclear proliferation, leading to instability in the region, had been a primary driver in the US' Iran policy. Additionally, the Iranian nuclear threat narrative had also been reinforced by the equation between the US and Israel.

reinforced by the equation between the US and Israel. The Israeli perception of Iran as posing an existential threat to it had acted as a significant factor in shaping the Iranian nuclear threat narrative. As Paul Pillar had argued, *"In the United States, the Iran issue has become in large part an Israel issue and a way for American politicians to demonstrate support for Israel"*. The portrayal of the nuclear threat perception could be well measured by the fact that scholars within the US academia have argued for nothing less than a military solution to Iran's nuclear dilemma. Mathew Kroenig in his work, *"Time to Attack Iran, 2012"* had argued for a US military strike on Iran's nuclear facilities in order to mitigate the threat. Kroenig had suggested military action as preferable to other available alternatives. Preventive war, according to him is the "least bad option". Justifying the military option on the available IAEA report that, in fact, is not the "smoking gun evidence"²⁵, Kroenig argued that Tehran could well produce a nuclear weapon in a six-month timeframe. The work further reinforces the US capability of a "clean, calibrated" and preventive response which could limit the prospects for escalation by providing Iran with certain redline warnings which would invite devastating consequences.²⁶ Steady nuclear negotiations between the EU3 + 3 and Iran (later joined by the US) have unfolded since 2013. These negotiations, in their first phase, were able to set a path for a comprehensive solution to the Iranian nuclear problem.

PRESIDENT OBAMA AND THE LANDMARK DEAL

Eighteen months of intermittent negotiations finally produced the first breakthrough in 2013 in the form of an agreement between the P-5+1 and Iran. The nuclear commentators hailed the Geneva Agreement as a step forward in the Iranian nuclear stalemate. It was for the first time since 2002, that a formal agreement for curtailing the Iranian nuclear capability was signed between Iran and the six world powers. The Geneva Accord, in principle, had set the framework for all the parties, such that

25. According to El Baradei, n.17.

26. Colin H. Kahl, "Not Time to Attack Iran: Why War Should Be a Last Resort", *Foreign Affairs*, vol. 91, issue, 2, 91.2, March-April 2012, pp.166-173.

a comprehensive solution could be delivered in a designated timeframe. The aim of the accord was to facilitate many guidelines for all the parties, on which the negotiations could be based in the coming months. A formal document titled the “Joint Action Plan-2013 (JPOA-1)” was released. The JPOA-1, being politically binding in nature, did put upon the negotiating parties commitment towards reaching a final agreement. It also established a joint commission of the negotiating parties, which was made responsible for monitoring the step by step implementation and IAEA verification of the measures.

The JPOA-1, among other guidelines, had provided a condition for Iran under which the UNSC, US and EU parties would not be able to impose additional nuclear related sanctions as long as the agreement remained in place. The final goal of these negotiations was also defined by the JPOA-1 as “a mutually acceptable comprehensive solution, such that Iran’s nuclear programme remains exclusively for peaceful purposes”. This was mentioned in its Preamble, that recognised a complete solution as one that constituted the agreement of all the parties. The underlying philosophy mentioned in the Preamble had the standard operating principle in place: “nothing is agreed until everything is agreed” implying that a final agreement would be concluded only when all the parties agreed to all the terms.²⁷

The Iran-P-5 negotiations passed the first phase of the interim agreement in June 2014. The IAEA head Gen Yukiya Amano confirmed in June 2014, that Iran was complying with the terms of the interim agreement. Subsequently, the final Phase I of the negotiations began but a comprehensive nuclear agreement could not be concluded. The talks, which initially were supposed to finish by November 24, 2014, had to be extended and Iran was tasked to take a few more additional steps before a final deal could be secured. Unfortunately, Iran missed the deadline of September 18, 2014, in providing

27. Text of the Joint Plan of Action agreed to in Geneva on November 24, 2013, between the P5+1 nations (China, France, Germany, Russia, the United Kingdom, and the United States) and Iran, *New York Times*, Available at http://www.nytimes.com/interactive/2013/11/25/world/middleeast/iran-nuclear-deal-document.html?_r=0, Accessed on February 3, 2015. *. note that the official framework of agreement is titled Joint Plan of Action (JPOA) concluded at Geneva, on November 24, 2013, and Joint Comprehensive Plan of Action (JCPOA) released at Lausanne, Switzerland on April 2, 2015. The author has used JPOA-1 & JCPOA-2 in order to offer more clarity.

the IAEA with information about its past activities with possible military dimensions, though it kept its compliance with the Geneva Accord.

Phase II: The Lausanne Agreement: April 2015

The fresh round of US-Iran negotiations began on January 14, 2014²⁸, when US Secretary of State Kerry met with Iranian Foreign Minister Mohammad Javed Zarif to advance the nuclear talks. Two months later, on April 2, 2015, a second framework of the agreement was achieved at Lausanne, Switzerland. The “Parameters for a Joint Comprehensive Plan of Action Regarding the Islamic Republic of Iran’s Nuclear Programme” (JCPOA-2), a blueprint of the agreed framework, was released by the White House the same day. The JCPOA-2 clearly set the foundation upon which the final agreement would be based.

However, the second breakthrough on the Iran–P-5 talks became a controversial issue. While it was commendable that in under one and a half years of the conclusion of the Joint Plan of Action (JPOA-1), the negotiating parties were able to achieve another breakthrough out of the Iran–P5+1 talks, the ‘Parameters’ as the title suggested were viewed by Iran as ‘only’ the parameters or agreed guidelines, upon which the final ‘comprehensive’ solution would be negotiated. The legality of the parameters was still non-binding in nature and provided huge scope for further deliberations.

Interestingly, three versions of the ‘Parameters’ of the JCOPA-2 were released by all the three key negotiating parties immediately after the JCPOA was released: (a) the US State Department Press Release; (b) the EU-Iran Joint Statement (both released on the same day); and (c) Summary of the Package of Joint Solutions for Reaching a Comprehensive Plan of Joint Action by the Islamic Republic of Iran

Subsequently, on July 14, 2015, the P5+1 and Iran reached a landmark nuclear accord responsible for ensuring that Iran’s nuclear programme would be only for peaceful purpose. This breakthrough in the Iranian nuclear crisis came after a decade of intermittent, and two years of steady, negotiations

28. “Zarif and Kerry to Meet for Talks on Iranian Nuclear Negotiations”, Radio Free Europe Radio Liberty, January 14, 2014, Available at <http://www.rferl.org/content/iran-united-state-kerry-zarif-nuclear-talks/26792694.html>. Accessed on January 15, 2014.

between the two sides. The entire process of negotiations underwent a tumultuous exchange of views among the six negotiating parties (later joined by the United States) — the EU-3 (UK, France, Germany) and China, Russia and the IAEA.

The landmark deal had made significant non-proliferation gains such as (a) reduction in the current enrichment capability; (b) transparent and vigorous monitoring by the IAEA; (c) an extended timeline for (suspected) nuclear breakout. It also limited the scope for Iran's enrichment and its R&D capabilities. This included a reduction of two-thirds of Iran's installed centrifuges. Through the nuclear deal, Iran had also agreed to not enrich uranium over 3.67 percent. Furthermore, it was also prohibited from building newer enrichment facilities for the next 15 years. It was argued by the proponents of the nuclear deal that this would further impact the breakout timeline of Iran's (suspected) acquisition of nuclear weapons in the future.²⁹

The deal also expanded the IAEA's monitoring of the Iranian nuclear programme provisionally. Demands for regular IAEA access to all of Iran's nuclear facilities, enrichment facilities, and access to supply chains, uranium mines and uranium mills were put forward. Iran also agreed to implement explicit inspections under the Additional Protocol of the IAEA. Furthermore, Iran wilfully agreed to redesign and rebuild a heavy water research reactor at Arak, based upon the design provided by the P-5+1. According to the agreed framework, the original core of the reactor would be destroyed under the specified P-5+1 design. Iran had also committed towards a 'no' reprocessing of spent fuel policy.³⁰

US-IRAN RELATIONS: BEGINNING OF A NEW ERA?

In the immediate aftermath of the deal between the P5+1 and Iran, a flawed sense of jubilation about the US-Iran rapprochement prevailed. It was observed by many experts that this would mean the beginning of a new era in US-Iran relations. In fact, US Defence Secretary Kerry himself had expressed that the brokering of the nuclear deal had opened up a

29. "Decoding the Iran Nuclear Deal", Belfer Centre, Harvard Kennedy School, April 2015.

30. Ibid.

It is true that landmark nuclear agreements do have the potential to completely reshape the dynamics of a bilateral relationship. However, the same cannot be expected out of the US-Iran bilateral ties for the time being.

new opportunity for communication for both countries.³¹ Optimism about the US-Iran reunion was hinted at by President Rouhani in his UN General Assembly (UNGA) speech, wherein he expressed that the deal might, "...lead to positive outcomes regarding the establishment of sustainable peace and stability in the region."³²

He suggested that the Joint Comprehensive Plan of Action (JCPOA), should not be limited to seeking a nuclear deal but also be employed

in recreating a fresh constructive international order. To the US, he hinted at constructive engagement by highlighting, "... (Iran) will not forget war and sanctions but we look to peace and development. Indeed, the entire process of nuclear negotiations had opened up the possibility for former allies to cooperate on significant regional security issues". As both countries had evolved from sharing a hostile perception of one another, this breakthrough was viewed by many scholars as a promising opportunity.

It is true that landmark nuclear agreements do have the potential to completely reshape the dynamics of a bilateral relationship. However, the same cannot be expected out of the US-Iran bilateral ties for the time being. The Islamic Republic of Iran has been considered as one of the most hostile nations towards US interests and vice versa. The two countries have witnessed periods of extreme engagement, estrangement and nuclear standoff with each other. However, in less than 90 days of the US-Iran rapprochement, the highest authority in the Islamic Republic had called for an outright ban on future bilateral negotiations. On October 7, 2015, the Supreme Leader of Iran, Ayatollah Ali Khamenei banned any further

31. "Kerry: Iran Helpful in Fight Against ISIS", in *Iran Primer* (Washington: UISP Press, 2010). Available at <http://iranprimer.usip.org/blog/2016/jun/30/kerry-iran-helpful-fight-against-isis>, Accessed on September 2, 2016.

32. "Full text of Rouhani's 2015 Address to the UN General Assembly" *Times of Israel*, September 29, 2015, Available at <http://www.timesofisrael.com/full-text-of-rouhanis-2015-address-to-the-un-general-assembly/>. Accessed on October 12, 2015.

negotiations between the two countries. While addressing the Iranian Revolutionary Guards, he stated that the “country (US) is aiming to infiltrate Iran through negotiations”.

Similarly, on a previous occasion too, the reaction on the Zarif-Obama handshake had invited a strong reaction from the hardliners in Iran. Eventually, the Iranian foreign minister had to apologise for hurting the national sensitivities. At the other end of the spectrum, opposition on further engagement with Iran emerged directly from the White House. The Obama Administration too declared American unwillingness to seeking economic ties with Iran. The US commercial sector also remained prohibited from conducting business with Iran.

More than a year has passed since the US and Iran engaged directly in negotiating the nuclear deal. However, not much has changed in US-Iran relations despite a newly opened channel of communication. According to the recent IAEA reports, the nuclear deal is being executed with sufficient cooperation from Iran. While there remains a generic positivity about the successful (ongoing) implementation of the nuclear deal, the recent trend in the US-Iran relations only reinforces the observation that US-Iran rapprochement in the true sense is yet to take place.

Recently, the United States lifted certain sanctions on Iran after the IAEA’s verification. However, within two months of the verification, the US also renewed its National Emergencies Act on March 15, 2016. According to the Act, Iran is still considered a “national emergency” by the United States. It was further stated by President Obama in a letter to speakers of both the Houses, that Iran “continues to pose an unusual and extraordinary threat to the national security, foreign policy, and economy of the United States”.³³

33. Notice - Continuation of the National Emergency with Respect to Iran, *White House Press*, March 09, 2016, Available at <https://www.whitehouse.gov/the-press-office/2016/03/09/notice-and-letter-continuation-national-emergency-respect-iran>. Accessed on September 8, 2016.

Additionally, the ambassadorial relations between the two countries are yet to blossom. The US still operates its consulate in Iran through the Swiss Embassy. Similar is the case with people-to-people ties. According to the recent travel warnings, American citizens are warned not to undertake unnecessary travel to Iran. On the economic front, the engagement is characterised by trade embargos. This implies that American citizens and banks are prohibited to deal with Iranian companies, including investing in Iran. Iran is still classified under the "Country of Particular Concern" (CPC), which calls for further restrictions on certain imports from, and exports to, the country.³⁴ According to the official statement by the US Department of Treasury, entering into financial agreements with Iranian banks is strictly prohibited. The embargo further extends to the import of technology and goods originating in the US from anywhere in the world. The US continues to deny access to these goods and services.³⁵

Amidst the American denial regime, the most troublesome are the sanctions on Iran's ballistic missile programme. It must be noted that various key Iranian defence entities such as the Ministry of Defence and Armed Forces Logistics (MODAFL), Defence Industries Organisation, Aerospace Industries Organisation and other key missile entities are still under sanctions, outside of the JCPOA agreement. Recently, fresh rounds of sanctions have been imposed on 11 individuals and entities for supporting the development of ballistic missile defence.³⁶ Iran's ballistic missile programme is considered to be a significant threat to regional security, and it is unlikely that the American debate surrounding it would diminish in the coming years. There is every reason to believe that if Iran conducts more missile tests in the future, more sanctions are likely to be imposed by the US.

It is important to point out here the areas wherein export/import exceptions have been granted: these remain imports of food items, carpets, agricultural

34. Executive Summary, Iran 2014 International Religious Freedom Report. Available at <http://www.state.gov/documents/organization/238666.pdf>, Accessed on September 16, 2016.

35. "Adam Szubin, US Treasury Official on Nuclear Deal," August 6, 2015. Accessed on September 1, 2016.

36. Non-Proliferation Designations, US Office of Foreign Assets Control, US Department of Treasury, January, 17, 2016. Available at <https://www.treasury.gov/resource-center/sanctions/OFAC-Enforcement/Pages/20160117.aspx>. Accessed on September 1, 2016.

and medical supplies, etc. on humanitarian grounds. An assessment of the nature of these sanctions makes it clear that the American attitude towards Iran will take a long time to change. Indeed, both countries have remained estranged for almost two decades and immediate bonhomie between the two is not likely in the foreseeable future. The assessment also highlights an important observation that, contrary to popular assumption, the nuclear deal is not likely to make as much difference in other issue areas as expected. Of course, the removal of sanctions and Iran's opening up to the world is likely to affect the regional dynamics, but with regard to security considerations, only limited objectives ought to be expected from the nuclear breakthrough.

CONCLUSION

As Iran's isolation has ended, it is ready to engage with the international community. Iran now has more than just the US to engage with—economically and strategically. An assessment of the trend of US-Iran relations offers some insight about the future trajectory of the bilateral relations. The nuclear deal has unveiled an Iran more confident about its place in the world. Iran is now ready to engage with more than just one international player. In the last one year, it has extended its interaction with other countries on issues of commercial, nuclear and strategic interests.

Many countries such as France are looking at partnering with Iran on infrastructure build-up; China too is ready to cooperate with Iran on the building of nuclear power plants; and Russia and Iran have resumed work on the Bushehr nuclear reactor. Additionally, Austria, has signed a Memorandum of Understanding (MoU) with Iran on joint research of oil and natural gas. Other countries that look forward to engaging with Iran are Mexico, Kazakhstan, and even India.³⁷

It is interesting to note that even in the non-nuclear realm, the US and Iran have hardly engaged in any bilateral cooperation. Thus, it can be deduced, by observing a trend in the US-Iran bilateral relations, that their hostile perceptions of each other are not likely to change immediately post the nuclear deal. In fact,

37. An assessment of the trend has been done through the archival study of news articles in the 'Nuclear Security Newsletters.

in the near future, the flashpoints in the US-Iran relations would become more visible, such as Iran's Ballistic Missile Defence (BMD) programme, etc. Decades of enmity between the two countries have resulted in a communication gap that cannot be bridged immediately. The nuclear deal has opened up a channel for communication, however, both countries are likely to be cautious on their approach towards walking the pathway to reconciliation. This should be viewed as a peculiar norm in US-Iran relations. Additionally, the nuclear deal may not be taken as a criterion for a transformation in bilateral ties. Successful implementation of the nuclear deal might impact the course of their bilateral ties. However, the deal is but one parameter. Nuclear deals have been used as strategic equalisers. It can be viewed as setting a pathway to a substantial remaking of ties. But the change in the White House does not yet allow arriving at concrete judgments about US-Iran relations.

ROLE OF THE MEDIA IN CULTIVATING PERCEPTIONS AND IMPACTING POWER EQUATIONS: CASE STUDY OF US PSYOPS

KRITI SINGH

To fight and conquer in all your battles is not supreme excellence; supreme excellence consists in breaking the enemy's resistance without fighting.

— Sun Tzu¹

INTRODUCTION

The history of war is as old as mankind itself. This begs the question: why is it so difficult for men to live in peace? The reason is attributed to 'selfish genes'. As evolutionary psychologists suggest, "It's natural for human groups to wage war because we're made up of selfish genes which demand to be replicated. So it's natural for us to try to get hold of resources which help us to survive, and to fight over them with other groups."² Primatologist Richard Wrangham opines, "There has been selection for a

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1. S. T. (2015). Sun Tzu Quotes. Retrieved January 7, 2016, from <http://www.brainyquote.com/quotes/quotes/s/suntzu133291.html>
2. Steve Taylor. "The Psychology of War: Why Do Human Beings Find It so Difficult to Live in Peace?" *Psychologytoday*, March 5, 2014. Accessed on January 7, 2016. <https://www.psychologytoday.com/blog/out-the-darkness/201403/the-psychology-war>.

Apart from strategy, tactics, weaponry and infantry, 'human psychology' plays a crucial and decisive role in the battleground. It is often said that the decisive win in the battle is more attributable to the 'morale' of the soldiers rather than only war resources, such as weaponry or strategy.

male psyche that, in certain circumstances, seeks opportunities to carry out low-cost attacks on unsuspecting neighbours."³ Therefore, wars become a part and parcel of human lives.

Therefore, apart from strategy, tactics, weaponry and infantry, 'human psychology' plays a crucial and decisive role in the battleground. It is often said that the decisive win in the battle is more attributable to the 'morale' of the soldiers rather than only war resources, such as weaponry or strategy. Clausewitz stresses the importance of 'morale' and 'will' for both the soldier and the

commander. The soldier's first requirement is moral and physical courage, for both the acceptance of responsibility and the suppression of fear.⁴

The idea was reinforced by Napoleon's statement that "in war, morale forces are to physical as three to one, relative material strength accounts for only one quarter."⁵ This notion was further reiterated in German Col Foerstch words, "The final word regarding victory and defeat rests not on arms and equipment, not on the way in which they are used, nor even on the principles of strategy and tactics, but on the morale of the troops."⁶ These statements highlight the importance of 'morale' and how significant it is in battles. In order to bring the enemy down, it is critical to bring his 'morale' down.

This paper examines the use of psychological warfare against the enemy during war-time to manage perceptions, to confuse him and, ultimately, to

3. "The Psychology of Killing and the Origins of War," 2011. Accessed on January 12, 2016. <http://smellslike.com/the-psychology-of-killing-and-the-origins-of-war/>.
4. C. (n.d.). "Importance of Military Morale," retrieved January 7, 2016, from <http://www.au.af.mil/au/awc/awcgate/clauswtz/clwt0013.htm>
5. N. (1999). "Napoleon on War", retrieved on January 17, 2016, from http://www.napoleonguide.com/maxim_war.htm
6. Arthur Upham Pope, "The Importance of Morale", *The Journal of Educational Sociology*, 15 (4). (American Sociological Association, Sage Publications, Inc., 1941), pp.195-205. doi:10.2307/2262466.

bring down his 'morale' to attain supreme excellence 'in breaking the enemy's resistance without fighting'. It examines how the United States of America (USA), a superpower, has adopted psychological warfare to manage perceptions and how the media has played a crucial role in this process. The paper touches upon the history of psychological warfare, analyses US psychological operations during wars, and highlights how the media was integrated into these operations.

The main sub-objectives of the paper are:

- To study the role of the media in cultivating perceptions and understand its theoretical references.
- To analyse the use of the media in psychological warfare.
- To evaluate events where the US used the media as an instrument of psychological warfare against the enemy and managed perceptions, along with power equations.

PSYCHOLOGICAL WARFARE

British military analyst and historian J. F. C. Fuller is believed to have been the first to employ the term "psychological warfare" in 1920.⁷ The *Encyclopedia Britannica* defines psychological warfare as "the use of propaganda against an enemy, supported by such military, economic, or political measures as may be required. Such propaganda is generally intended to demoralise the enemy, to break his will to fight or resist, and sometimes to render him favourably disposed to one's position."⁸ Maj Ed Rouse (Retd) defines

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7. "Psychological Warfare," International Encyclopedia of the Social Sciences, 1968, Encyclopedia.com. Accessed on January 21, 2016. <http://www.encyclopedia.com/doc/1G2-3045001007.html>

8. "Psychological Warfare" (2016), retrieved January 17, 2016, from the use of propaganda against an enemy, supported by such military, economic, or political measures as may be required.

Psychological Operations or PSYOPs as planned operations to convey select information and indicators to audiences to influence their emotions, motives, objective reasoning, and, ultimately, the behaviour of organisations, groups, and individuals. Used in all aspects of war, they comprise weapons whose effectiveness is limited only by the ingenuity of the commander using them. And in these planned operations, the media plays a crucial role.⁹

ROLE OF THE MEDIA IN CULTIVATING PERCEPTIONS

The never-ending quest of humans to know more has worked as a driving force for the media to grow and flourish. For better understanding different facets of the media, this section will, firstly elaborate on the roles of the media; secondly, understand the correlation between media and power; thirdly, evaluate the relationship between media and perceptions, and, fourthly, understand media as an agent of cultivating images from a theoretical frame of reference.

(i) Role of the Media in Society

The media plays an infinite role in our everyday life. It informs, entertains, motivates, acts as a gatekeeper or a watchdog which filters the information flowing in society, educates us, mobilises the masses, and does much more. While elaborating on the metaphors given to the media for various roles, Dennis McQuail in his book¹⁰ stated the following:

- *As a window on events and experience, which extends our vision, enabling us to see for ourselves what is going on, without interference from others.*
- *As a mirror of events in the society and the world, implying a faithful reflection (albeit with inversion and possible distortion of the image), although the angle and the direction of the mirror are decided by others, and we are less free to see what we want.*
- *As a filter, gatekeeper or portal, acting to select parts of experience for special attention and closing off other views and voices, whether deliberately or not.*
- *As a signpost, guide or interpreter, pointing the way and making sense of what is otherwise puzzling or fragmenting.*

9. Maj E Rouse, (n.d.), "Psychological Operations/Warfare", retrieved on January 9, 2016, from <http://www.psywarrior.com/psyhist.html>

10. Denis McQuail, *Mcquail's Mass Communication Theory*, 6th edition (London: Sage Publication, 2009), pp.84-85.

- *As a forum or platform for the presentation of information and ideas to an audience, often with the possibilities for response and feedback.*
- *As a disseminator who passes on and makes information not available to all.*
- *As an interlocutor or informed partner in conversation who responds to questions in a quasi-interactive way.*

Other relevant functions of the media include surveillance of sociopolitical developments, identifying relevant issues, providing a platform for debate across a diverse range of views, holding officials to account for the way they exercise power, providing incentives for citizens to learn, choose, and become involved in the political process, and resisting the efforts of forces outside the media to subvert their independence.¹¹ Bringing the entire gamut of roles of the media, Dennis McQuail described the following set of basic ideas about the purpose of the media:¹² information; correlation; continuity; entertainment; mobilisation.

(ii) Correlation Between the Media and Power

The various functions of the media elaborated above ascertain the view of American musician Jim Morrison "Whoever controls the media, controls the mind."¹³ The same fact was reiterated by the US minister and human rights activist, the late Malcolm X, "The media is the most powerful entity on earth. They have the power to make the innocent guilty and to make the guilty innocent, and that's power. Because they control the minds of the masses."¹⁴

The dramatic evolution in media technologies with the arrival of radio, television, video, new media, video games, multi-media games and the

11. Agner Fog, "The Supposed and the Real Role of Mass Media in Modern Democracy," Agner.org. Accessed on January 19, 2015. <http://www.agner.org/cultsel/mediacrisis.pdf>.

12. V Aggarwal, Vir Bala and V S Gupta, *Handbook Of Journalism And Mass Communication*, 1st ed., (New Delhi: Concept Publishing Company, 2001), pp. 23.

13. Jim Morrison Quotes at BrainyQuote.com "Jim Morrison Quotes At Brainyquote.Com", 2016, *Brainyquote*. Accessed on January 12, 2016. <http://www.brainyquote.com/quotes/quotes/j/jimmorriso167304.html>.

14. Malcolm X Quotes, "Malcolm X Quotes At Brainyquote.Com", 2016, *Brainyquote*. Accessed on January 12, 2016. <http://www.brainyquote.com/quotes/quote>

Internet has touched everyone's life. Mass media technologies play an important role in crafting our personalities, our thoughts, and our information database. With these overwhelming significant influences, the media has also brought with it the element of power, of 'influencing' people's opinion and perceptions.

An entire gamut of theories has been constructed by social scientists to understand the different effects of the media.¹⁵ There is an emerging, and healthy, public debate about the definitions and implications of media power. From Mexico, where young people took to the streets to protest the partisan coverage of the two main television networks in 2012¹⁶, to the United Kingdom, where the Leveson Inquiry¹⁷ had daily, during 2011-12, revealed the intimate details of the collusive relationships among top politicians, media executives, and police, the behaviour of media corporations and executives has increasingly come under scrutiny.¹⁸ In the Indian context, in the recent past, we witnessed an instance of the media's power to 'influence' the masses during the Indian anti-corruption movement led by Anna Hazare in 2012.

The power of the media is so ingrained in our lives that we often take it for granted or we don't even realise it. In particular, the issue of concentrated media power, the grip of large media businesses over public discourse (for example, the few powerful media conglomerates like 21st Century Fox, Walt Disney Company, Times Warner, owning media houses, and tailoring the content as per their requirement and then serving it to the masses), is starting to preoccupy not just politicians, civil servants, and activists, but ordinary

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15. It is an additional information These are my own notes, therefore, no publication detail added. "This quest to know the effects have been given the mass media discipline 'Agenda-Setting Theory, by Dr. Max McCombs and Dr. Donald Shaw, 'Cultivation Theory' by George Gerbner, 'Social Learning Theory' by Albert Bandura, psychologist and physicist, "Play Theory" by William Stephenson, 'Uses And Gratifications Theory' by Katz, Blumler, and Gurevitch, 'Media Systems Dependency Theory' by Sandra Ball-Rokeach and Melvin DeFleur, etc."
 16. See more: Catherine E. Shoichet, "Online and on the Streets, Mexico Youth Protests Grow as Election Looms," *CNN*, June 28, 2012. Accessed on May 12, 2016. <http://edition.cnn.com/2012/06/27/world/americas/mexico-student-protest-movement/>.
 17. See more: "About the Inquiry", <http://webarchive.nationalarchives.gov.uk/20140122145147/http://www.levesoninquiry.org.uk/about/>
 18. Des Freedman, "Paradigms of Media Power," *Communication, Culture & Critique* 8 (2015): 271-89. Accessed on January 22, 2016.

citizens concerned about the ability of communication conglomerates to stifle and distort wider democratic processes¹⁹, an altogether different debate.

This power is not restricted to the influence of the media on its audience, but also involves the role of the media within the broader framework of the social, cultural, political, or economic power structures of society.²⁰ Another trait, as noted by Edward S. Herman and Noam Chomsky is, "The dissemination of news may occasionally be so selective and biased that you may accuse the media of manipulation and propaganda, for example, in connection with war."²¹

Media power is generally symbolic and persuasive, in the sense that the media primarily has the potential to control to some extent the minds of readers or viewers, but not directly their actions. Except in cases of physical, coercive force, the control of action, which is usually the ultimate aim of the exercise of power, is generally indirect, whereas the control of intentions, plans, knowledge, beliefs, or opinions, that is, mental representations that monitor overt activities, is presupposed.²² Media moguls have the power to exploit their position in society by ensuring that news coverage within their media outlets is aligned with their own personal and financial interests. This allows for commercialisation where biased opinions masquerade as news which, in turn, has the capability to influence public attitudes²³

This invisible dependency of the masses on the media for the continuous flow of information is another example of how the media exercises power. Sources of information can be manipulated with vested interest and intent. And in this process, the media, especially news media, can play a crucial role and also exploit its power by manipulating the flow of information to get the desired result. A good example of this is the CNN effect.

19. Ibid.

20. Teun A. Van Dijk, "Power and the News Media," *Political Communication in Action*: 9-36. Accessed on January 23, 2016. [http://www.discourses.org/OldArticles/Power and the news media.pdf](http://www.discourses.org/OldArticles/Power%20and%20the%20news%20media.pdf).

21. Agner Fog, "Mass Media and Democracy Crisis : A Search for Causality Across Paradigms." www.criticalrealism.com/, 2016. Accessed on May 12, 2016. http://www.criticalrealism.com/archive/iacr_conference_2001/afog_mmdc.pdf.

22. Van Dijk, n.20.

23. Alana Mitchelson, "The Relationship Between News and Power," [Inkedhistoryofnow.wordpress.com](http://inkedhistoryofnow.wordpress.com), April 8, 2013. Accessed on January 22, 2016. <https://inkedhistoryofnow.wordpress.com/2013/04/08/the-relationship-between-news-and-power/>.

One of the major factors which continuously dominates the masses' perceptions is the mass media. And these perceptions, which later shape our opinions, are very astutely crafted by the media, which is controlled by the media owners, corporate influences, sociopolitical forces, cultural biases and other societal pressures.

The CNN effect is a theory that explicates the effect that 24-hour news networks such as CNN, have on the overall political and commercial environment. As media channels run continuous reporting of a specific happening or theme, the attention of the audience is continuously focussed for potentially elongated periods of time. Consequently, the CNN effect can instigate individuals and organisations to respond more forcefully towards the specific happening or theme being scrutinised.²⁴ We may speak of the CNN effect, firstly, as a policy agenda-setting agent; secondly, as an impediment to the achievement of desired

policy goals; and, thirdly, as an accelerant to policy decision-making. And in this process, one of the roles played by the media is that of an accelerator. One of the potential effects of global, real-time media is the shortening of response time for decision-making.²⁵

(iii) Relationship Between Media and Perception

Derived from the Latin word *perceptionem*, perception originated in the late 14th century, and means "the act or faculty of perceiving, or apprehending by means of the senses or of the mind; cognition; understanding."²⁶ Perception can be defined as our recognition and interpretation of sensory information. It also incorporates how humans react to communication or information. Perception is essential for humans to survive in a given environment, irrespective of whether it is true or false.

24. "CNN Effect," Investopedia. Accessed on January 21, 2016. <http://www.investopedia.com/terms/c/cnneffect.asp>.

25. Steven Livingston, "Clarifying the CNN Effect: An Examination of Media Effects According to Type of Military Intervention," *Press, Politics, Public Policy*, R, no. 18 1997. Accessed on January 21, 2016. http://shorensteincenter.org/wp-content/uploads/2012/03/r18_livingston.pdf.

26. "Perception", Dictionary.com, Dictionary.com Unabridged. Random House, Inc. Accessed on January 12, 2016, <http://www.dictionary.com/browse/perception>

One of the major factors which continuously dominates the masses' perceptions is the mass media. And these perceptions, which later shape our opinions, are very astutely crafted by the media, which is controlled by the media owners, corporate influences, sociopolitical forces, cultural biases and other societal pressures. This is further augmented with the construction of the messages, timings, repetitions and the selection of the content.

The media has a profound effect on the masses; it restructures, manipulates and influences the way the masses perceive the world. The instruments of the mass media like radio, television, newspapers, social media, printed / e-books, magazines, movies, etc., affect the minds of the masses, thus, affecting the opinions, perceptions and decision-making of the masses. At this point, the media acts as an agent of change behind the cultural or social or political movement happening in a society at any given context in time.

The way the media projects the images of a particular race, place, culture, identity, is the way the masses derive their perceptions and form opinions. The US media coverage of the Middle East needs a mention here. Very often, the US public has very little understanding of the Middle East; therefore, the continuous barrage of disasters, coups, uprisings, conflicts and terrorist activities, reported routinely by the US media, fosters a gross misimpression of the Middle Eastern peoples and cultures. The Middle Eastern countries—delineated here as the Arab countries plus Afghanistan, Cyprus, Iran, Israel, Pakistan, and Turkey—are often lumped together as if they comprised a single entity, devoid of any separate national identity, cultural heritage, religious ideology, political philosophy, or global sensitivity.²⁷ This example further reinforces the argument that the media manages our perceptions.

We spend our lives unconsciously building ways of seeing the world and understanding it. When we turn to the media for input, information, images and education, we receive content, which is also framed in a particular way.

27. Yahya R. Kamalipour, "Introduction," in *The U.S. Media and the Middle East: Image and Perception*, XX (London: Greenwood Publishing Group, 1997).

We spend our lives unconsciously building ways of seeing the world and understanding it. When we turn to the media for input, information, images and education, we receive content, which is also framed in a particular way.²⁸

This brings us to another crucial term, which is perception management. Perception management as defined by the US Department of Defence (DoD) as, "Actions to convey and/or deny selected information and indicators to foreign audiences to influence their emotions, motives, and objective reasoning as well as to intelligence systems and leaders at all levels, to influence official estimates, ultimately resulting in foreign behaviours and official actions favourable to the originator's objectives. In various ways, perception management combines truth projection, operations security, cover and deception, and psychological operations."²⁹ And in constructing perceptions, disseminating 'selective information' to influence the minds in order to achieve the desired objectives, the media as the fountainhead of all information distribution, plays an indispensable role. Thus, 'cultivating' images in the minds of the masses, which is the next subject of discussion, from the theoretical framework.

(vi) Understanding the Media as Agent of Cultivating Images

The cultivation theory investigates the continuing effects of the mass media in general, with special reference to television. It explains how 'television shapes concepts of social reality.' The cultivation theory (sometimes referred to as the cultivation hypothesis or cultivation analysis) was an approach developed by Professor George Gerbner, of the Annenberg School of Communications at the University of Pennsylvania. The cultivation theory, in its most basic form, suggests that television is responsible for shaping, or 'cultivating' viewers' conceptions of social reality. The combined effect of massive television exposure by viewers over time subtly shapes the

28. Besser Howard, "Nefarious Uses and Democratic Possibilities: Propaganda in the U.S. Mass Media," New York University. Accessed on January 22, 2016. http://besser.tsoa.nyu.edu/impact/f01/Focus/Mass-media/209/Final_Paper/paper.htm.

29. "Perception Management," Department of Defence Dictionary of Military and Associated Terms, November 8, 2010. Accessed on January 22, 2016. http://www.dtic.mil/doctrine/new_pubs/jp1_02.pdf.

perception of social reality for individuals and, ultimately, for our culture as a whole.³⁰

George Gerber constructed this theory in the late 1960s, in the backdrop of the electronic revolution occurring during that era, with the growth in television viewership. Through this theory, he tried to explain the relation between TV viewing and its impact on the viewer's life. The theory also tries to identify the transformation in attitude of viewers, with the change of content in the long term. It posits that a viewer's attitude can be manipulated, according to the content exhibited on television.

Gerbner argues that the mass media cultivates attitudes and values, which are already present in a culture: the media maintains and propagates these values amongst the members of a culture, thus, binding it together. He has argued that television tends to cultivate middle-of-the-road political perspectives. Gerbner called this effect 'mainstreaming'.³¹ As Gerbner writes in the forward note of the book titled *Television and its Views: Cultivation Theory and Research*, "Stories socialise us into roles of gender, age, class, vocation and life-style, and offer models of conformity or targets for rebellion. They weave the seamless web of the cultural environment that cultivates most of what we think, what we do, and how we conduct our affairs. The story-telling process was once more hand-crafted, home-made, community inspired. Now it is mostly mass-produced and profit driven. It is the end result of a complex manufacturing and marketing process."³²

Despite the fact that this theory is more than five decades old now, it still holds relevance till date, as its core hypothesis, on which it was developed, can be still proved with different mass media. One can still witness how, like the Gerber television impact, other media instruments like social media and films, can 'blur, blend, truth or reality.' Since Gerbner's death in 2005, research, using the cultivation theory, has steadily moved in the direction

30. "Cultivation Theory," University of Twente. January 22, 2016. Accessed January 22, 2016. [https://www.utwente.nl/cw/theorieenoverzicht/Theory Clusters/Mass Media/Cultivation_Theory/](https://www.utwente.nl/cw/theorieenoverzicht/Theory%20Clusters/Mass%20Media/Cultivation_Theory/). More information about this article is not available on the website. The name is "Twente" only.

31. Ibid.

32. George Gerbner, "Foreword Note," *Television and Its Viewers: Cultivation Theory and Research*, edited by For, lx (Cambridge: Cambridge University Press, 1999).

of attribution effects to large amounts of exposure to a specific form of media content. This content can be delivered by a variety of different media, including the new media. One way of looking at the new media is that to some extent it gives each one of us the power to shape the message system that cultivates our understanding of the social world.³³

As we move another step in understanding the cultivation theory, another concept which deserves mention, is the **mean world syndrome**. The mean world syndrome is a phenomenon where the violence-related content of the mass media convinces viewers that the world is more dangerous than it actually is, and prompts a desire for more protection than is warranted by any actual threat. The mean world syndrome is one of the main conclusions of the cultivation theory.³⁴

In the backdrop of these explanations about various dimensions of the media and scrutinising it from the lens of power, perception, impact and effect, the next section of the paper will take up case studies of the US' psychological warfare, with the objective of understanding the role of the media in meeting the objectives of the US' psychological warfare and how it affected the power equation of the US in the world order.

CASE STUDY: ROLE OF THE MEDIA IN THE US' PSYCHOLOGICAL WARFARE

In this section, the paper will, firstly, throw light on the brief history of Psychological Operations (PSYOPs). Secondly, it will discuss the key elements or components of PSYOPs. Thirdly, it will briefly touch upon mass media tools employed in PSYOPs. And, lastly, within the limited scope of the paper, it will discuss two PSYOPs conducted by the US during wars.

Brief History of Psychological Operations

Psychological operations are as old as mankind itself. Their application

33. J. Stanley, Baran and Dennis Davis, "Media and Culture Theories: Meaning-Making in the Social World," in *Mass Communication Theory: Foundations, Ferment, and Future*, 347. 6th ed (Boston: Cengage Learning, 2011).

34. Shamme, "Is the Mean World Really So Mean In Real ??" *Iiteeeestudents*, January 11, 2012. Accessed on January 22, 2016. <https://iiteeeestudents.wordpress.com/tag/mean-world-syndrome/>.

goes back to the dawn of recorded history. One of the earliest examples of psychological warfare, as it is known today, is recorded in the writings of Herodotus, a Greek historian, who described the war between the Greeks and Persians. The Christian Bible recounts the successful use of pitchers, lamps and noise by Gideon in the battle against the Midianites, about 1245 B.C., to create panic among his enemy by suggesting he had superior numerical strength when the opposite was true.³⁵

One of the earliest and simplest examples of PSYOPs trickery occurred over 3,000 years ago in the Trojan War. Over 2,000 years ago, the use of deception and psychological manipulation as a tool of combat was detailed in Chinese military strategist Sun Tzu's *The Art of War*: "All warfare is based on deception. Therefore, when capable of attacking, feign incapacity; when active in moving troops, feign inactivity."³⁶

Other exemplary examples of PSYOPs documented in the history of mankind, which deserve mention here are the Athenians' use of psychological warfare against the Melians in the Peloponnesian War, the Romans' disinformation and blackmail campaigns that ultimately forced the Carthaginians to surrender in the Punic War and the use of frightening rumours and exaggeration used by the Mongolian warrior and ruler Genghis Khan.³⁷ Another often recounted tale of psychological warfare from the ancient world revolved around Alexander the Great. He is said to have had an oversized suit of armour cast and left behind when his forces withdrew, so that when the enemy found it, they would believe him and his men to be giants, dissuading them from pursuit.³⁸

Manipulation of the adversary through psychological operations and special warfare continued throughout the Middle Ages, the Renaissance, and the Age of Absolutism. Ready-made recipes for conducting psychological warfare and special operations (PSYOPs) can be found in the

35. "Preface," in *Psychological Operations*, II. Vol. 5 (California: Department of the Army, 1962).

36. James Corbett, "Psyops 101: An Introduction to Psychological Operations," Creative Commons, October 23, 2012. Accessed on January 23, 2016. <https://www.corbettreport.com/psyops-101-an-introduction-to-psychological-operations/>.

37. János Radványi, "Introduction to Psychological Operations," in *Psychological Operations and Political Warfare in Long-term Strategic Planning*, 1-7 (New York: ABC-CLIO, 1990).

38. Corbett, n.36.

The main intent behind psychological operations is to influence the behaviour of the target audience. They are aimed against the enemy, their supporters and supporters in the making. As one of the key components of Information Operations (IOs), PSYOPs play a crucial role in influencing, disrupting, and corrupting the enemy's decisions.

writings of Niccolo Machiavelli and his contemporaries.³⁹ One can find extensive usage of psychological operations in most of the wars, from the Italo-Abyssinian War from 1895–96, Spanish Civil War from 1936–39, World Wars I and II, Korean War from 1950–53, Vietnam War from 1955–75, Cold War, Gulf War codename Operation Desert Shield from 1990–91, to the War on Terrorism from 2001- till date, etc.

In the present scenario, psychological operations are extensively employed across the entire spectrum of warfare or conflict, with or without any accompanying military action, from special operations, to high-intensity and Low-Intensity Conflict (LIC). This includes variations of LIC such as counter-terrorism, peace-keeping, Civil-Military Operations (CMO), Military Operations Other Than War (MOOTW), Information Warfare (IW), Unconventional Warfare (UW), etc. Planning for PSYOPs is the same, regardless of the type of warfare in which it is used. It is used in conjunction with all instruments of national power.⁴⁰ PSYOPs no longer find expression only in times of war. They are now used before, during, and after wars, becoming a permanent weapon or tool in foreign affairs. Their impact can be tremendous at any time.⁴¹

Key Elements and Scope of Psychological Warfare

- **Intent:** The main intent behind psychological operations is to influence the behaviour of the target audience. They are aimed against the enemy, their supporters and supporters in the making. As one of the key components of Information Operations (IOs), PSYOPs play a crucial role in influencing, disrupting, and corrupting the enemy's decisions. The central element

39. Radványi, n.37

40. "Psychological Operations," Newworldwar.org. 2011. Accessed on January 23, 2016. <http://www.newworldwar.org/psyop.htm>.

41. "Preface," *Psychological Operations*, ii. Vol. 5 (California: Department of the Army, 1962).

of PSYOPs is the psychological dimension of the human being. According to the Allied Joint Doctrine for Psychological Operations of the North Atlantic Treaty Organisation (NATO):

The psychological dimension of conflict is as important as the physical. Conflict is a struggle of wills, that takes place in people's minds as well as on the battlefield. The attitudes and behaviour of people (friend, foe and the undecided or uncommitted) may be central to determining the outcome of conflict and the nature of the post-conflict environment. Therefore, it is necessary to understand the motivation of various target audiences — leaders, military forces, populations — in order to shape their perceptions, affect their will and to persuade them to accept the outcome desired by NATO.

Propaganda is an organised dissemination of information, allegations, etc, to assist or damage the cause of a government, movement.

- **Emotional Dimension:** PSYOPs exploit the 'emotional' dimension of humans. By manipulating the flow of information, they cultivate images, agendas, thus, resulting in managing and manipulating perceptions and influencing the opinion of the target audience, thereby, manipulating and corrupting the decision-making of the target audience. British military analyst and historian J. F. C. Fuller had suggested that traditional means of warfare may in time be "replaced by a purely psychological warfare, wherein weapons are not even used or battlefields sought ...but [rather] ... the corruption of the human reason, the dimming of the human intellect, and the disintegration of the moral and spiritual life of one nation by the influence of the will of another is accomplished."⁴²
- **Propaganda:** This is one of the crucial components of psychological warfare. Although a tricky term to define, as the word comes with the baggage of negative connotation: in simple terms, propaganda is an organised dissemination of information, allegations, etc, to assist or

42. "Psychological Warfare," *International Encyclopedia of the Social Sciences*. 1968. *Encyclopedia.com*. Accessed January 21, 2016. <http://www.encyclopedia.com/doc/1G2-3045001007.html>

damage the cause of a government, movement, etc.⁴³ Jowett and O'Donnell define propaganda as, "Propaganda is the deliberate, systematic attempt to shape perceptions, manipulate cognitions, and direct behavior to achieve a response that furthers the desired intent of the propagandist." And as German politician and Reich Minister of Propaganda in Nazi Germany, Paul Joseph Goebbels noted, "Propaganda becomes ineffective the moment we are aware of it."

- **Understanding the Target Audience and Need of Experts:** Another important component of psychological warfare is understanding the target audience's mindset, culture, semiotics, behaviour, etc. Also, in order to construct an effective psychological operation, there is a dire need to engage qualified clinical psychologists who are expert in understanding the conscious and unconscious dimension of human behaviour and who can understand the cultural and psychological dimensions of the target audience. Modern developments in public opinion polling, audience sampling, panel interviewing, intelligence analysis, and the new techniques for assessing cultural traits of foreign groups enable the making of more accurate predictions of group and mass behaviour.⁴⁴
- **Scope:** It is difficult to precisely determine the scope of psychological warfare. One aspect can be seen from the lens of military operations, to disseminate information targeting a specific audience, to achieve the desired result. However, this scope is narrow as PSYOPs transcend the military margins and can be adopted by a nation-state in order to influence other nations, their populations and governments, through employment of political and diplomatic engagements, economic apparatuses and the military. Acts of terrorism and gruesome violent acts in order to instill fear in the minds of the target audience also fall in the scope of PSYOPs.

Mass Media Tools in Psychological Operations

PSYOPs, in the broadest sense, mean the use of propaganda and other

43. Propaganda, Dictionary.com. *Collins English Dictionary - Complete & Unabridged 10th Edition.* (HarperCollins Publishers), <http://dictionary.reference.com/browse/propaganda>. Accessed on January 24, 2016.

44. n.42.

political, economic, military and ideological actions to influence human actions and behaviour, favourable to the originating agency for a specific purpose, in both peace and war. With this broad concept, they include the simplest advertising and publicity techniques, including public relations.⁴⁵ If we investigate one of the key elements from the news media point of view, it is “to understand how news management or ‘spin’ shapes information, emphasising positive features and downplaying negative ones, casting institutions in a favorable light.”⁴⁶

In PSYOPs, the whole array of media tools is used, be it print, electronic, and now with the emergence of new media technology, especially social media: we can see the optimisation of the mass media to new heights. From leaflets, to scripted radio broadcasts, television messages and now the social media messages aimed to get the desired result, all are continuously being used for PSYOPs. Al Qaeda leader Osama bin Laden’s audio and video recordings, the exploitation of social media platforms by the Islamic State of Iraq and the Levant (ISIL), via websites, YouTube and blogs are taking PSYOPs to the next level.

PSYOPs Conducted By the US: Korean War and Operation Desert Storm

Psychological techniques to augment politics have been used by the US throughout its history. The Declaration of Independence was, and continues to be, a brilliant and effective propaganda instrument, justifying revolution.⁴⁷ To counter the negative attitude towards the term PSYOP as a ‘deceptive and nasty’ affair, in 2010, the US Department of Defence rechristened military psychological operations as “Military Information Support Operations (MISOs),” in order to give a positive connotation and a new name to the old business. Although in the history of the US, warfare has many examples of PSYOPs, due to the limited scope of this paper, only two events, the Korean War and the First Gulf War will be analysed.

45. n. 35.

46. Garth S. Jowett, and Victoria O’ Donnell, *What Is Propaganda, and How Does It Differ From Persuasion?* (Sage Publications). Accessed on January 24, 2016. http://www.sagepub.com/sites/default/files/upm-binaries/11847_Chapter1.pdf.

47. n. 35.

(a) Korean War (June 25, 1950 – July 27, 1953): The conflict between North and South Korea took an ugly turn on June 25, 1950, with the beginning of the Korean War when soldiers from the North Korean People’s Army breached the 38th Parallel and invaded South Korea. The world order of that era was bipolar and with the Cold War in the backdrop, the world was divided into two power blocs: one dominated by the former USSR and the other by the USA. North Korea was backed by the Soviets, and the Western countries backed South Korea. And in July, the USA joined the war in support of South Korea, thus, making this war the “first military action of the Cold War.”

The relevance of the Korean War for America can be gauged by the statement of then US President Harry Truman (1884-1972), stating, “If we let Korea down, the Soviet[s] will keep right on going and swallow up one [place] after another.” The fight on the Korean peninsula was a symbol of the global struggle between East and West, between good and evil.⁴⁸ During this phase, the US Army created, as a special staff section, the Office of the Chief of Psychological Warfare (OCPW) and a centre and school in North Carolina for the codification of the doctrine, and the training of military personnel, in what came to be called, in short, “psywar.” With the establishment of the OCPW and a psywar centre and school, interest in psychological warfare spread throughout the US armed forces.⁴⁹

The war took the US by surprise and was considered as one of the greatest intelligence lapses in US military history. As part of PSYOPs, both sides widely used propaganda during the Korean conflict. Aircraft and artillery delivered United Nations leaflets. B-29 bombers dropped strategic propaganda leaflets deep behind the enemy’s rear lines. Frontline tactical propaganda material was dropped by light bombers and spotter aircraft, or fired from 105mm howitzers. More than 20 million leaflets a week were prepared and disseminated by the United Nations forces at the height of the conflict.⁵⁰ This was followed by the use of loudspeakers and radio to fuel

48. “Korean War.” <http://www.history.com/topics/korean-war>. Accessed on January 25, 2016. <http://www.history.com/topics/korean-war>.

49. n.42.

50. Herbert A. Friedman, “The American Psyop Organization During the Korean War,” *Psywarrior*. Accessed on January 25, 2016. <http://www.psywarrior.com/KoreaPSYOPHist.html>.

the propaganda against North Korea to counter Chinese and Russian radio broadcasts. Artillery leaflet shells were also used to accurately disseminate the propaganda leaflets. Some 15 million propaganda leaflets were dumped on enemy frontline troops each week by the psywar units.⁵¹

(b) Operation Desert Storm (January 17, 1991 – February 28, 1991): Operation Desert Storm, also known as the first Gulf War, was the first major crisis for the US after the end of the Cold War. The war was in reaction to Baghdad's invasion of Kuwait and was countered by the US and allied forces. The magnitude of Iraq's invasion under the command of the Iraqi dictator Saddam Hussein took the US by surprise. The war witnessed a new level of military technology engagement in the frontline. It was the first telecast war and witnessed the extensive use of the media at a different level. Operation Desert Storm represented the first time the US sought to shape, control, and configure the region from the air, and 25 years later, as the air campaign against the ISIL has demonstrated, the US is still trying to determine the destiny of the Middle East from miles above its soil.⁵²

During the 1990s, theatre commanders increasingly incorporated psychological resources in their campaign planning. Air Force Instruction 10-702, published in 1994, stated "Commanders must include a designated PSYOP planner at the beginning of the campaign planning process to effectively accomplish this mission."⁵³ Post war, according to the final report to Congress by the Department of Defence, "Conduct of the Persian Gulf War (3:87)", the PSYOP effort was focussed on breaking the Iraqi will to resist, and on increasing the fears of the Iraqi soldiers. The unexpected degree of success enjoyed by the coalition can be directly attributed to the manner in which PSYOPs complemented the overall conduct of operations against

51. Ibid.

52. Ibrahim Al-Marashi, "The Enduring Legacy of Operation Desert Storm," *Al Jazeera*, January 17, 2016. Accessed on January 25, 2016. <http://www.aljazeera.com/indepth/opinion/2016/01/operation-desert-storm-25-years-iraq-saddam-hussein-kuwait-160117064302534.html>.

53. Daniel L. Haulman, "USAF PSYCHOLOGICAL OPERATIONS, 1990-2003," Air Force Historical Research Agency, May 23, 2003. Accessed on January 25, 2016. <http://www.afhra.af.mil/shared/media/document/AFD-070912-044.pdf>.

the enemy in the Kuwait theatre of operations.⁵⁴ The Gulf War brought a whole new meaning to the use of multimedia in PSYOPs. Over a seven-week period, 29 million leaflets were disseminated, reaching approximately 98 percent of the 300,000 troops.⁵⁵

As traditional “users of propaganda against the enemy,” PSYOP units generated initiatives during the Persian Gulf War which employed standard, dedicated communications assets (principally broadcasting and printing equipment) in support of combat operations. PSYOP materials were disseminated to their distinctive audiences through three basic methodologies. The first, and most effective, method was aerial leaflet dissemination. Scripted field level radio transmissions and a combination of both ground and air loudspeaker broadcasts provided the two additional techniques used throughout the conflict.⁵⁶ The responsibility for preparing the leaflets during the war was on the shoulders of the US Army’s 4th Psychological Operations Group at Fort Bragg, North Carolina, USA. Continuing with its time-tested and efficient tactics of ‘dropping of leaflets’ during the war, around 29 million leaflets were disseminated, reaching approximately 98 percent of the 300,000 troops.⁵⁷

CONCLUSION

The ‘psychology’ component plays a crucial and decisive role in battles. Psychological operations comprise one of the most glaring examples in this regard. The roots of PSYOPs can be traced back to the first traces of mankind. With the changing technologies, communication skills and evolution in psychology, PSYOPs have always played a crucial part in attaining the power seat and getting the dominating position in the dynamic world order, as the United States has proved. In this process, the ‘mass media’ acts like the backbone for ‘communicating’ to the ‘target audience’

54. “An Analysis of Gulf War Psyops and their Applicability to Future Operations,” Globalsecurity.org. 1993. Accessed on January 25, 2016. <http://www.globalsecurity.org/military/library/report/1993/WPA.htm>.

55. “The Gulf War.” *Psywarrior*. Accessed January 24, 2016. <http://www.psywarrior.com/gulfwar.html>.

56. n.54.

57. n.55.

to get the desired result. From inscriptions on rocks, to leaflets, posters, radio and TV broadcasts, videos, audiotapes to social media 'Tweets', the media's capability to make PSYOPs more challenging and effective cannot be denied. In the words of Brig Gen S.B. Griffith, II, USMC, "The mind of the enemy and the will of his leaders is a target of far more importance than the bodies of his troops." And "capture their minds and their hearts and souls will follow".⁵⁸

58 "Military Quotes (G): Mohandas K. Gandhi - Herman Göring", 2016, Military-Quotes.Com. Accessed on May 20, 2016. <http://www.military-quotes.com/database/g.htm>.

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